Ph. D. Entrance Test II

2016

Syllabus
## Syllabus for Pet – II Examination

### I N D E X

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<th>Sr. No</th>
<th>Subject Code</th>
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<tr>
<td>1</td>
<td>Faculty of Social Science</td>
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Syllabus for Pet – II Examination

Name of Subject: Sociology,
Facutly of Social Science, Subject Code: 1.01

Unit-I: Structuralism and Functionalism:
A. Structuralism of A.R. Radcliffe Brown and Levi-Strauss
B. Robert K. Merton: Middle range theory, Codification of functional analysis and reference group
D. Functionalism of Bronislaw Malinowski

Unit-II: Conflict Theory:
A. Karl Marx: Class and Class Conflict, Dialectical Materialism, Ideology and Social Change
B. Ralf Dahrendorf: Imperatively Coordinated Association and Class Conflict, Dahrendorf’s Criticism of Marx
C. Lewis Coser: Functional analysis of conflict
D. C. Wright Mills: Power Elite

Unit-III: Symbolic Interactionism, Phenomenology and Ethnomethodology:
A. G.H. Mead: Self, Mind and Society
B. Herbert Blumer: Basic Premises of Symbolic Interactionism
C. Ethnomethodology of Harold Garfinkel and Goffmann’s Presentation of Self in Everyday Life
D. Phenomenology of Alfred Schutz, Peter Berger and Lookman’s concept of Social Construction of Reality

Unit-IV: Critical Theory:
A. Max Horkheimer, Theodore Adorno and Herbert Marcuse
B. Jeorg Lukacs, Antonio Gramsci and Louis Althusser
C. Jurgen Habermas: Communication Theory and Colonization of Life World
D. Role and importance of Critical theory

Unit-V: Recent Trends in Sociological Theory:
A. Structuration: Anthony Giddens and Margaret Archer
B. Post-Structuralism: Jacques Derrida and Michel Focault
C. Post Modernism: Jean Baudrillard and Pierre Bourdieu
D. Gender Theory: Radical, liberal, Marxist and Black Feminism

Unit-VI: Perspectives on Indian Society:
A. Textual Perspective: Louis Dumont and Radha Kamal Mukherjee
B. Structural-Functional Perspective: S.C. Dube and M.N. Srinivas
C. Marxist Perspective: D.P. Mukherjee and A.R. Desai
D. Sabaltern perspective: B.R. Ambedkar and Davis Hardiman
**Unit–VII:** Theoretic al Orientation to Methodology:

A. Max Weber: Ideal type, value free and value neutral approach
B. Emile Durkheim: Social fact and positivism
C. Vilfredo Pareto: Logico-Experimental Method
D. Epistemology and social research

**Unit–VIII:** Quantitative and Qualitative Methods in Social Research:

A. Formulation of research questions, review and research gap and hypotheses
B. Techniques and Methods of Data Collection, precautions while developing techniques of data collection
C. Universe and sample
D. Data Analysis, interpretation and report writing

**Suggested Readings:**

5. Dahrendorf Ralph, 1959, Class and Class Conflict in Industrial Society.
33. Francis Abraham, Modern Sociological Theory, Delhi, OUP.
34. Skidmore William, Theoretical Thinking in Sociology, Cambridge University Press.
46. Singh, Y. 1973, Modernization of Indian Tradition, Delhi, Thomson Press.
47. Srinivas, M.N. 1960, India's Villages, Asia Publishing House, Bombay.
52. Sinha, Surajit. 1980, Tribes and Indian Civilization, in Man in India.
53. Bose, Nirmal Kumar, Problems of Indian Nationalism, Calcutta.

Refer all concerned Articles from Man in India, Eastern Anthropologist and Social Change.

59. Bose, Pradip Kumar, Research Methodology, ICSSR, New Delhi.
73. Whyte, W.F., Street Corner Society.
74. Daniel Bell, Doing Sociological Research.
75. Bhandarkar, P.L., Samajik Sanshodhan Padhati (Marathi).

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Syllabus for Pet – II Examination

Name of Subject: Philosophy,
Facutly of Arts, Subject Code: 1.02

Unit- I: Indian Philosophy

I. Charvaka – Metaphysics.
II. Buddhism – Pratityasumudpada.
III. Vaisheshika – Atomism.
IV. Sumkhya – Nature of Purusha & Prakriti.

Unit- II: Western Philosophy

I. Plato – Theory of Idea, Concept of Soul.
II. Aristotle – Causation.
III. Descartes – Dualism.
IV. David Hume – Scepticism.

Unit- III: Ethics

I. Purusharthas : Role and Status in Indian Ethics.
II. Nishkam Karmayoga.
III. Teleological and Deontological theories in Western Ethics.

Unit- IV: Epistemology

I. Cognition : It’s definition and nature division of cognition – valid and invalid cognition.
III. Nature and definition of Knowledge : belief & knowledge.
IV. Theories of truth – Correspondence Theory, Coherence Theory, Pragmatic Theory.

Unit- V: Analytic Tradition

II. G. E. Moore – Refutation of Idealism.
IV. Ludwig Wittgenstein – Picture Theory and Family Resemblance.
Unit- VI: Symbolic Logic


III. Truth Table

IV. Rules of inference.

Unit- VII: Phenomenology and Existentialism

I. Nature of Phenomenology.

II. Heidegger – Dasein

III. Nature of Existentialism

IV. Freedom: Decision and Choice

Unit- VIII: Modern Indian Thought


II. Shri Aarobindo: Integral yoga.


IV. S. Radhakrishnan: Intellect and Intuition.
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<tr>
<th>No.</th>
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<tr>
<td>1</td>
<td>M. Hiriyanna</td>
<td>Outlines of Indian Philosophy</td>
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<td>I. Copic</td>
<td>Symbolic Logic, 5th edition</td>
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<td>H. J. Blackhams</td>
<td>Six Existentialist Thinkers</td>
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<td>Swami Vivekananda</td>
<td>Practical Vedanta</td>
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26] डॉ. तुलेश माणपेक्षा, डॉ. सुनीता इंग्लेस, तलाशाचे वेळ,
27] डॉ. तुलेश माणपेक्षा, तलाशाचे लांबांश

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Syllabus for Pet – II Examination

Name of Subject : Psychology,  
Faculty of Social Science  
Subject Code: 1.03

1. Units:

There are eight units in paper. Minimum one question will be set from each unit. Question paper will consist of eight questions. Students will have to answer five questions.

2. Pattern of Question Paper

a. There will be eight units in paper.
b. Question paper will consist of eight questions.
c. Students can choose any five questions out of eight questions.
d. Maximum marks for each question will be 10.
e. Maximum marks in paper will be 50.
f. Paper will be of 2 hours duration.

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<th>Unit– I:</th>
<th>Approaches of Psychology :</th>
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<td>Basic assumptions of behaviourism – The Pioneers of behaviourism –</td>
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<td>Stimuli and Response – Classical Conditioning – Operant Conditioning –</td>
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<td>Operant Conditioning Phenomenon – Applications</td>
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<td>Perception and Cognition – Lesarning and Memory as Retention of Learning – A basic model of Memory – Encoding and storage in Memory – Cognition and Emotion</td>
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<td>Carli Rogers’ theory – Personality and the Self – Personality development and conditions for Growth – Abraham Maslow’s theory – Motivation and Hierarchy of Needs – Self-actualization and peak experiences – Maslow’s Concept of Healthy Growth.</td>
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| Unit– II: | Methods of studying social Behaviour – Issues in the study of social behaviour – perspective on Aggression – Defining Aggression – Methods of studying aggression – Theories of aggression =- Aggression and Media. Perspectives on Pro-social behaviour – Theories of altruism |

| Unit– III: | Explaining Motivation – Instinct Approaches – Drive Reduction Approaches – Arousal approaches – incentive Approaches – Cognitive Approaches – The need for Achievement. The need for affiliation, the need for power. |
| | Understanding Emotional Experience – The functions of Emotions – Determining the range of Emotions – Theories of Emotions. |
### Unit-IV:
Research in Psychology – nature, Objectives and types, Problem and Hypothesis – Concept, Sources, Criteria for Selecting a research problem, Meaning and Characteristic of a good Hypothesis, Types of Hypothesis.

### Unit-V

### Unit-VI:

### Unit-VII:
Research Tools and Research Designs
- Questionnaire, Interview, Observation, Case Study, Survey Method – Their advantages and Limitations
- Research Design – Concept and importance – Types – within group design – between group designs

### Unit-VIII:
Parametric & Non-parametric Methods (Underlying Assumptions and Utility) t-test, ANOVA, Sign Test and U Test – Correlation – Meaning and Types.
- Research Report writing. (APA style)
- Application of computer in research.

**Books recommended:**


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Syllabus for Pet – II Examination
Name of Subject: Economics,
Facutly of Science, Subject Code: 1.04

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<th>Unit- I:</th>
<th>Micro Economic Analysis</th>
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<td>Demand analysis- Marshallian, Hicksian and Revealed preference approaches</td>
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<td>Theory of Production and Costs</td>
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<td>Pricing and output under different forms of market structure</td>
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<td>Factor Pricing analysis</td>
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<td>Determination of output and employment-Classical approach, Keynesian approach, Consumption hypotheses</td>
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<td>Demand for Money-Fisher and Cambridge versions, Approaches of Keynesian Friedman, Patinkin, Baumol and tobin</td>
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<td>Supply of Money, Determinants of money supply, High-powered money, Money multiplier Phillips Curve analysis</td>
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<td>Business cycles- Models of Samuelson, Hicks and Kaldor.</td>
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<th>Unit- III:</th>
<th>Economics of Growth and development</th>
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<td>Development and Growth-Role of institutions Theories of growth and development Models of growth of Joan Robinson and Kaldor; Technical Progress-Hicks, Harrod and learning by doing, production function approach to the determinants of growth : Endogenous growth : role of education, research and knowledge-explanation of cross country differentials in economic development and growth. Theories of development-classical, Marx, Schumpeter and structural analysis of development-Imperfect market paradigm, Lewis model of development, Ranis-Fel model, Dependency theory of development Factors in economy development-natural resources, population capital Human Resource Development and infrastructure Trade and development-trade as engine of growth, two-gap analysis, Prebisch, Singer and Myrdal views; gains from trade and LDCs</td>
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<td>Unit– IV: Public Finance</td>
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<td>Theories of taxation, types, incidence and effects Theories of public expenditure-effects on savings, investment and growth Burden of public debt Union finance-Trends in Revenue and Expenditure of the State Governments Public Debt-India’s Public debt since 1951-growth composition, ownership pattern and debt management Union-state Financial Relations-Horizontal and vertical imbalance the Finance Commissions Fiscal Policy and fiscal Reforms in India</td>
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<td>Monetary approach and adjustment in the balance of payments Regional blocs-multilateralism and world trading system The Political Economy of imposition of non-tariff barriers International trade under conditions of imperfect competition in goods market Theory of International reserves Optimum Currency Areas. Theory and impact in the developed and developing countries WTO and its impact on the different sectors of the economy</td>
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<th>Unit– VII: Demography and Environmental Economics</th>
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<td>Population and Economic development-interrelation between population development and environment, sustainable development. Malthusian theory of population, optimum theory of population, theory of demographic transition, population as Limits to Growth and as Ultimate Source Concepts of Demography-Vital rates. life tables, composition and uses, Measurement of fertility Total fertility rate, gross and net reproduction rate-Age pyramids population projection-stable stationary and quasi-stationary population, characteristics of Indian population through recent census, causes of environmental and ecosystem degeneration-policies for controlling pollution-economic and persuasive their relative effectiveness in LDCs, Role of State in environmental preservation-Review of environmental legislation in India</td>
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<td>Measures of Central tendency, dispersion, skewness and kurtosis Elementary theory of probability-Binomial, Poisson and Normal distributions Simple correlation and regression analysis Statistical inferences-Applications, sampling distributions (t, x² and F tests), sampling of attributes, testing of Hypothesis Index numbers and time series analysis Sampling and census methods, types of sampling and errors. Introduction to Research – Meaning, Characteristics, Need, Objective and importance in social science research., Types of Research, Types of Research Design and Stages in Research Process.</td>
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</tbody>
</table>
Syllabus for PET – II Examination

Name of Subject :- Mass-Communication
Faculty of Social Sciences, Subject Code: 1.05

Mass Communication

Unit- I:

PRINCIPLES OF MASS COMMUNICATION

i. Nature and process of human communication, functions of communication, verbal and non-verbal communication, intra-personal, inter-personal, small group, public and mass communication.

ii. Models: SMR, SMCR, Shannon and Weaver, Lasswel, Osgood, Schramm, Gerbner, Newcomb, convergent and gate-keeping, communication and socialization.

iii. Nature and process of mass communication, media of mass communication, characteristics and typology of audiences. Media systems and theories: authoritarian, libertarian, socialistic, social-responsibility, development, participatory.

iv. Mass Media: Public opinion and democracy. Media culture and its production, media organization, media content, market-driven media content- effects, skyvasion, cultural integration and cultural pollution.

v. Functionalist approaches: The culture of make believe. Effects, Uses & Gratification, Agenda Setting.

Unit- II:

DEVELOPMENT OF MEDIA

i. Early communication systems in India. Traditional and Folk Media. Invention of printing press and paper. Pioneer news publications in Europe and USA. Early efforts to publish newspapers in different parts of India.


**Unit- III:**

**PRINT MEDIA**

i. News: definition, concept, elements, values, sources, lead writing, kinds of leads. Specialized Reporting: politics, legislature, crime, law, sports, business, development, rural & agriculture, science & environment, education, arts, culture & entertainment, human interest.


**Unit- IV:**

**Electronic Media**

i. Principles and techniques of audiovisual communication – Using audio and pictures to enhance presentation.


**Unit- V:**

Development Communication and Intercultural communication


iii. Democratic decentralization: Panchayat Raj – planning at national state, regional district, block and village levels. Agricultural communication and rural development: The genesis and growth of agricultural extension.

v. Culture, communication and folk media: Character, concept and functions. Dance and music as instruments of inter-cultural communication. UNESCO’S efforts in the promotion of intercultural communication.

Unit- VI:

Communication Research

i. Nature and characteristics of research, definition and elements. Role, function, scope and importance of communication research.search. Mass Communication research.

ii. Basic concepts, tools and techniques of research. Research design in Social Sciences. Methods of communication research: census method, survey method, observation method, case studies, and content analysis.

iii. Tools and methods of data collection - media sources, books, questionnaire and schedules, people-o-meter, diary method, field studies, logistic groups, focus groups, telephone, surveys, on-line polls. Sampling methods. Sampling errors and distributions in the findings.

iv. Types of research in Print and Electronic Media. Evaluation, feedback, feed forward studies, media habits, public opinion surveys, pre-election studies and exit polls. Market research in media fields, development of trends and recent trends in communication research. Ethical perspectives and mass media research.


Unit- VII:

Media Management and Laws

i. Principles of media management and their significance. Media as an industry and profession.

ii. Ownership patterns of mass-media in India: sole proprietorship, partnership, private limited companies, public limited companies, trusts, co-operatives, religious institutions (societies) and franchises (chains). Foreign equity in Indian media (including print media) and Press Commissions on Indian newspaper management structure.

iii. Organisational structure. Functions of different departments: General Administration, Editorial, Finance, Circulation (sales promotion); Marketing (Advertising), Human Resource and Production. DAVP, INS and ABC. Economics of print and electronic media.


Unit- VIII:

Advertising, Public Relation and New Media


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Syllabus for Pet – II Examination

Name of Subject: Ancient Indian History, Culture & Archaeology,
Facutly of Social Science, Subject Code: 1.06

Unit– I: Prehistory of India
Unit– II: Proto history of India
Unit- III: Historical Archaeology of India
Unit- IV: Indian Art and Architecture
Unit- V: Indian Epigraphy, Palaeography
Unit- VI: Ancient World Civilizations
Unit- VII: Indian Culture and its Impact on the Ancient World
Unit- VIII: Ancient Indian Literature

Note- The topics included in the syllabus are as per and equivalent to the post-graduate course.

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Syllabus for Pet – II Examination

Name of Subject: Political Science,
Faculty of Social Science, Subject Code: 1.07

UNIT- I:


b) Research Design, Literature Review & Its importance, Hypotheses and Variables; Tools and Techniques of Data Collection - Observation, Questionnaire, Interviews, Projective Techniques, Scaling Techniques; Sampling : Meaning, Significance, Types and Selection; Field Survey method, Case Study Method, Library Research

c) Data Processing & analysis - Statistical techniques of data analysis, Use of Computers; Thesis and Report Writing, bibliography, footnotes, references, Chapterization, Characteristics of a Good Report; Values & Theory Building in Social Research

UNIT- II:

a) Raja Rammohan Roy– Socio-political reforms and movements, thoughts on the British government, Education and social practices in India; Jyotiba Fule– Socio-political movements and reforms, thoughts on Caste system, Education and the Idea of State; Dr.B.R.Ambedkar– Thoughtson Social Political System, Caste System, Constitutional Democracy and national integration and political concepts of Liberty, Equality and Fraternity


c) Jawaharlal Nehru – Ideaof India and Indian nationalism, on Indian Constitutionalism, Democratic Socialism and Philosophy of India's Foreign Policy; Rammanohar Lohia – Indiannationalism, on Choukhamba theory, Social Equality; V.D.Savarkar – Hindunationalism, Hindu Society & Reforms; Abul Kalam Azad – Indiannationalism, Hindu-Muslim unity and composite nationalism

UNIT- III:


b) Powers & Functions of the President, Prime Minister and Cabinet; Indian Parliament-composition, powers and functions; Indian Judiciary – Powers & Functions; Constitutional role of Supreme Court; Judicial Review& Judicial Activism; Party System in India – Historical Development, Features & Role; Regional Political Parties; Pressure Groups& Interest Groups – Features, Functions & Impact
c) Electoral Politics and role of Election Commission; Social Movements in India – their History & Significance; Caste, Class, Gender, Language, Religion, Region and their role in Indian Politics; Issues of Development – Poverty, Unemployment, Health Issues, Agricultural Crisis, Inflation, Environmental degradation; Issues & Problems – Corruption, Terrorism, Communalism, Reservation policy and Mandalisation, Impact of Globalisation.

UNIT- IV :

a) Idealism :Old & Modern; Liberalism: Classical, Neo-Liberalism and libertarianism; Socialism: Origin & development of socialist thought, Guild Socialism, Fabian Socialism, Democratic Socialism, Consocialism;

b) ClassicalCommunism and Neo-communism - Meaning, Nature, Significance and Development; Feminism: Meaning, nature, philosophy and kinds of feminism- liberal, Marxist, radical and black feminism


UNIT- V :

a) Comparative Politics: Meaning, Nature, Development and Scope, Traditional Approaches to the Study of Comparative politics: Philosophical, Historical, Legal-Institutional; Modern Approaches to the Study of Comparative Politics: Systems, Structural-Functionalism, Political Sociology and Political Economy.

b) Constitutionalism: Meaning and Features and Development; Comparative Study of Political Institutions: Executive, Legislature and Judiciary; Comparative study of Political Parties, Electoral Process and Voting Behaviour; Leadership, Elites and Role of Women in Politics, Pressure Groups and Social Movements


UNIT- VI :

a) Nature & Evolution of Classical Western Political Thought; Thoughts of Plato and Aristotle; Social Contract Theory of Hobbes, Locke and Rousseau;

b) Thoughts of Machiavelli and Thomas Aquinas on State & Church; Theory of Utilitarianism : Meaning, nature and significance; Contributions of Bentham and Mill

c) Scientific Socialism : Meaning, nature, significance;Thoughts of Hegel and Marx; Contributions of Lenin & Mao to Marxian Socialism

UNIT- VII :

b) Phases in World Politics: Era of Cold War and Its characteristics; End of Cold War and Nature of Post-Cold War World Order; Major Issues in World Politics – Growth of Nuclear Weapons & its Proliferation, Arms Race, Disarmament; Racialism & Apartheid, Impact of Globalization, Human Rights, Environmental Issues& Global Terrorism

c) Foreign Policy, Diplomacy & International Law as the instruments of International Politics, Role of United Nations and its allied agencies; International Trade, WTO and New International Economic Order; Role of Regional Organisations: European Union & SAARC – Their Structure and Impact

UNIT- VIII:

a) State Politics in India: Nature and Significance of the study; Patterns of state politics; Socio-economic determinants of state politics; Legislative, Administrative and Financial relationship between Centre and the States; Impact of national politics on state politics

b) Issues in State Politics: Demand of autonomy and small states, border and riverwater sharing, Caste and Ethnic inclusion and exclusion; Linguistic, regional, religious communalism, Issues of development, environmental issues and Gender justice

c) Electoral Politics in the States: party politics of regional political parties, political elites – their functions and roles; Impact of social movements, Human Development issues: regional imbalances, literacy, sex ratio, poverty and unemployment
Syllabus for Pet – II Examination
Subject : Dr.Ambedkar Thought
Faculty of Social Sciences   Subject Code- 1.08

Unit- I: Dr. Ambedkar’s Theories on Caste:
   a) Theory of Origin of Caste.
   b) Structure of Caste.
   c) Caste – Class Theory.
   d) Eradication of Caste System.

Unit- II: Dr. Ambedkar on Education:
   a) Primary, Secondary and Higher Education.
   b) Technical and Vocational Education.
   c) Women’s Education.
   d) Cultural Education & Moral Education.

Unit- III: Essayist Dr. Ambedkar’s : Salient Features of His Essay:
   a) Annihilation of Caste.
   b) Buddha or Karl Marx.
   c) Rise and Downfall of Hindu Women.
   d) Ranade, Gandhi and Jinnah.

Unit- IV: Dr. Ambedkar's Views on the Constitutional Framework of Democracy:
   a) Elections and Parliamentary Democracy.
   c) Separation of Power.
   d) Provision of Emergency.

Unit- V: Critical Analysis of Economic Structure of Indian Society by Dr. Ambedkar:
   a) Economics of Caste.
   b) Economics of Untouchability.
   c) Economic Conditions of the Downtrodden in Indian Society.

Unit- VI: Dr. Ambedkar Views on:
   a) Renouncement (Grihatyaga) of Siddhartha
   b) Anishwaravada,
   c) Anatmavad,
   d) Anityata

Unit- VII: Dr. Ambedkar on Democracy
   a) Principles of Democracy
   b) Nexus of Social and Economic Democracy
   c) Conditions for Success of Democracy

Unit- VIII: Dr. Ambedkar on National Problems:
   a) Nizam State
   b) Kashmir Problem
   c) Indo – China Pact – 1954, Tibet – Buffer State
   d) Linguistic States
REFERENCE BOOKS:

1) Dr. Babasaheb Ambedkar Writing and Speeches Vol.-1, Education Deptt. Govt. of Maharashtra Mumbai.

2) Dr. Babasaheb Ambedkar Writing and Speeches Vol.-2, Education Deptt. Govt. of Maharashtra Mumbai.

3) Dr. Babasaheb Ambedkar Writing and Speeches Vol.-3, Education Deptt. Govt. of Maharashtra Mumbai.

4) Dr. Babasaheb Ambedkar Writing and Speeches Vol.-4, Education Deptt. Govt. of Maharashtra Mumbai.

5) Dr. Babasaheb Ambedkar Writing and Speeches Vol.-5, Education Deptt. Govt. of Maharashtra Mumbai.

6) Dr. Babasaheb Ambedkar Writing and Speeches Vol.-6, Education Deptt. Govt. of Maharashtra Mumbai.

7) Dr. Babasaheb Ambedkar Writing and Speeches Vol.-7, Education Deptt. Govt. of Maharashtra Mumbai.

8) Dr. Babasaheb Ambedkar Writing and Speeches Vol.-8, Education Deptt. Govt. of Maharashtra Mumbai.

9) Dr. Babasaheb Ambedkar Writing and Speeches Vol.-9, Education Deptt. Govt. of Maharashtra Mumbai.

10) Dr. Babasaheb Ambedkar Writing and Speeches Vol.-10, Education Deptt. Govt. of Maharashtra Mumbai.

11) Dr. Babasaheb Ambedkar Writing and Speeches Vol.-11, Education Deptt. Govt. of Maharashtra Mumbai.

12) Dr. Babasaheb Ambedkar Writing and Speeches Vol.-17, Part – 1, 2, 3, Education Deptt. Govt. of Maharashtra Mumbai.

13) Dr. Babasaheb Ambedkar Writing and Speeches Vol.-18, Part – 1, 2, 3, Education Deptt. Govt. of Maharashtra Mumbai.

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Syllabus for Pet – II Examination

Name of Subject: Gandhian Thought, Facutly of Social Science, Subject Code: 1.09


**Unit– V:** Evolution of the concept of Satyagraha, Satyagraha and Duragraha, Discipline of a Satyagrahi, Satyagraha in South Africa, Various Satyagrahas in India organized by Gandhi, Satyagraha as a Method of Social Change, Working and Techniques of Satyagraha, Various forms of Satyagraha (Non co-operation, Civil disobedience, Picketing, Fasting, Strike, Boycott, Hizrat, Dharna). Satyagraha and Democracy, Satyagraha as a Moral Equivalent of War, Recent experiments of Satyagraha in India and Abroad. Satyagraha in a Totalitarian State, Constructive Programme and Satyagraha, Satyagraha in Nuclear Age, Satyagraha in Modern Context.

**Unit- VII:** Evolution of Village Communities in India, Rural reconstruction before 1952, Problems of Rural Society, Role of Constructive Programme in Rural Development, Concept of Rural Development, Villages in Rig Vedic and Post – Rig Vedic Age, Indian villages in British rule, Khadi and Village Industries, Gandhi and Khadi Movement, Problems of Urbanization, Pollution, Gandhian Approach to Rural Development, Appropriate Technology, Role of Co-operative Sector in Rural Development, Problems of Co-operative Movement in Rural Areas, Gandhian Programmes of Rural Development, Role of NGO’s in Rural Society, Micro-planning, Panchayat Raj, Impact of Panchayat Raj on Rural India, Concept of Integrated Rural Development.

**Unit- VIII:** Detailed Study of Gandhi’s original Books – The Story of My Experiments with Truth, Hind Swaraj, Constructive Programme, Village Swaraj, Key to Health.

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Syllabus for Pet – II Examination

Name of Subject: History,
Faculty of Social Science, Subject Code: 1.10

Unit- I:
   a) Nature, Scope, Definition of History
   b) Collection of Data, Selection of Data
   c) Authenticity of Sources
   d) Footnotes, Bibliography

Unit- II:
   a) State under Mahajanapadas
   b) Mauryan State, Gupta Polity
   c) Vijayanagar State
   d) State under the Sultans of Delhi

Unit- III:
   a) Administrative system of the Mughals
   b) Rise of the Marathas
   c) Administration of the Marathas
   d) Nature of Maratha Confederacy

Unit- IV:
   a) Advent of European Trading Companies
   b) Establishment of British Power
   c) Development of Education and Social Reform Movements
   d) Civil Administration under the British Rule

Unit- V:
   a) Revolt of 1857
   b) Indian Freedom Movement
   c) Stages of Constitutional Development
   d) Independence and Partition

Unit- VI:
   a) Drain of Wealth
   b) Land Revenue Settlements
   c) Growth of Indian Industries
   d) Commercialization of Agriculture

Unit- VII:
   a) Integration of Indian States
   b) Making of Indian Constitution, its Salient Features
   c) Planned Economy
   d) Non – Alignment

Unit- VIII:
   a) Colonialism, Nationalism, Socialism, Globalisation
   b) De-colonisation in Asia and Africa
   c) Cold War, Rise of Unipolar World
   d) Apartheid, Civil Rights
### Suggested Readings

1. Historiography – N Subramaniah
3. Itihas Tantra Ani Tatvagyan – Dr. Shanta Kothekar
4. ItihasLekhan, Avdharana, VidhayeinEvamSadhan – Brijesh Kumar Srivastava
5. Ancient India – V. D. Mahajan
7. The Wonder that was India – A. L. Basham
8. History of South India – Nilkanth Shastri
9. Cambridge History of India – Volume 3, ed. W Haig
10. The Sultanate of Delhi – A. L. Srivastava
11. Pracheen Bharat kaltihas – D. N. Jha, K. M. Shreemali
12. BhartiyaRajya – Ramavtar Sharma and Sushma Yadav
13. Mughal Empire – A. L. Srivastava
14. The Maratha Supremacy – R. C. Majumdar and V. G. Dighe
15. Marathi Riyasat (All Volumes) – G. S. Sardesai
17. An Advanced History of India – R. C. Majumdar, Roychaudhari and K.K. Dutta
18. Modern India – Bipan Chandra
19. The Cambridge History of India – H. H. Dodwell
20. AdhunikBhartachaltihas 1757 – 1857 – Dr. Vaidya and Dr. Kothekar
21. Adhunik Bharat – Dinanath Varma
22. India’s Struggle for Freedom – Bipan Chandra
23. Modern India – Sumit Sarkar
25. Adhunik Bharat (1858 – 1920) – Dr. Vaidya and Dr. Kothekar
26. Adhunik Bharat (1920 – 1947) – Dr. Vaidya and Dr. Kothekar
27. Adhunik Bharat kaltihas – R. L. Shukla
28. The Rise and Growth of Economic Nationalism in India – Bipan Chandra
29. India Today – Rajni Palme Dutt
30. Economic and Social History of India – S. P. Nanda
31. Economic History of India – V. B. Singh
32. Adhunik Bharat kaArthikltihas – Shreedhar Pandey
33. Bharat kaArthikltihas – Agnes Thakur
34. History of Modern India – Grover and Grover
35. SwatantraBharatachaltihas (1947 – 2000) – Dr. Vaidya and Dr. Kothekar
36. BhartiyaShasanaurRajneeti – BasuikNath Chaudhary and Yuvraj Kumar
37. History of Modern Times – C. D. M. Kettleby
38. The Age of Conflict, 1914 to the Present – Alberg and Alberg
40. Twentieth Century World – L. P. Mathur
41. History of Modern Europe – V. D. Mahajan
42. Adhunik Jag - Dr. Vaidya and Dr. Kothekar
43. Adhunik Europe cha Itihas – Dr. A.R. Kulkarni
44. Europe kaAdhunikltihas – Satyaketu Vidyalankar

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## Syllabus for Pet – II Examination

**Name of Subject:** Library & Information Science, Faculty of Social Science  
**Subject Code:** 1.11

### Unit – I:
- Information, Information Science, Information Society
- Information Transfer Cycle – Generation, Collection, Storage and Dissemination
- Role of information in Planning, Management Socio-economic Development, Technology Transfer.
- Communication – Channels, Barriers.

### Unit – II:
- Law of Library Science
- Library and information Science Education in India
- Library and information Profession
- Library Associations in India, UK and USA- ILA, IASLIC, IATLIS, SIS, LA, ASLIB, SLA and ALA.

### Unit – III:
- Reference and Information Services, referral Service
- Online Services
- Translation Services

### Unit – IV:
- Organization of Knowledge
- Data information and Knowledge : Concept, types and Characteristics
- Modes of Information of Subjects
- Canon of Library Classification and Cataloging
- Indexing: Pre-Coordinate, Post Coordinate
- Thesaurus and list of subject headings
- Online Classification Schemes and Traditions Schemes.

### Unit – V:
- Management - Principals, Functions, School of Thought
- Planning, Organizational, Structure
- Financial Management – Resource Generation, types of Budgeting, Cost and Cost- Benefit analysis PERT, CPM

### Unit – VI:
- Types of the Library – National, Public, Academic and Special Objectives, Structure and Functions
| Unit – VII: | * Information Technology – Components; Impact of IT on Society  
* Libraries Automation: Areas of Automation, Planning, hardware, & software selection  
* OPAC, WEB OPAC, M-OPAC  
* Library Management Software, Digital Library management software – SOUL, LIBSYS, KOHA, D-space, Green Stone |
| Unit – VIII: | * Types of Research Basic, Applied, Interdisciplinary Research Design  
* Hypothesis, Data Collection,  
* Methods of Research in LISW: Historical, Descriptive, Case Study, Survey, Comparative, Experimental.  
* Data Analysis, Statistical methods, Report Writing. |

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Syllabus for Pet – II Examination

Name of Subject: Social Work,
Facutly of Social Science, Subject Code: 1.12

**Unit - I: Social Work – History, Approaches and Perspectives**

1. Concept and History of Social Work in India.
4. Perspectives: Marxist, Feminist and Subaltern.

**Unit - II: Basics of Behavioral and Social Sciences**

2. Concept of Adjustment in Psychology; IQ; Emotional Intelligence; Behavioural Problems in Children; Personality Disorders; Psychopathology.

**Unit - III: Social Work Methods**

2. Understanding the Concept of Community and its context in India – Dalits, Women, Tribal People and Backward Castes.
3. The Practice of Community Organization as a Method of Social Work.

**Unit - IV: Social Welfare Administration**

1. Basic Approaches to Social Welfare Administration.
3. Budgeting and Sources of Finance.

**Unit - V: Social Work Research Methodology**

1. Formulation of Research Problem, Framing Objectives and Preparation of Tools of Data Collection.
2. Universe, Sampling Frame and Sampling Unit; Types of Probability and Non-Probability Sampling.

**Unit - VI: Statistics for Social Work Research**

1. Measures of Central Tendency (mean, median, mode) and Dispersion.
4. Analyses of Variance (ANOVA).
Unit - VII: Disability and HIV/AIDS

2. Legislation for the Welfare of Disabled.
3. Social Dimensions of HIV/AIDS.
4. Process of Counselling with special reference to Disability and HIV/AIDS.
5.

Unit - VIII: Social Policy, Social Planning, Development, Exclusion and Social Legislation

2. Process of Formulation of Planning and Social Policies in India.

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Syllabus for Pet – II Examination

Name of Subject: Geography, Facultly of Social Science, Subject Code: 1.13

Unit – I:

A) Geographic Thought: General character of geographic knowledge during the ancient, and medieval period. Foundations of modern geography: Contribution of German, French, British and American schools; Conceptual and methodological developments during the 20th century, Changing paradigms man and environment, determinism and possibilism, areal differentiation and spatial organization, Quantitative revolution. Impact of positivism, humanism, radicalism and behaviouralism in geography.


UNIT- II:

A) Statistical Methods: Data sources and types of data; Statistical diagrams; Study of frequency distribution and cumulative frequency. Measures of central tendency, Selection of class intervals for mapping; Measures of dispersion and concentration; Standard deviation; Lorenz curve; Methods of measuring association among different attributes; simple and multiple correlation; Regression. Measurement of spatial patterns of distribution; Nearest-neighbor analysis; Scaling techniques, rank score, weighted score; Sampling techniques for geographical analysis.

B) Cartography : Types of maps : Techniques for the study of spatial patterns of distribution: Choropleth; Isopleths and Chorochromatic maps and pie diagrams; Mapping of location-specific data: Accessibility and flow maps. Remote Sensing and computer application in mapping; Digital mapping, Geographic Information System (GIS).

Unit – III:


B) Oceanography : Origin of ocean basins. Bottom relief of Indian, Atlantic and pacific Oceans. Temperature and salinity of the oceans: Density of sea water, Tides and ocean currents; Seal-level changes. Impact of human on the marine environment, law of the sea, exclusive economic zone, food and mineral resources of the sea, marine deposits and formation of coral reefs, oceans and world geo-politics
UNIT – IV:


Unit – V:


B) Regional Planning : Regional concept in Geography, its application to planning, Concept of planning region, Regional hierarchy, Types of regions and methods of regional delineation, Conceptual and theoretical framework of regional planning. Regional planning and their utility in India :Concept of development, Indicators of development, Regional imbalances. Planning for the region’s development and multi regional planning in a national context.

UNIT- VI:

A) Economic Geography: Location of economic activities and spatial organization of economies; Classification of economies; Sectors of economy : primary, secondary, tertiary and quaternary Classification of industries : Weber’s and Losch’s approaches; Resource based and footloose industries. Models of transportation and transport cost. Accessibility and connectivity: Inter-regional and Intra regional, comparative cost advantages.

B) Environmental Geography
Geography as a study of environment, concepts and components of environment, approaches to environmental studies, concepts of ecology and ecosystem. Man-environment relationship.
Unit- VII:


B) Geography of tourism
Basics of Tourism: Definition and factors influencing tourism, elements of tourism, tourism as an industry. Types of tourism, positive & negative Impacts of tourism. Role of foreign capital and impact on globalization on tourism.

Unit- VIII:

A) Environment hazards & disasters:
Meaning & approaches, Causes and consequences of Disaster. –physical, economic and cultural. Types of environmental hazards and disaster: Natural disaster and. Man induced hazards and resultant environmental disasters. Emerging approaches to disaster management - pre, emergency and post disaster stage. National and international policies for disaster Management.

B) Geography of India:
Physiographic divisions and Climate: its regional variations, Vegetation and soil types, vegetation and soil major regions. Coastal and Marine resources, Water resources and Irrigation, Agriculture and Agro climatic region, Mineral and power resources, Major industries and industrial regions. Population distribution and growth, Settlement patterns. Regional disparities.

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Syllabus for PET – II Examination

Name of Subject: Home Economics,
Facutly of Social Science, Subject Code: 1.14

Unit- I:


c) Data Collection - Importance & Types of Data, Sources of Data, Methods of Data collection, their merits and demerits. Classification of Data - characteristics and objectives of Classification, Types of Classification. Tabulation of Data - Objectives of the tabulation, Characteristics of a good Table, Types of Tables, Rules and precautions while preparing Tables, Advantages of tabulation. Interpretation of Data- Process of Analysis and Interpretation.


Unit- II:


Leisure Time- Definition, concept and importance of leisure time. Types of spending leisure time. Factors affecting leisure time.

Unit- III:

a) The Three Domain of Human Development- * Biosocial Development, * Cognitive Development * Psychological Development

Psychological Tests-Meaning, Importance and use of Psychological Tests. Psychometric method, Scale for infant assessment, Draw a man test, Children Apperception Test. Early Childhood Care and Education. (ECCE) Importance, need and scope of ECCE. Objectives of ECCE. Types of preschools – Play Centres, Day Care, Montessori, Kindergarten, Balwadi, Anganwadi, etc. Role and responsibilities of care giver and teacher. Record and Report. Types - aim and purpose / need, general, characteristic. E.g. anecdotal, cumulative sample work, medical etc.

b) Early childhood – Characteristics, Developmental task, Skills of early childhood, Emotions during early childhood, Socialization and social behaviour, Happiness and Hazards during early childhood.


c) Puberty - Characteristics, causes of Puberty, Primary and Secondary sex Characteristics, Developmental tasks, problems during puberty, Happiness and interest, Vocational interest, Self discipline and family relationship.

Adolescence – Characteristics, Developmental Tasks, physical changes during Adolescence, sex interest and sex behaviour, causes of family frictions during adolescence, Hazards and Happiness.

Adolescent conflicts - Parent, School Authority, Grandparents.

d) Counselling: History of counselling, meaning, need, objectives and functions. Qualities and skills of Counsellor, Distinction between Guidance and counselling.

Mental Health -Definition, concept and importance of holistic health, well being and happiness. Sense of Identity, autonomy, individualism during adolescence, Problems related to physical appearance and sexuality during adolescence. Personality Development- Definitions, Meaning, Importance.

Determinants of Personality
* Heredity & environment
* Learning & maturation
Unit- IV:


b) Family- In the social context, as a component of social system and Functions. Socio – cultural studies of family pattern in India. Family structure: Traditional, Extended, Nuclear, Joint families. Family disorganization and tension- definition and meaning, causes of family disorganization, causes of family tension- situation of Fundamental and Primary tension. Alternate families – Single Parent, Childless Families and Female Headed Families.

c) Concept of Aging and the Aging Process- Physiological aspects, Psychological aspect, Social aspect, Spiritual aspect retired status, single status, economic status, security, social adjustment and recognition.,. Adjustment pattern and changing lifestyle during old–age. Family pattern during old age - changing roles and the aging family, conjugal husband-wife relationship, sexual adjustment. Intergenerational family relations, grand parenthood, widowhood, Alternative life style, second marriage in old-age. Services and programs for the aged- Laws and facilities favouring the senior citizens. Categories of services - Housing, Health, leisure time activities, institution for the aged, (old age homes, adoption of the old) day care centres, rearrangement after retirement, economic programmes – retirement pension, death cum retirement gratuity, provident fund, insurance schemes.


Unit- V:


c) History of Clothing, Psychological effects of clothing and factors affecting selection of clothing. Application of Elements of Arts and principles of design in clothing. Selection of dress design according to different types of figure. Wardrobe Planning, Clothing for different age groups. Consumer behaviour as applied to clothing. Fashion - Definition, Origin, fashion cycle, factor affecting fashion, fashion trends.


Unit- VI:

a) Review of nutrients- Proteins, Carbohydrates, fats, Vitamins and Mineral- their Classification, Functions, Sources and Deficiency Diseases. Different Types of Cooking Methods and Effect of various cooking methods on different nutrients.


c) Women and Nutrition- Situation of women in Global, National and Local context, Women’s Health, Improving their Nutritional & Health status, Health problems of women. Intervention throughout the life cycle, Empowerment of women, Role of education.


Unit- VII:

b) Communication- Importance in Extension work. Functions of communication- Information function, Instructive/command function, Influence/persuasive function, integrated function. 


Unit- VIII:

a) Housing - Concept and History. Changes in housing needs and standard. Housing values and goals at the present time. Housing in India as affected by trends in - Population, economics status, Occupation, family mobility, Social and cultural status. Public rural and urban housing schemes for various economic groups. Role of Co-operative Societies in development of housing in urban and rural areas. Role of private sector in development of housing in urban and rural areas.


Name of Subject: Public Administration, Faculty of Social Science, Subject Code: 1.15

Unit- I: Introduction


b) Basic Concepts & Principles of Organization.

Unit- II: Theories of Administration

Scientific Management (Taylor & the Movement)
Classical Theory (Fayol, Urwick, Gulick & others)
Bureaucratic Theory (Weber & his Critics)
Ideas of Mary Parker Follett, C. I. Bernard
Human Relations School (Elton Mayo & Others)

Unit- III: Indian Administration

a) The President, The Prime Minister, The council of Ministers, Central Secretariat, Cabinet Secretariat, Prime Minister’s Office, NITI Aayog, Finance Commission, Election Commission, Comptroller & Auditor General of INDIA

b) Public Sector Enterprises - Patterns, Role, Performance & Impact of Liberalization.

C) Disaster Management in India, Good Governance, E-Governance.

Unit- IV: Management of Human Resources


b) Recruitment, Training, Promotion - Types, Retirement benefits, Union Public Service Commission, State Public Service Commission.

c) Staff Associations, Machinery for Negotiation, Joint Consultative Council.
Unit V: Local Government & Administration in India


b) 73rd & 74th Constitutional amendment act & their main characteristics, PESA & its implementation.


Unit VI: Financial Administration & Social Welfare Administration


Unit VII: Comparative & Development Administration


b) Administrative System of USA, UK & INDIA.

Unit VIII: Research Methodology

a) Social Research- Meaning, objectives, types, Importance of Research in Public Administration, Problem of Research in Public Administration.

b) Selection of Research Problem, Methods of Data Collection.

c) Research Design, Methods of Data Collection


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# Syllabus for Pet – II Examination

**Name of Subject:** Women Studies & Development, Facutly of Social Science, Subject Code: 1.16

<table>
<thead>
<tr>
<th>01. UNIT I:</th>
<th>Introduction of Women’s Studies:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Definition, Meaning, Concept, Genesis, Growth and Scope of women's studies in India, Women's Studies- An International perspective, Women's Studies as a Academic Discipline.</td>
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<tr>
<td>C. Issue based Movement- Anti price rise, Dowry, Rape, Anti alcohol, (Anti Arrack Movement). Women’s movement in the State.</td>
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<tr>
<td>D. Narmada Bachao Andolan; Dalit Women's Liberation movement; Women's organization and Association of India.</td>
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<table>
<thead>
<tr>
<th>02 UNIT II:</th>
<th>Global efforts for women’s emancipation</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. <strong>International Conferences for the advancement of Women</strong>: First World Conference on women in Mexico 1975, Second World Conference on women in Copenhagen 1980, Third World Conference on women in Nairobi 1985, Fourth World Conference on women Beijing 1995,</td>
<td></td>
</tr>
<tr>
<td>C. <strong>Millennium Development Goals (UN: 2000 Agenda)</strong>.</td>
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</table>

<table>
<thead>
<tr>
<th>03 UNIT III:</th>
<th>Feminisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. <strong>Liberal Feminism</strong> - Enlightenment Age Liberalism, Liberal Feminist Voice (Marl Wollstonecraft, Betty Friedan), Equal right trough law (Education &amp; Employment), Critiques of Liberal Feminism.</td>
<td></td>
</tr>
<tr>
<td>B. <strong>Marxist / Socialist Feminism</strong> - Class Struggle, Production, Capitalistic Patriarchy, Family Private Property &amp; the state, Sexual Division of Labour, Legitimacy for Domestic Work, Women as Sexual Objects, Alienation, Critiques / contribution on Socialist feminism.</td>
<td></td>
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<tr>
<td>C. <strong>Radical Feminism</strong> - Patriarchy, Sex Class Struggle, Reproductive technologies for Liberation, Reproductive technologies for enslavement, Women as Sexual Slaves.</td>
<td></td>
</tr>
</tbody>
</table>
| D. **New Trends Feminism** - Black Feminism, Psychoanalytic Feminism, Dalit Feminism,
<table>
<thead>
<tr>
<th>UNIT-IV: Gender &amp; Development</th>
</tr>
</thead>
</table>
**B. Approaches of Women & Development** - Women in Development (WID), Women and Development (WAD) Gender and Development (GAD) Women, Environmental Sustainability & Development (WED), DAWN. Five Year Plans and Policies for Women in India.  
**C. Panchayati Raj Political Role and participation**, NGO and Women Development, Self Help Groups [SHG] and International Funding Agencies.  
**E. Women in Care Economy** – Domestic work,  
**F. Women in Shadow Employment.** |

<table>
<thead>
<tr>
<th>UNIT-V: Women and Health</th>
</tr>
</thead>
</table>
| **A. Reproductive health and Reproductive rights,**  
**B. Health Education special reference to rural women,**  
**C. Family Welfare methods of Gender bias Practices,**  
**D. Role of Women in population control,**  
**E. Mortality and Morbidity factors influencing health – Nutrition and Health**  
**F. HIV/AIDS Control Programme and Gender Discourse.** |

<table>
<thead>
<tr>
<th>UNIT-VI: Women and Law</th>
</tr>
</thead>
</table>
| **A. Fundamental Rights, Provisions relating to Women in Indian Constitutions, Understanding Debate on Personal Law and making process.**  
**B. Hindu Code Bill to Law Against Domestic Violence.**  
**C. Muslim Personal Law and Shah Bano Case.**  
**D. Christian Personal Law and Mary Roy Case.**  
**E. Rape Case and Reconstruction of Laws.** |

<table>
<thead>
<tr>
<th>UNIT-VII: Gender and Knowledge Making Process, Art, Literature and Media</th>
</tr>
</thead>
</table>
| **A. Eminent Thinkers and Gender Discourse - Lokhitvadi (Gopal Hari Deshmukh), Jyotirao Phule (Aakand (poetry) and Satsar), Gopal G. Agarkar, , Dr. Babasaheb Ambedkar, Rahul Sankrutayan , Com. Shard Patil, J. S. Alatekar, I. B. Horner, Eleanor Zelliot, Gail Omvedt, Sulbha Brahme, Rumila Thapper, Uma Chakravorthi, V. Geetha.**  
**B. Literature Folk Art, Street Plays, Theatres, Paintings.**  
**C. Women and Media, Alternative Media for Women’s Movement, Publications, Books Stalls.** |
<table>
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<tr>
<th></th>
<th>UNIT- VIII:</th>
<th>Feminist Research Methodology</th>
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</thead>
<tbody>
<tr>
<td>A.</td>
<td><strong>Feminist Research Methodology/Epistemology:</strong> Quantitative and Qualitative Research: An Introduction Feminist Epistemology, Methodology and Method What is Distinctive about Feminist Method?</td>
<td></td>
</tr>
<tr>
<td>C.</td>
<td>Subjectivity and Objectivity in Research - debate in feminist discourse.</td>
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<tr>
<td>D.</td>
<td><strong>Method of Data Creation</strong>: Case Study, Participatory and action Research, Interview and Focus Group Discussion, Samples.</td>
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<tr>
<td>E.</td>
<td><strong>Data Analysis</strong>: Data Processing, atobris, Narration, text, pictim &amp; wida Mode and Median Methods of Data Analysis. <strong>Using Computer Software</strong>: Statistical Analysis Packages (e.g. SPSS), Spreadsheets, Database Management Systems. Atlasiti, erisitebin.</td>
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<tr>
<td>F.</td>
<td><strong>Report Writing</strong>: Meaning and Significance in research.</td>
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</tbody>
</table>
Syllabus for Pet – II Examination

Name of Subject : Buddhist Studies,
Faculty of Social Science, Subject Code: 1.17

N.B. 1) Total Unit – 08
     2) Total Question – 08
     3) Total Marks – 50
     4) Question to solve – Any 05
     5) All Questions carry equal Marks.

Syllabus Buddhist Studies

Unit- I: Buddhism in India
1) Causes of the Origin of Buddhism
2) Life of Buddha
3) Historical Significance of main event from the life of Buddha.
4) Four Noble Truth, AryaAshtangikMarg, Pratityasamutpad, Nibban

Reference Book :
1) Origin of Buddhism – G.C. Pandey
2) Bhagawan Buddha – DharamanandKasombi
3) BouddhaSanskruti – Rahul Sankrutyayan.
4) The Buddha and His Dhamma – Dr. B. R. Ambedkar
5) BouddhaDhammachaAbhyuddayaniVikas- Dr. Niraj Bodhi

Unit- II: Buddhist Literature
1) Sutta Literature
2) Vinaya Literature
3) Abhidhamma Literature
4) Buddhist Sanskrit Literature (Lalitvistar, Saddhammapundarik Sutra)

Reference Book :-
1) History of Pali literature – B.C. Law
2) Pali literature and Language – Dr. Gieger
3) Pali Sahityakalitihas- Dr. BharatsinghUpadhyay
4) Pali Sahityakalitihas- Rahul Sankrutyayan
5) Pali Bhashakalitihas- Dr. Bhagchandra Jain
6) Bouddha Dharma Dharshan- AcharyaNarendraDeo

Unit- III: History of Buddhism and Sects
1) Ashoka's Contribution to Buddhism
2) Kanishka’s Contribution towards Dhamma
3) Sarvastiviada
4) Vijnanvada,Sunyaavada (Madhyanika)
**Reference Book:**
1) Fa- hi-en – A Record of Buddhism
2) Ancient India V.D. Mahajan
3) BouddhaDarshan – Rahul Sankrutayyan
4) JagatilBouddhaDhammamachaltihas – M. S. More
5) SamratAsokacheDhammakaryaaniKaryapranali – Dr. Niraj Bodhi
6) Buddhist Sects in India – NalinakshaDutta

**Unit- IV: AnupitakSahitya&Abhidhamma**
1) MilindPanho
2) Visuddhimagga
3) Chitta, Chetsika
4) Rupa, Nibban

**Reference Book:**
1) History of Pali literature – B.C. Law
2) Pali literature and Language – Dr. Gieger
3) Pali Sahityakalitihas- Dr. BharatsinghUpadhyay
4) AbhidhammaatthaSangaho- Dr. BhikshuRewatDhamma

**Unit- V: Buddhist Vinaya& Education**
1) Parajika, Sanghadisesa
2) PacittiyaDhamma , SekhiyaDhamma
3) Development of Buddhist Education
4) Takshasheela, Nalanda

**Reference Book:**
1) Pali Sahityakalitihas – Dr. BharatsinghUpaddhyaya
2) VinayaPitaka- Tr. Dr. Swami DwarkadasShastri
3) VinayaPitaka – Rahul Sankrutayyan
4) Nalanda Buddhism and the World-Edited by Dr. R. Panth
5) PrachinBhartiyaVidhyapith – Dr. Aaltekar

**Unit- VI: Buddhist Thinkers**
1) AnagarikaDhammapala
2) DhammanadKosambi
3) Dr. B.R. Ambedkar
4) SatyanarayanGoenka

**Reference Book:**
1. DharmanandKoshami – J.S. Sukhathanakar
2. AdhunikDhammaVicharvant – Dr. MalatiBodele
3. Dhammachkrpravartanke bad keparivartan – Dr. PradeepAglave
4. BhartiyaSanskruti me Boudda Den – JagannathUpadhyaya

**Unit- VII: Vinaya Text & Travelers**
1) Chullavagga
2) Parivara
3) Fahiyam
4) Yuaon- chuang
Reference Book:
1) Pali SahityakalItahas – Dr. BharatsinghUpaddyaya
2) Pali SahityakalItahas – Bhadant Rahul Sankrityayan
3) VinayaPitaka – Rahul Sankrityayan
4) Nalanda Buddhism and the World- Edited by Dr. R. Panth
5) PrachinbhartiyaVidhapith – Dr. Aaltekar

Unit- VIII: Buddhist Art and Architecture

1) Sanchi, Bharhut
2) Gandhar Art, Mathura Art
3) Amravati, Nagarjunkonda
4) Ajanta, Elora

Reference Book:

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## Syllabus for Pet – II Examination

**Name of Subject:** Travel and Tourism,  
**Faculty of Social Science, Subject Code:** 1.18

### UNIT – I: Introduction to Tourism
- Introduction, Concepts & Significance of tourism
- Importance scope and development of tourism
- Understanding tourism product, tours, tourist
- Emerging forms of tourism and tourism systems
- Organizations of Tourism

### UNIT – II: The Origin and background of tourism
- Travelling in Ancient Period
- Medieval system of travelling
- Travels linked with religion
- Renaissance and Grand Tour
- Travelling in industrial Period
- Role of Railways
- Oceanic Voyages

### UNIT – III: Tourism Impact
- Economic, Social, Environmental & political effect
- Threat and obstacles of Tourism
- Measures to overcome negative effects
- Attitudes, Expectation and Behavior; Constraints of Tourism Growth
- Globalization of tourism and its challenges

### UNIT – IV: Travel Agency & Tour Operation
- Travel formalities, Passport, Visa
- Travel Agency – Functions and Operations
- Tour operator: Operation main partners
- Hotel/Accommodation/ Transport
- Package tour, planning a tour, costing tour, marketing material
- Itinerary planning
- Guide and Escorts: Definition of guides & Escorts, Tourist expectation, Role of guide, Location, Guiding as a Techniques, Escorting a tour

### UNIT – V: Hospitality and Transport Services
- Introduction to Hospitality Services
- Hotel Organization
- Hotel Operations
- Hotel Performance
- Tourism Transportation services: Road, Air, Rail, Water
- Marketing of tourism

**Marks**

<table>
<thead>
<tr>
<th>UNIT</th>
<th>Topic</th>
<th>Marks</th>
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</thead>
<tbody>
<tr>
<td>I</td>
<td>Introduction to Tourism</td>
<td>10</td>
</tr>
<tr>
<td>II</td>
<td>The Origin and background of tourism</td>
<td>10</td>
</tr>
<tr>
<td>III</td>
<td>Tourism Impact</td>
<td></td>
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<tr>
<td>IV</td>
<td>Travel Agency &amp; Tour Operation</td>
<td>10</td>
</tr>
<tr>
<td>V</td>
<td>Hospitality and Transport Services</td>
<td>10</td>
</tr>
</tbody>
</table>
UNIT- VI: Planning for Growth and Promotion of tourism

* Planning Procedure
* Territorial Planning & Regional planning
* Human Resource Planning
* Sustainable tourism
* Protection of Environment
* Tourism communication system business
  communication travel writing

Unit – VII: Tourism Resources of India

* Geography and tourism interrelation.
* Geography of India. Physical features. Topography.
* Ecology of India, Forest wealth; Flora and fauna; Environmental Concerns; Loss of Environmental wealth; Nature Conservation and Wild life Preservation.
* Seasonality and Destination; Seasons and Climate; Seasonality in Tourism; Festival season; Destination Management
* Fair, Festivals, Food, Art Effects, Heritage, Culture

UNIT- VIII: Tourism Resources of Asia Specific and Europe

* Geo-Physical Resources
* Historical & Cultural Resources
* Natural Resources
* Other Resources

Books Recommended

1. Tourism and Hospitality Industry , Sunil Kabia; Reference Press  New Delhi
6. Hospitality Sales and Marketing, Abbey, J.R.
7. Modern Marketing Management, Davar
8. Marketing Hospitality, Sales and Marketing for hotels, Motels & Resorts – Foster, D.C.
9. Sales & Marketing for the travel professional, Faster D.C.
10. Marketing Management, Kotler Philip
11. Tourism –RomilaChawla
12. India –ArunaDeshpande
15. Tourism Economics – Donald E. Lund berg, M. Krishnamoorthy, Mink H. Stavenga, John Wiley &
17. Tourism Operations and Management – S. Roday, A. Biwal, V. Joshi, Oxford University Press, New Delhi
Syllabus for Pet – II Examination

Subject : FOOD SCIENCE AND NUTRITION
Faculty of Home Science, Subject Code No. 2.01

UNIT- I:

- Carbohydrates, proteins, amino acids, fats & fatty acids: Occurrence, classification, properties, functions, sources, biological importance, metabolism, digestion, absorption, transport, synthesis, degradation & turnover; factors influencing dietary requirements
- Regulation of blood glucose concentration, GI, non glycemic carbohydrates; Concept & measurement of protein quality; effect of diet on serum lipids and lipoproteins
- Vitamins & minerals: Biochemical properties, coenzyme activities, functions, bioavailability, sources, absorption, transport, storage, excretion, deficiency, toxicity, recommended intake, assessment of status & interaction with other nutrients
- Composition and functions of blood, plasma and blood corpuscles, functions of plasma proteins, functions of haemoglobin, methods for analysis of blood nutrients, LFT, KFT, CBC.

UNIT- II:

- Body Composition: Levels, measurement techniques, compartmental models, direct & indirect methods & significance of body composition measurement
- Energy Metabolism: Concept of energy, regulation of food intake, factors influencing food intake, energy intake; Energy expenditure & requirement: components, factors affecting & methods, dietary energy recommendations; energy imbalance: measurement & consequences
- Water, electrolyte and acid base balance
- Sports nutrition & potential health benefits of food components other than nutrients
- Methods for analysis of carbohydrates, proteins, fats, vitamins, minerals & fiber from foods.

UNIT- III:

- Therapeutic diets: adaptation & types; Nutritional support: special feeding methods
- Occurrence, etiology, classification, clinical determination/assessment, signs/symptoms, metabolic aberrations, clinical manifestations, consequences, complications/risk factors, nutritional & medical management, dietary modifications, lifestyle modifications& preventive aspects: obesity, underweight, upper & lower gastro intestinal tract diseases, liver, gall bladder & pancreatic diseases, hypertension, coronary heart diseases, diabetes mellitus, renal diseases, cancer, bone disorders, surgery, burns, trauma, sepsis, HIV/AIDS.

UNIT- IV:

- Demographic profile & vital statistics
- Food security policies & programmes/schemes
- Assessment of nutritional status: Methods of nutritional assessment, anthropometry, growth standards, dietary and clinical assessment, biochemical and radiological assessment
- Nutrition and infection/immunity
- Nutrition education & counselling
UNIT- V:
- Sensory & objective assessment of food quality, physical properties & physiochemical changes in foods, product development and standardization of recipes; Colloidal systems and its application to food preparation
- Cereals, flours, starches & pulses: composition, methods of processing, types, properties, effects of milling, soaking, germination, gluten development, malting of grains & toxic constituents; Leavening agents: classification, properties, ingredients, their functions & method of preparation of batters, dough, cakes, biscuits & breads
- Fats, oils, oilseeds and nuts: composition, properties, oil extraction & by products, toxic constituents, modification of natural oils, deterioration of fats, antioxidants & fat substitutes

UNIT- VI:
- Sugar & milk cookery; Eggs, meat, poultry & fish: Composition, types, quality evaluation, changes during storage, factors affecting coagulation of egg protein, uses of eggs in cookery, methods of cooking eggs; ripening, tenderizing of meat, effects of different cooking methods on meat, chicken & fish, curing & smoking of meat, fish products-fish meal, fish protein concentrate, fish oils
- Vegetables and fruits: Classification, colour pigments & textural changes during ripening & processing, processing of vegetables & fruits; Browning reactions - types & prevention
- Food additives, preservation, fortification, enrichment & fermentation; Microorganisms in food, food contamination/spoilage, food sanitation & control

UNIT- VII:
- Research: definition & types, the research process, defining the research problem, research design
- Sampling: concepts, error, types, determination of sample size, estimation and confidence intervals
- Hypothesis: formulation, types, errors
- Literature search, referencing, abstracting, bibliography
- Validity & reliability of data

UNIT- VIII:
- Measurement and scaling: classification & techniques, questionnaire designing & data collection
- Concept & scope of statistics, classification, tabulation & graphical presentation of data, Concepts of descriptive & inferential statistics
- The writing process, parts of dissertation/research report/article
- Computer applications in data analysis: use of MS-Office, MS-Excel for research, Use of SPSS for data analysis

REFERENCES:
13. C.R. Kothari. Research Methodology (Methods & Techniques)
51. Peckham G. and Freeiand-Graves, G.H. (1979) : Foundation Of Food Preparation, Mac Millian Company
59. Research Methodology – Concepts and Cases, by Chawla, Deepak & Sondhi Neena
67. Statistics by Andy Field, SAGE Publication
77. Yadav : Instrumental Methods of Chemical Analysis, Campus India Publications.
Syllabus for Pet – II Examination

Name of Subject: Human Development, Facutly of Home Science, Subject Code: 2.02

Total Marks-50

UNIT – I:
Methods and programmes

- Various methods of studying HD – Observation interview, case study, questionnaire, scale for infant assessment, CAT, WISC, DAM etc.
- Approaches & theories in family studies,
- Management skills
- programmes for children
- programmes for family.

UNIT – II:
Early Childhood

- Importance & Objectives of ECCE, types of preschool,
- ECCE in India
- Various art activities and materials for promoting various developments during early childhood,
- Mathematics - Goals, Mathematical concepts
- Environmental studies – Family, school, various communities, festivals, role of teachers in developing environmental concepts.

UNIT – III:
Theories in HD

- Early theories & ethological theories.
- Psycho analytic theory of Freud
- Henry Murray’s theory of needs.
- Psycho social theory of Eric Erickson.
- Bronfenbrenner’s ecological theory
- Abraham Maslow – Humanistic theory
- Learning theories
- Cognitive theories.

UNIT – IV:
Child With Special Needs

- Mental Retardation
- Auditory Impairment
- Visual Impairment
- Learning difficulties & disability
- Child with Communication Disorders, child with cerebral Palsy & Orthopedic disability.
UNIT – V:

Counselling and therapies

- Models of Counselling – Psychodynamic,
- behaviour model,
- client centered model,
- Adlers model and
- Eclectic model
- Cognitive therapy, psychoanalysis, play therapy, group therapy, family therapy & marital therapy.

UNIT – VI:

Mental Health & Rights

- Mental health- definition, concept & importance of holistic health
- Mental health needs during childhood and adolescent years.
- Behavioral difficulties during early and middle childhood
- Problems during adolescent
- Mental health problems in community
- Human Rights, child rights, women rights
- children in difficult circumstances

UNIT - VII:

- Research: definition & types, the research process, defining the research problem, research design
- Sampling: concepts, error, types, determination of sample size, estimation and confidence intervals
- Hypothesis: formulation, types, errors
- Literature search, referencing, abstracting, bibliography
- Validity & reliability of data

UNIT-VIII:

- Measurement and scaling: classification & techniques, questionnaire designing & data collection
- Concept & scope of statistics, classification, tabulation & graphical presentation of data, Concepts of descriptive & inferential statistics
- The writing process, parts of dissertation/research report/article
- Computer applications in data analysis: use of MS-Office, MS-Excel for research, Use of SPSS for data analysis.

References:

7. Berk, L.E. Human Development. SUA, Allyn and Bacon 2002
12. C.R. Kothari. Research Methodology (Methods & Techniques)

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Syllabus for Pet – II Examination

Name of Subject : Textile & Clothing,
Faculty of Home Science, Subject Code: 2.03

Theory –Course content Max marks-50

UNIT – I: Introduction to Textiles-

* Textile fibers its-classification, essential and desirable-properties of textile fibers, natural fibers-cultivation, physical & chemical properties of Man-made fibers-manufacturing process, physical & chemical properties.
* Study of new fibers- Lycra, lyocel, ultra fine fibers, , photo adoptive fibers, intelligent fibers, nano fibers & medical fibers. Brief study of manufacturing, physical & chemical properties.
* Yarn Manufacturing process, Types of yarns, simple yarn, ply yarn- novelty and fancy yarns, types of textured yarns Non woven- Bonded fabrics , felt fabrics, laminated fabrics, decorative fabrics-braiding-netting, laces, crocheting & tatting, industrial textiles- Geo textiles ,medical, nano textiles, smart textiles

UNIT – II: Textile Chemistry

* Polymer Chemistry - Polymerization process, Functionality : Linear and cross linked polymer. Condensation and addition polymers. Polymerization techniques, Characteristics of Fibre, Forming Polymers, Melt, Pry & Wet Spinning.
* Fiber Structure, Formation and arrangement of Crystalline and Amorphous region in fiber and their influence on various properties of fibres - Dye Stuff Chemistry. Colour theory difference between a coloured compound and a dye suitable for textiles.
* Classification of dyes. Azoic, Aniline black. Acid, Basic, Mordant, Disperse, Vat, Reactive, direct, pigment. Brief, introduction about chemical constitution, properties methods of application and suitability of various dyes to different fibers and their blends.

UNIT – III: Advanced Textile Design

* Shuttle less looms – air jet looms-water jet looms-rapier looms-projectile looms, basic principles and operations in weaving & Knitting introduction-weft knitting & warp knitting-basic principles and operations.
* Fabric weaves-Jacquard, swivel, lappet, figure and dobby weave. Methods of weave representation, repeat of weave drafts, rowing in weaving plan, lifting plan, peg plan, relation between weave draft. Prepare a peg plan for basic weave and its variation., general principles of printing.
* Study of machinery used for printing such as table, roller stencil, flat bed screen, rotary screen faults and remedies in painting. Styles of printing and their fixation methods Styles of printing and their fixation methods
UNIT – IV: Pattern Making & Grading

* Working with patterns - Reading pattern envelope understanding pattern markings, Different Pattern Making methods i)Drafting (ii) Draping (iii) Flat Patterns (iv) Use of commercial patterns Pattern alteration, lengthening and shortening patterns, making bust, shoulder, crotch length alteration, increasing and decreasing waistline and hipline, neckline and sleeve alteration.

* Techniques of pattern grading -: The draft grade or Nested grade, the track grade. Advantages and disadvantages of these techniques, instructions for grading. Commercial pattern envelope

* Draping on the dress form – dart manipulation, pleats, darts, tucks and gathers. Neckline variation, armhole variation, waistline variation. The princess waist, yokes, basic cowls and variation.

UNIT – V: Textile Testing & Quality Control


* Yarn Testing: Definition, objective method of testing, to test-count denier twist, diameter, tensile strength, elongation at break, stress strain curves, elastic recovery, yarn appearance, evenness, interpretation of results.


UNIT – VI: Fashion Design & Apparel Merchandising


UNIT- VII: Research Method

* Research: definition & types, the research process, defining the research problem, research design
* Sampling: concepts, error, types, determination of sample size, estimation and confidence intervals
* Hypothesis: formulation, types, errors
* Literature search, referencing, abstracting, bibliography
* Validity & reliability of data

UNIT- VIII: Statistics

* Measurement and scaling: classification & techniques, questionnaire designing & data collection
* Concept & scope of statistics, classification, tabulation & graphical presentation of data, Concepts of descriptive & inferential statistics
* The writing process, parts of dissertation/research report/article
* Computer applications in data analysis: use of MS-Office, MS-Excel for research, Use of SPSS for data analysis

REFERENCES:

- Grewer &Hamley – Handbook of Textile Testing and quality control
- Knitting technology-D.B. Ajronkar
- Non-Woven manufacture-NN. Banerjee
- C.R. Kothari. Research Methodology (Methods & Techniques)
- Shenai V. A. History of Textile Design.
- Shenai V. A. Principles and practice of dyeing.
- Watson : Textile design and colour, universal publishing corporation.
Syllabus for Pet – II Examination

SUBJECT :- FAMILY RESOURCE MANAGEMENT
Faculty of Home Science
Subject Code No. 2.04

UNIT – I:
- Introduction to management, Management discipline and approach to its study, Process theory – Quantitative and behavior approach systems and contingency approach
- Work Simplification, System approach to management, Management Control tools, Management of material goods,
- Physical energy – energy demands and stages of family life cycle, Fatigue – types
- Time Management (G.C & K) g & C.P.M. Pert, Decision making – modes of decision making, Stress Management - meaning and significance
- Energy Saving Technology, Waste Management – Classification of waste, characteristics, need, methods and technologies, Zero waste management – vermicomposting, organic composting

UNIT- II:
- History of Housing, concept and development of Housing, Present housing condition in India, Rural and urban, cost of housing, housing management problems, low cost housing.
- Private and public housing, Various housing schemes, Central government programs, Local government programs, Industrial housing
- Building materials and finishes, Basic building materials, Basic finishing materials, Building finishes, Cost of housing design, Estimating, costing and cost reduction techniques,
- Principles of House planning, green housing, Housing interior design – principles

UNIT – III:
- Man-machine - Environmental system, Physiological Aspects of Work, Musculoskeletal Problems in Sitting and Standing, Physical Work Capacity, Neuromuscular system and types of muscular contraction and energy requirement.
- Energy management and factors affecting muscular activity, Energy expenditure for different activities and energy balance, Aerobic and anaerobic work, Muscular strength-endurance and energy consumption, Time motion studies - principles of motion economy
- Definition of Anthropometry, Application of anthropometry in Design, Static and dynamic anthropometry, Work space and work station design for standing and sitting operations, Principles of applied anthropometry in ergonomics

UNIT – IV:
• **Engineering Psychology**, The design of Human machine system, Work Organization, Motivation and Job Satisfaction, Ergonomic consideration for the physically challenged
• Environment pollution and sources of pollution, Environmental protection, meaning, need and protection measures, Social movements and organizations and sustainable environment, Climate change and their impacts on human environment

**UNIT- V:**

• **The Entrepreneur**, Entrepreneurial motivation, Entrepreneurial Competency – Concepts, Developing entrepreneurial competencies, Concept need and process in entrepreneurship development and women entrepreneurship, Government policies and schemes for enterprise development, Institutional support in enterprise development and management.

• **Launching and organizing an enterprise**, Enterprise feasibility study, SWOT analysis, Resource mobilization – finance, technology, raw material, site and manpower, Costing and marketing management and quality control, Feedback, monitoring and evaluation

• **Financial Planning and Implementation**, Budgeting, Accounting, Advertising, Marketing, Consumer Education

**UNIT- VI:**

• Introduction & definition of landscaping, Importance of landscaping, Principles of landscape gardening, Climatic Condition– Microclimatic consideration in landscape, Fruit growing in small areas, Plants to define areas, Equipments
• Symbols used in landscaping, Garden Furniture, Importance – Use, Types & selection, General Introduction to garden equipment – types & use, Garden Lighting, Lights & their use, Lamps, Filters, how to choose a lamp
• Understanding of various materials for paving walk way etc. (Stone, Masonry, Brick Masonry)
• Kitchen Garden (Vegetable garden), Terrace Garden, Indoor & Outdoor Plants, Landscape division according to use for ground area, Water Garden and Rock Garden, Use of rainwater in landscape, System of Irrigation Drainage

**UNIT- VII:**

• Research: definition & types, the research process, defining the research problem, research design
• Sampling: concepts, error, types, determination of sample size, estimation and confidence intervals
• Hypothesis: formulation, types, errors
• Literature search, referencing, abstracting, bibliography
• Validity & reliability of data

**UNIT- VIII:**

• Measurement and scaling: classification & techniques, questionnaire designing & data collection
• Concept & scope of statistics, classification, tabulation & graphical presentation of data, Concepts of descriptive & inferential statistics
• The writing process, parts of dissertation/research report/article
• Computer applications in data analysis: use of MS-Office, MS-Excel for research, Use of SPSS for data analysis
References:

- Harriet and Reel Goldstein: Art in everyday life.
- Baker Sue, Bradley P. Huyton, J.: Principles of Hotel Front Office Operation Cassell, Wellington H.
- CednCroexer - All about Landscaping – Ortho Books.
- Lemor J.M. - The Complete Home Landscape Designer.
- C.R. Kothari : Research Methodology (Methods & Techniques).

********************************************
Syllabus for Pet – II Examination

Name of Subject: Cosmetic technology,
Faculty of Home Science Subject Code: 2.05

Unit – I: Skin Care Cosmetics: Introduction, formulations, properties, evaluation and advances in skin care products e.g. moisturisers, antiwrinkle preparations, skin whitening preparations, sunscreen preparations, makeup preparations and men’s cosmetics.

Unit – II: Hair Care Cosmetics: Introduction, formulations, properties, evaluation and advances in Hair oils, shampoos, hair conditioners, hair dyes, hair colorants and hair tonics.

Unit – III: Cosmetic Microbiology: Significance of microbiological testing in cosmetics
A) Study of following microbiological processes; Sterilization, Disinfection, Determination of TMC, Determination of MIC
B) Study of Antiseptics, Sanitizers, Germicides, Antimicrobials, Preservatives.
C) Microbiological analysis of skin, hair, eye and baby cosmetics.

Unit – IV: Natural Cosmetics: Study of the following herbs with reference to their sources, chemical constituents, evaluation, cosmetic uses and formulations: e.g. Aloe, Babool, Brahmi, Bawachhi, Chandan, Cucumber, Haldi, Ambahaldi, jashtamadh, Jatamansi, Lodra, Mehndi, Neem, Nagarmotha, Ritha, Raktachandand, Shikakai, Tulsi, Arnica, Manjishta.


Unit – VI: Plant design: Selection of Plant location, plant layout for manufacture of creams, powders, lotions, soaps and alcohol preparations.

Unit – VII: Dermatological testing of skin care, hair care and makeup preparations as per BIS specifications. Alternate methods for animal testing.

Unit – VIII: Review of recent actives (cosmeceuticals) used in skin and hair care products

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**Syllabus for Pet – II Examination**

**Name of Subject : Extension Education, Faculty of Home Science, Subject Code: 2.06**

**THEORY:** 50 marks

**Unit – I: Communication Technology & Media**
- Principles and Theories of Communication.
- Communication Process and Models of Communication.
- Government Policies on Mass Media in India

**Unit – II: Media Technology**
- Classification of Media and detailed study of each medium.
- Media Planning and scheduling section of media on the basis of suitability, reach, impact, frequency and cost.
- Development Communication - Planning, Organisation, Administration and Evaluation of Development Communication Programmes.

**Unit – III: Community Health**
- Concept of Community Health, Objectives of Health Services.
- Different Agencies involved in Health System.
- Food & Nutrition Policy and its implementation.
- Deficiency diseases and its impact on rural population.
- Methods of Nutritional Assessment.

**Unit – IV: Indicators to Assess Health Status**
- Crude death rate, Pre-natal Mortality, Birth rate, Natural and Gross Reproductio rate, Maternal and Infant Mortality Rate
- Gender as a determinant of Health, Sex Ratio in India
- Problems and issues relating to women’s health.

**Unit – V: Non Formal Education**
- Planning and methodology of NFE Programmes, Characteristics of NFE, Technique of Community Study.
- Methods and materials for NFE.
- Evaluation of NFE Programmes.
- Characteristics of NFE Learners.
- History of Distance Education, Objectives, Philosophy, Need and Concept of Distance Education.
- Media in Distance Education, Criteria in Selection of Media.
- Curriculum Development for NFE, Barriers in Distance Learning.
UNIT –VI: **Diffusion and Adoption of Innovations**

* Core element of diffusion, Attributes and Generation of Innovation
* Diffusion Networks and Consequences of Innovation
* Adoption Process, Characteristics of Adoptor Categories
* Barriers to Adoption
* Role of Government & NGDs in overcoming barriers to technology adoption.

Unit – VII:

* Research : definition & types, the research process, defining the research problem, research design.
* Sampling : concept, error, types, determination of sample size, estimation and confidence intervals.
* Hypothesis : formulation, types, errors
* Literature search, referencing, abstracting, bibliography
* Validity & reliability of data

Unit – VIII:

* Measurement and scaling : classification & techniques, questionnaire designing & data collection.
* Concept & scope of statistics, classification, tabulation & graphical presentation of data, Concepts of descriptive & inferential statistics.
* The writing process, parts of dissertation / research report / article.
* Computer applications in data analysis : use of MS-Office, MS-Excel for research, Use of SPSS for data analysis.

REFERENCE

9. Introduction to Sociology - V. B. Sahdeva Kitab Mahal.
# Syllabus for Pet – II Examination

**Name of Subject:** Hotel Management & Catering Technology,  
**Faculty of Home Science, Subject Code:** 2.07

<table>
<thead>
<tr>
<th>Unit – I:</th>
<th>Introduction to Hospitality</th>
<th>Marks</th>
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<tbody>
<tr>
<td></td>
<td>- Growth and development of Hospitality</td>
<td>10</td>
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<tr>
<td></td>
<td>- Impact of socio-economics and technology on hospitality</td>
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<td></td>
<td>- Future scope of Hospitality</td>
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<tr>
<td></td>
<td>- Various Modules related to reservations, Registration, cashier, telephones, guest, history,</td>
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<td></td>
<td>Housekeeping</td>
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<td></td>
<td>- Conference and Banqueting systems</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Unit – II:</th>
<th>Hospitality Regulations</th>
<th>Marks</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>- Rules and Regulations relating to hospitality Industry</td>
<td>10</td>
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<tr>
<td></td>
<td>- Renewal suspension and termination of licenses, procedure for granting star gradation in India</td>
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<td></td>
<td>- Various approvals and permissions required to set up a hotel.</td>
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<td></td>
<td>- Bar and liquor licenses, validity, renewal and penalties.</td>
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<td></td>
<td>- Various types of licenses required by restaurants and all Food and Beverage outlets.</td>
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<td>- FSSAI regulation</td>
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<tr>
<th>Unit – III:</th>
<th>Sales and Marketing</th>
<th>Marks</th>
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<tr>
<td></td>
<td>- Sales – Definition, Importance, Objectives of Sales Promotion,</td>
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<td></td>
<td>- Factors contributing the growth of sales promotion.</td>
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<td></td>
<td>- Tools/levels of Sales promotion - Consumer sales promotion</td>
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<td>- Personal Selling-Definition, Concept, Objectives, Importance.</td>
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<td>- Marketing – Marketing Environment – Concept of Micro and Macro Environment, Case study</td>
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<td></td>
<td>- Marketing Planning – Meaning of Planning and Marketing Planning, Importance, Benefits and Characteristics of marketing Planning,</td>
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<tr>
<th>Unit – IV:</th>
<th>Strategic Management</th>
<th>Marks</th>
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<tbody>
<tr>
<td></td>
<td>- Nature, importance &amp; evaluation and objectives of Business policy as a discipline,</td>
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<tr>
<td></td>
<td>- Understanding strategy, Definition and explaining Strategy, strategic decision making.</td>
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<td></td>
<td>- Process of strategic management</td>
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</tbody>
</table>
### Unit – V: Food and Beverage Department

- An analysis of menu development for food service establishments by production department
- Create menus from the perspective of concept, clarity, cost, price and efficiency.
- Principles of pricing, product development, target marketing,
- Risk management, Importance of food safety in hotel industry.

### Unit – VI: Event Management

- Concept, designing and developing the concept
- Preparing event proposal
- Staffing, preparing organization charts
- Training and briefing of staff.

### Unit – VII: Computing systems in Hospitality

- Front Office Reports
- Food and Beverage Control systems – Mini Bar
- Table Management systems
- Budget and budgetary control

### Unit – VIII: Tourism

- Understanding Tourism, definitions
- Importance scope and development of tourism
- Emerging forms of tourism
- Economic, Social, Environmental, effect of tourism
- Travel agency and tour operators package tour and itinerary planning

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**Books Recommended**

1. Guest management, Dr. R.K. Singh; Aman Publications
2. Banquet Management and Room Divisions, Dr. D.K. Agarwal; Aman Publications.
3. Tourism and Hospitality Industry, Sunil Kabia; Reference Press New Delhi
6. The Industrial Dispute Act 1947, Akalank publications
7. The Insurance Act 1938, Akalank publications
9. Hospitality Marketing, Neil Wearne; global Books and Subscription Services
10. Professional Hospitality, Van Der Wagen; Global Books and Subscription Services
11. Tourism and Hospitality Industry, Sunil Kabia; Reference Press, New Delhi
Syllabus for Pet – II Examination

Name of Subject: Fashion Design,
Facutly of Home Science, Subject Code: 2.08

Theory -50 marks

Unit – I:  
10 Marks

CAD in fashion

• Rendering fashion figures using different medium.
• Planning a Colour story.
• Periodic fashion illustration
• Technical illustration & Stylized illustrations
• Illustrating Indian & Western costumes on male & female croqui.
• Fashion Arts – Body Art & Pop Art.
• Introduction to photoshop – Definition of Layer, Colour Modes, RGB Colourmodel, Adobe illustrator- Getting to know & Working in Illustrator Using drawing tools, Selection and Curves, Handling text, Transformations in illustrator. CMYK Colour model, Pixles, Vector, Resolution, Main menu Bar.

Unit – II:  
10 Marks

Pattern making and Grading

• Methods of pattern designing a) Drafting b) Flat pattern c) Draping
• Terminology, Apparel product development, cost sheet, pattern chart, design specification sheet.
• Standard ideal figure, pattern industry standards and standardization of sizes, landmark terms, symbol key HBL.
• Development of stylelines – classic princess, arm-hole princess and panel in basic bodice.
• Grading Techniques - The draft or multisize or Nested grade, The track or single grade
• Selection and application of grading technique for different garment depending on their fit.
• Difference between Manual grading and computerized grading.

Unit – III:  
10 Marks

TEXTILES

• Flow chart for production processes of Natural and Man made fibres.
• Flow chart for processes of conversion of yarn into fabric, i.e., weaving, knitting, non-woven.
• Comparative studies of the woven and knitted fabrics construction and advantages of each.
• Fully cut knitted garments- knit type, uses, Fully fashioned knitted garments- knit type, uses
• Integral knitted garments- knit types, uses, Cut stitch shaped knitted garments - knit type, uses, Quality control, Defects in knitted fabric
• Application Dyes on suitable material. Dyeing methods – fibre, yarn, hank
• and package. Fabric and garment dyeing. Dyeing defects, causes and remedies

Types of Printing machines

Unit – IV:

History of fashion

10 Marks

• The Couturier, Haute Couture, Prêt-À-Porte, Fashion Direction, Fashion Editors, Line, Knockoffs, Avant Grade, Bridge
• Fashion Cycle and fashion flow chart, Theories and Principles of Fashion Adoption
• Indian Fashion Pre & Post Independence
• History of Indian Costumes. - Pre Historic Vedic Period Maurya, Sunga, Satavahana, Kushan period Gupta, Mughal period
• History of Western Costumes - Ancient Egypt, Ancient Greek, Ancient Rome, Byzantine, Renaissance

Unit V:

World costume

10 Marks

• Ancient era costume - Mesopotamian, Egyptian, Greek, Roman Costumes
• Middle ages costume - Byzantine Age of Knights, Renaissance Period, Asian and African Costumes, Modern era costumes, Victorian, Edwardian, American Costumes, 18th-20th Century, 20th Century Costumes and influences
• Traditional costumes of asian countries - Japanese and Chinese Costumes, emphasis on Geisha and Samurai Costume, Thai and Malaysian Costumes, Costumes of Pakistan, Sri Lanka
• Role of Costumes in Movies/Theater/Television, Costume design for films: Analysis of movies/television serials made in different genres.
• Costume design for theatre - Analysis and Costuming of Famous Classical and Contemporary plays made in different genres.
• Study of Indian & International designers

Unit – VI:

Garment production

10 Marks

• General & Technical Classification of Sewing Industry
• Structure of Garment Manufacturing Technology
• Machines used in Different Departments
• Different types of I.S.M, Classification of I.S.M, Symbols of I.S.M
• Meaning of Production and Productivity - Process Chart, Time Study, Work Measurement, Work Analysis, Motion Study
• Measuring Productivity - Types of Productivity Measure, Productivity Measure, Productive Improvement, Measuring Productivity Growth and Decline, Steps in implementing a productivity Measurement
Unit – VII: 10 Marks

Marketing and merchandising

- Marketing function – definition and classification product planning and development importance of fashion products, nature of fashion products.
- Advertising media used in apparel marketing. Advertising department, advertising agencies. A survey on analysis of customers fashion preference & international advertising.
- Fashion sales promotional programme for apparel marketing, communication and promotion, personal selling, point of purchase, sales promotion objectives, consumer sales promotion.

Unit – VIII: 10 Marks

Research method

- Selection of Research Topic, selection of research problem, literature review, evaluation of research problem.
- Research design- meaning, concept & features of research design, experimental design, plan of research work. Methods & Tools of Research - Reliability and validity of research tool. Qualitative and quantitative studies, Primary& Secondary data collection method. Preparing questionnaire and opinionnaire, identification of sources of information, searching and classifying information, organization of data collection. Processing & analyzing of data & information, limitation

REFERENCES:-

- Learning Illustrator CS5 by Ramesh Bangia, Khanna Book publication company (P), Ltd. Delhi
- Learning Coreldraw X5 by Ramesh Bangia, Khanna Book Publishing
- "Fashion Design" by Janice G. Ellinwood.
- "Fashion Illustration” by Dr. Vijay Kakde, Blue Bird Publication (India) Ltd.
- Cartis Irving E., Fundamentals principles of pattern making for misses and women’s garments New york FIT 1987
- Handrod Jack , Professional pattern grading for women’s, men’s and children’s apparel!, redendo bench Struin Pamela, "Pattern drafting for Dress Making” Augustan Delhi 1995
- Textile, Fibre to Fabrics by Potter M. D., McGraw-Hill, United States of America
- History of Fashion by Manmeet Sodhia Kalyani Publishers
- Knitted Clothing Technology, Terry Brackenbury, Blackwell science, OM Book Service
- Martin Shoben/Janet P Ward, Pattern Cutting and Making up.
- History of Fashion by Manmeet Sodhia Kalyani Publishers
- Introduction to clothing prod. Mgmt. by A J Chuter (Blackwell series)
- Garment technology for Fashion designers by Gerry (Cooklin Blackwell)
- Marketing Principle and methods by Philip C. F and Duneon D.T, Irwin publications
### Syllabus for Pet – II Examination

**Name of Subject : Business Management & Administration, Faculty of Commerce, Subject Code: 3.01**

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<thead>
<tr>
<th>Unit – I:</th>
<th>Principles of Management</th>
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<td>Unit- II:</td>
<td>Financial Management</td>
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<tr>
<td>Unit-III:</td>
<td>Human Resource Management</td>
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<td>Unit-IV:</td>
<td>Marketing Management</td>
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<td>Unit-V:</td>
<td>Organizational Behaviour</td>
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<td>Unit-VI:</td>
<td>Quantitative Techniques</td>
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<td>Unit-VII:</td>
<td>Managerial Economics</td>
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<td>Unit-VIII:</td>
<td>Research Methodology</td>
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</table>
Syllabus for Pet – II Examination

Name of Subject: Business Economics, Facutly of Commerce, Subject Code: 3.02

Unit- I: Firms and Perfect Market Structure
Behaviour of profit maximizing firms and the production process; short-run costs and output decisions; costs and output in the long run.

Unit -II: Macroeconomics and National Income Accounting
Basic issues studied in macroeconomics; measurement of gross domestic product; income, expenditure and the circular flow; real versus nominal GDP; price indices; national income accounting for an open economy; balance of payments: current and capital accounts.

Unit - III: Money
Functions of money; quantity theory of money; determination of money supply and demand; credit creation; tools of monetary policy.

Unit - IV: Consumer Theory
Preference; utility; budget constraint; choice; demand; Slutsky equation; buying and selling; choice under risk and intertemporal choice; revealed preference.

Unit - V: Open Economy Models
Short-run open economy models; Mundell-Fleming model; exchange rate determination; purchasing power parity; asset market approach; Dornbusch’s overshooting model; monetary approach to balance of payments

Unit - VI: Policies and Performance in Agriculture
Growth; productivity; agrarian structure and technology; capital formation; trade; pricing and procurement.

Unit - VII: Policies and Performance in Industry
Growth; productivity; diversification; small scale industries; public sector; competition policy; foreign investment.

Unit - VIII: Business Research

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Syllabus for Pet – II Examination

Name of Subject: Commerce,
Facutly of Commerce, Subject Code: 3.03

UNIT- I: Recent Trends in Commerce


UNIT- II: International Trade


UNIT - III: Business Environment

Elements of Business Environment - Internal and External, Economic - Environment and Industrial Policy and Its Impact on Firms and General Business Environment. Industrial Zones or Area: Small Industrial Zone, Co-operative Industrial Estate, SEZ, STPI etc.

MSMEs, SSI: Problems and Prospects. Global Outsourcing- Rationale, India’s Perspective.

UNIT - IV: Financial Market:


UNIT - V: Banking - Insurance and Financial Institution

Importance of Banking to Business, Types of Banks and Their Functions, Role of Reserve Bank of India, NABARD and Rural Banking, Financial Inclusion and Micro Finance, Banking Sector Reforms in India, NPA, Capital adequacy norms, E-banking, Mobile Banking, Development Banking : IDBI, IFCI, SFCs, UTI, SIDBI


UNIT - VI: Co-operation and Rural Business Development

Co-operative movement and Agriculture Development in India: co-operative farming, co-operative marketing, co-operative banking, Role of Self Help Groups (SHGs) in rural sector, Problems and remedies. Changing Landscape of APMCs, e-Mandi, Agri-Business and Rural Entrepreneurship.
**Unit - VII: Commercial Law and Institutional Support to Commerce**


**Unit - VIII: Business Research**

Syllabus for Pet – II Examination

Name of Subject: Accounts & Statistics, Facutly of Commerce, Subject Code: 3.04

Unit- I: Introduction:
Generally Accepted Accounting Principles (GAAP), International Financial Reporting Standards (IFRS), Indian Accounting Standards (Ind AS), India's roadmap to Convergence with IFRS, Forms of organizations and their effect on Accounting.

Unit- II: Corporate Accounts:
Types of Companies, Shares and Share Capital, Issue of Shares; Current trend, Final Accounts of Companies according to Revised schedule VI 2011, Annual Reports, Corporate Social Responsibility.

Unit- III: Financial Statement Analysis:

Unit- IV: Contemporary issues in Accounting:
Foreign Currency Accounting, Creative Accounting, Social and Environmental Accounting, Human Resource Accounting, Inflation Accounting, Computerised Accounting.

Unit- V: Descriptive Statistics:
Concept of primary and secondary data. Methods of collection and editing of primary data. Measures of central tendency, Absolute and relative measures of dispersion, Measures of Skewness based on quartiles and moments and kurtosis based on moments with real life examples.

Unit- VI: Probability:
Basic concepts in probability—deterministic and random experiments, trail, outcome, sample space, event, and operations of events, mutually exclusive and exhaustive events, and equally likely and favourable outcomes with examples.

Unit- VII: Correlation and Regression:
Population correlation coefficient and its properties, sample correlation coefficient, Principle of least squares, simple linear regression, correlation verses regression, properties of regression coefficients.

Unit- VIII: Business Research

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## Syllabus for Pet – II Examination

**Name of Subject:** English, Facutly of Arts, Subject Code: 4.01

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<thead>
<tr>
<th>Unit- I:</th>
<th>Renaissance Literature</th>
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<tbody>
<tr>
<td>1)</td>
<td>Elizabethan Sonnets</td>
</tr>
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<td>2)</td>
<td>Renaissance Drama</td>
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<tr>
<td>3)</td>
<td>Christopher Marlowe: Doctor Faustus</td>
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<td>4)</td>
<td>Shakespeare: Hamlet</td>
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<thead>
<tr>
<th>Unit- II:</th>
<th>17th &amp; 18th Century Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Metaphysical Poetry</td>
</tr>
<tr>
<td>2)</td>
<td>John Dryden: Absalom and Achitophel</td>
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<tr>
<td>3)</td>
<td>Alexander Pope: “The Rape of the Lock”</td>
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<td>4)</td>
<td>Henry Fielding: Tom Jones</td>
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<thead>
<tr>
<th>Unit- III:</th>
<th>Romantic and Victorian Literature</th>
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<tbody>
<tr>
<td>1)</td>
<td>Wordsworth: “Tintern Abbey”</td>
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<tr>
<td>2)</td>
<td>Keats: “Ode to a Nightingale”</td>
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<tr>
<td>3)</td>
<td>Robert Browning: “Andrea del Sarto”</td>
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<td>4)</td>
<td>Thomas Hardy: The Mayor of Casterbridge</td>
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<tr>
<th>Unit- IV:</th>
<th>Twentieth Century Literature</th>
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<tbody>
<tr>
<td>1)</td>
<td>WB Yeats: “The Second Coming”</td>
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<tr>
<td>3)</td>
<td>EM Forster: A Passage to India</td>
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<td>4)</td>
<td>GB Shaw: Candida</td>
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<tr>
<th>Unit- V:</th>
<th>Indian Writing in English</th>
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<tbody>
<tr>
<td>1)</td>
<td>Rabindranath Tagore: Gitanjali</td>
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<tr>
<td>2)</td>
<td>Kamla Das: Poetry of Kamla Das</td>
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<tr>
<td>3)</td>
<td>Mulkraj Anad: Untouchable</td>
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<td>4)</td>
<td>Mahesh Datani: Dance Like a Man</td>
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<thead>
<tr>
<th>Unit- VI:</th>
<th>Literary Criticism and theory</th>
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<tbody>
<tr>
<td>1)</td>
<td>Wordsworth: “Preface to Lyrical Ballads”</td>
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<tr>
<td>2)</td>
<td>Matthew Arnold: “Function of Criticism at the Present Time”</td>
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<tr>
<td>3)</td>
<td>Derrida: “Structure, Sign &amp; Play….“</td>
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<td>4)</td>
<td>Lionel Trilling: Freud and Literature</td>
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<tr>
<th>Unit- VII:</th>
<th>American Literature</th>
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<tbody>
<tr>
<td>1)</td>
<td>Thoreau: Walden</td>
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<tr>
<td>2)</td>
<td>Walt Whitman: “Song of Myself”</td>
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<tr>
<td>3)</td>
<td>Hemingway: The Old Man and the Sea</td>
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<td>4)</td>
<td>Arther Miller: Death of a Salesman</td>
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<thead>
<tr>
<th>Unit- VIII:</th>
<th>Postcolonial Theory and Literature</th>
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<tbody>
<tr>
<td>1)</td>
<td>Edward Said: Orientalism</td>
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<tr>
<td>2)</td>
<td>Gayatri Spivak: “Can the Subaltern Speak?”</td>
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<tr>
<td>3)</td>
<td>Amitav Ghosh: The Shadow Lines</td>
</tr>
<tr>
<td>4)</td>
<td>Kiran Desai: The Inheritance of Loss</td>
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</tbody>
</table>
**Syllabus for Pet – II Examination**

*Name of Subject: Sanskrit, Facutly of Arts, Subject Code: 4.02*

| UNIT – I:       | Vedic Literature - वैदिकसाहित्यम्                                      | 1 |
| UNIT – II:     | Sanskrit Literature-संस्कृतसाहित्यम्                                      | 2 |
| UNIT – III:    | Grammar and Linguistics, Nirukt. भाषाविज्ञान व्याकरण निरुक्तम् च। | 3 |
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1 पद्धति—वैदिकसाहित्यम्

- रायिता-स्राभण-आरण्यक-उपनिषदः
- अर्थसूत्रसमीकि-अंगिनि: I-1, इन्द्र: II-12, पुरुष: X-90, नासविनः X-129.
- अर्थसूत्रसमीकि-कालः X.53 सम्बादसूत्रसमीकि-सरसंहः परितंत्र: X.109)
- वैदिककालसंस्कृतम्
- वेदाङ्गसाहित्यम्

संदर्भ प्रमाण: Reference Books
1. संस्कृत साहित्यायाम इतिहास: – दृ. सिंधु डांगे,मंगल प्रकाशन,नागपुर
2. ग्रंथावधि: महात्मा भारतेन्द्र-सिद्धेश्वरशास्त्री विद्वान,भारतीय वरिजकोष मंड़ल, पुणे
3. वैदिक साहित्य: आयाम जलदेव उपाध्याय,वीरभद्र प्रकाशन,वाराणसी
4. भाषान्वयो राजनीतिक सिद्धांत: वल्लभी आयार्य, वीरभद्र प्रकाशन, दिल्ली
5. The New Vedic Selection–by Telang and Choube, Bhartiya Vidya Prakashan,Varanasi

UNIT - II: Sanskrit Literature

2 पद्धति—संस्कृतसाहित्यम्

- आर्यमहाकाव्ययो: चन्दनालाल:
- पंचमहाकाव्यानि
- गद्यसत्र कादमबरी-महाभाषेत् तुतातलम्
- पद्यसत्र दुधर्सरितम्,मेघदुतम्
- चम्पूकायसत्र-नलचनम्,उचचवास-1
- नाटकसत्र-उत्तररामगरितम्,गुरुकर्त्तिकम् मुदाराक्षसम्

संदर्भ प्रमाण: Reference Books
1. संस्कृत साहित्यायाम इतिहास: – दृ. सिंधु डांगे,मंगल प्रकाशन,नागपुर
2. संस्कृत साहित्य का इतिहास: बलदेव उपाध्याय, चौधरी संस्कृत विद्यालय, वाराणसी
3. नलचनम्,समानात्म वेदालकार,साहित्य मंडल,सुभाष बाजार, मेरठ
4. चम्पूकाय का आलोचनात्मक एवं ऐतिहासिक अध्ययन: – दृ. छत्रीश
5. कादमबरी-महाभाषेत्-तुतातलम्-चौधरी आर्यन्तविलाय, दिल्ली
6. History of classical Sanskrit literature-Krishnmachariar M, Molilal Banarasidas,Delhi

UNIT - III: Grammar and Linguistics, Nirukt

3 पद्धति—भाषाविज्ञान व्याकरण निरूरत च।

- निरूरतम्-अयायशः 1,2
- भाषाविज्ञानम्—भाषायामित्रतानि,तर्किकरणम्, सुप्रज्ञानम्,अथपरिवर्तनम्,धार्मिकपरिवर्तनम्
- भाषाविज्ञानम्: भाषाविज्ञान अध्ययन: क्षेत्रीयपरिवर्तनम्,धार्मिकपरिवर्तनम्
- व्याकरणम् — व्याकरणपरिणामकाल,पंचसद्धार्मिक,समालस्य
- लघुसिद्धान्तकालमुखी—व्याकरणपरिणामम् ’भू‘, ’वृ‘, कारकप्रकरणम्, मल्लयर्थी, सौतीर्थी

संदर्भ प्रमाण: लोमिनितमदम उद्वोऽ
1. निरूरतम्–दृ.मोनिन्धर,भारतीय अनुसंधान प्रतिष्ठान, दिल्ली
2. संस्कृत महाशास्त्रसंग्रह, मोनिन्धर, बालकाल, वीरभद्र प्रकाशन, वाराणसी
3. संस्कृत महाशास्त्रानि-चकरातटी, श्रीरामचर्य बुद्धवादी, वीरभद्र प्रकाशन, दिल्ली
4. संस्कृत व्याकरण (भाग 2) W. P.Hiwtrane Ed. By दृ.मोनिन्धर द्रा,उत्तरप्रदेश हिंदी यंग अकादमी, लखनऊ
5. वैदिकसाहित्यमुखी, संस्कृतविज्ञानसंस्थान, 635 सदस्यता पत्ते, पुणे
6. A Dictionary of Sanskrit Grammar, K. V. Abhyankar, Gritional Institue, Baroda
UNIT - IV: Indian Philosophy

4 घटकम्—भारतीयदर्शनम्।
- वेदात्मसार, तर्कसब्दह
- सांख्यकारिका, योगसूत्रम्
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- नासिककदर्शनद्वितिहासः।
- चार्यक—वैद्य—जैनदर्शनिनानी(सर्वदर्शनसंग्रह)।

संदर्भप्रमाण — Reference Books

1. भारतीय तत्त्वज्ञानाचा भूमिका इतिहास—डॉ. गजानन नानारायण जोशी, सारस्वत प्रकाशन, पुंजे।
2. वेदात्मसार — ए. एच. योगें, पुंजे।
3. तर्कसब्दह—पन्नी चाँगकर पुंजे।
4. भारतीयदर्शन—डॉ. बलदेव उपाध्याय, मोलीलाल बनारसीदास प्रकाशन, दिल्ली।
5. कालपनिषद् शौकरामायणसहित — गोरखपुर, गौतमप्रेस।
6. सत्यदर्शनसंग्रहः—माधवकार्य, भाग्यार्कर प्राध्यविद्या संस्थान मन्दिर, पुंजे।
7. अर्थसंशय—चौथव्या प्रकाशन, वाराणसी।
8. सांख्यकारिक — लुक्कुरुकुण। डॉ. श्रीकृष्णराम निषदी। चौथव्या सूर्यभारती प्रकाशन, वाराणसी — 221001।
9. योगसूत्रम्—साेम संवेदनानन्द सारासूत्र मंड, नानागुपुर।
10. History of Indian Philosophy, Dasgupta, Vol.1-2, Motilall Banarasidas Publication, Delhi।

UNIT - V: Poetics and Dramatics

5 घटकम्—काव्यशास्त्र नाट्यशास्त्र च।

- समावृतत्वकायक्रिया—काव्यप्रयोजनम्, काव्यलक्षणम्, शब्दक्रिया, काव्यमुद्रा, दोषा,
- आन्दर्थक्रिया—व्याख्यालक्:—व्याख्यालक्षण, मूलविविधोत्साहनति माति, मूलविविध:
- काव्यालक—सामायकरिषयः.
- भारतमुकुन्तकनन्तायक्षासंग्रहः—सरस्वती, सरस्वतनम्, माधवर्णनम्, अभिनवगुप्तसमस्त: सरस्वतनम्:
- धान्यशास्त्रि दशलक्षकम्—प्रकाशी—1,2.

संदर्भप्रमाण — Reference Books.

1. काव्यप्रकाश—सत्यप्रकाशशास्त्री, चौथव्या प्रकाशन, वाराणसी।
2. व्याख्यालक—आन्दर्थक्रिया, मोलीलाल बनारसीदास दिल्ली।
3. नाट्यशास्त्रम्—डॉ. सत्यप्रकाश एम, चौथव्या प्रकाशन, दिल्ली।
4. नाट्यशास्त्र का इतिहास—डॉ. परमनाथ द्विवेदी, चौथव्या प्रकाशन, दिल्ली।
5. श्रीरूपकम्—धान्यशास्त्रि वनस्पति वनस्पति हिन्दीयायोगप्राप्ति, व्याख्याकार डॉ. मोताकंकर व्यास, चौथव्या प्रकाशन दिल्ली।

UNIT - VI: Sanskrit Inscription, Script, Kosh

6 घटकम्—पुराणिकेष्विकाय—लिपि—कोषप्रत्या: च।

- उत्तरक्षेत्रेष्वा—गिरिसार—प्रदेशव:प्रत्यामिलेखः,
- कुमारपुराणस्कृतसिद्धिविलेखः,
- पद्मावतिगुप्तरी—पुनराभाषणः
- रामपुराणस्कृत इन्द्रहारावदसमस्तः
- लिपि—ब्रह्मी, खृष्टीय, शारदा, नागरी
- अमरकोश—दियर्गः, कालवर्गः।
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7 घटकम्— कौटिल्यार्थशास्त्रम्, मानसरस्रस्मृति, मनुसृतिः च:

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• मानसरस्रस्मृति: सामान्यपरिचयः
• मनुसृतिः—अध्यायः 1.7

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8 घटकम्— प्रकृत्यार्थशास्त्रः:

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• कृषिशास्त्रम्
• वाष्पशास्त्रम्
• आधुनिकसंक्रमतसाहित्यस्य परिचयः:

UNIT- VII: Reference Books
1. कौटिल्यार्थशास्त्रम्— वस्तंत पत्तर्णन, मेनका प्रकाशन, सदाशिव पेट, विजयानगर कॉलमी,
2. कौटिल्यार्थशास्त्रम्— प. प. कंगाले महाराष्ट्र राज्य विधानसभा मंडळ, पुणे
3. मानसरस्रस्मृति:— भोजन बांधव, सरासरी, वाराणसी
4. मनुसृतिः— मोरकील बनासकोट, देहली

UNIT- VIII: Reference Books
1. वराहभिज्ञकृत वृहतसाहित्य— चौराहा विद्यापीठ, वाराणसी.
2. आधुनिकसंक्रमतसाहित्यस्य परिचयः:

• वाष्पशास्त्रम्— महामतम्— दानवानरमयप्रणालि शिवार्थिता हिंदी व्याकरणपेशेम्, डॉ. शेलजा पांडेय, न्यू दिल्ली,
4. आधुनिकसंक्रमतसाहित्य, मोंडर्स बुक स्टोर्स, नागपूर—डॉ. श्री. भा. वर्णकर
5. आधुनिकसंक्रमतकाया— परम्परा— डॉ. केतकर राव मुसालमाकर

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विषय: — आचार्य पद्मी नोडर्वनी प्रवेश परीक्षा पेट—2 साठी अभ्यासक्रम (Syllabus).

1. पद्मी व पद्मपुत्र झालेल्या सर्व सत्तांचा शास्त्रीय अभ्यास (तुलनात्मक अध्ययन,
   समावृतता सर्व, रागांमध्ये गाव व तालांचा अभ्यास, स्वर संतुक (भारतीय आणि युरोपीय
   स्वर संस्करण अभ्यास व तुलना)

2. गायकी व नापकी, संगीततत्त्व गणिती व इतिहास (वैश्विकव्यांसह) सादर्शीती.

3. संगीत विषयक श्रुतीचा अभ्यास ,
   1. भरतनाथणे — भरतनाथणे
   2. संगीततत्त्वाकर — शारणेश
   3. गानन्विविक — पं. श्रीनिवास
   4. संगीतरचण — पं. दामोदर
   5. प्रणवभारती — पं. ओकाराय धाकुर.

4. 1. लोकसंगीत अर्थ आणि व्याख्या (राजस्थान, पंजाब, महाराष्ट्र, उत्तरप्रदेश) पंडीत मुख्य
   लोकसंगीत प्रकार.
   2. लोकसंगीत आणि शास्त्रीय संगीत यात्री संबंध.

5. प्रक्षेप प्राचीन आणि आधुनिक —
   1. पाश्चात्यसंगीत
   2. बाबुदुंदुंडत
   3. बूंदागांवन
   4. गानसंगीत

6. वर्तीलशा्श्वास, उपत्यका वहन आणि प्रण साधोत्तर संक्या व विज्ञान तरंगीचा लोंबाचा
   परस्पर संबंध.
   स्वरसंस्कर, खुंबमोह व सारण चातुर्य.

7. 25. वातावरण शास्त्रीय संगीततत्त्व विषयक—
   1. संदर्भ व फूडजन संकलना — अर्थ, विज्ञान व उपयोगिता
   2. भारतीय संगीततत्त्व पायचाय संगीततत्त्वा प्रभाव
   3. संगीत व वाद्यविकारण
   4. साईदाब शास्त्र संकलना भारतीय व वाद्यांचे मत.

8. 1. संस्कृत गायकी — अर्थ, व्याख्या, प्रकार, तिथा, उपणे, मुतुमारां.
   2. ऐतिहासिक वैज्ञानिक शास्त्रीय तृणाकोनातून संगीत विषयक विविध निर्देश
   3. संगीत सामाग्री—
   वा. ह. देशपाय, गोविदराम घे, पाचं समितीत योगदान.

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<td>Madhyayugin Marathi Kavitaychey Swarup, Madhyayugin Marathi Kavitaychey Prabha, Samsat Kavitaa, Peshkari Kavitaa, Shabhirii Kavitaa, Aaheekik Marathi Kavitaychey Jagadhara, Aaheekik Marathi Kavitaychey Swarup, Marathi Natakavitaa, Swatantrapur Marathi Kavitaa, Swatantrayottar Marathi Kavitaa, Sathottari Marathi Kavitaa, Natawadottari Marathi Kavitaa, Marathiotal Pravesh Kavi v twamchya Kavitavishayak Kaamigiri</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unit  - VIII:</th>
<th>Madhyayugin-Aaheekik Gadyay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madhyayugin Marathi Gadyachya Swarup, Mahanubhav Gadya, Bakar Sahitya, Aaheekik Pathe, Ekopantakya Shataktaal Marathi Gadya, Swatantrapur Marathi Gadya, Swatantrayottar Marathi Gadya, Marathi Laxmit Gadya, Marathi Vachakar Gadya</td>
<td></td>
</tr>
</tbody>
</table>
Syllabus for Pet – II Examination
Name of Subject: Persian,
Faculty of Arts, Subject Code: 4.05

Unit – I:
(Classical and Ornate Prose)
Life of authors and critical assessment of their works;
(A) Nizami Aruzzi Samarqandi - Chahar Maqala
(B) Nizamul Mulk Tusi - Siyasat Nameh
(C) Zahuri Tershezi - Seh Nasr Zuhuri (Third Nasr)

Books Recommended:
(1) Tarihk-e-Adbiyat-e-Iran Dr. Raza Zadah Shafaq
(2) Chakide-Tarihk-e-Adbiyat-e-Iran (Prose) Dr. Manzar Imam
(3) Farsi Nasr ki Tarikh Translated by : Prof. Sharif Husain Qasmi

Unit – II:
(Classical Poetry)
Life of Poets and their contributions;
(a) Firdausi - Mathnavi
(b) Manuchehri, Khaqani, Anvari - Qasaid
(c) Sa'adi, Hafiz, Iraqi - Ghazaliyat
(d) Sarmad - Rubaiyat
(From Barguzida-e-Sher-e-Farsi and Rubaiyat-e-Sarmad)

Books Recommended:
(1) Barguzida-e-Sher-e-Farsi Munibur Rahman
(2) Rubaiyat-e-Sarmad Sarmad
(3) Tarihk-e-Adbiyat-e-Iran Dr. Raza Zadeh Shafaq
(4) Chakide-Tarihk-e-Adbiyat-e-Iran (Poetry) Dr. Manzar Imam

Unit – III:
Sufi Literature (Poetry)
Life of following Poets and salient features of their works;
(a) Jalaluddin Rumi - Masnavi-e-Ma'anvi
(b) Sheikh Fariduddin Attar - Mantiquat Tair
(c) Hakeem Sanai - Hadiqatul Haqiqat

Books Recommended:
(1) Tarihk-e-Adbiyat-e-Iran Dr. Raza Zadeh Shafaq
(2) Chakide-Tarihk-e-Adbiyat-e-Iran (Poetry) Dr. Manzar Imam

Unit – IV:
History of Persian Language and Literature
(From Taheri to Saljuqi Period)

Books Recommended:
(1) Tarihk-e-Adbiyat-e-Iran Dr. Raza Zadeh Shafaq
(2) Sanadeed-e-Ajam Mehdi Husain Naseri
(3) Sherul-Ajam Shibli Nomani
(4) Chakide-Tarihk-e-Adbiyat-e-Iran Dr. Manzar Imam
(Poetry)
Unit – V:

(Modern Prose)

Life of authors and critical assessment of their works;
(a) Haji Zainul Abedin - Syahat Nama-e-Ibrahim Beg
(b) Husain Kazim Zadeh - Rahbar-e-Nazad-e-Nau

Unit – VI:

(Modern Poetry)

Life of Poets and their contributions;
(a) Dr. Mohd. Iqbal - Manzoomat (From Payam-e-Mashriq)
(b) Bahar - Qasaid
(c) Shahryar, Arif Qazwini, Farrukhi Yazdi - Ghazaliyat
(d) Parveen Etesami - Qat‘at
(From Barguzida-e-Sher-e-Farsi Ma‘asir Vol. I)
Books Recommended:
(1) Payam-e-Mashriq Dr. M. Iqbal
(2) Barguzida-e-Sher-e-Farsi-e Ma‘asir Vol. I Munibur Rahman
(3) Adbiyate Jadeed-e Iran Dr. Manzar Imam
(4) Jadeed Farsi Shairi Munibur Rahman
(5) Asri Farsi Shairi Dr. Ahsanuz Zafar

Unit – VII:

Special Study of Ghalib

(a) Critical Study of Prose work of Ghalib

1) Dastambu
2) Mehre Nim Rooz
3) Panj Ahang
4) Persian Letters of Ghalib

Unit - VIII

(b) Critical Study of poetical work of Ghalib

1) Ghazal
2) Mathnavi
3) Qasidah
4) Marsiya, Rubaiyat and Qataat

Books Recommended:
(1) Kulliyat-e-Ghalib (Farsi) Waris Kirmani
(2) Ghalib ki Farsi Shairi Shaukat Sabzwari
(3) Falsafa-e-Ghalib Abdul Hakim

Pattern of Question Paper

Question paper will be of 50 Marks. It will consist of Eight questions, one question from each unit of the syllabus which will carry 10 Marks. However, candidates have to attempt only five questions.

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# Syllabus for Pet – II Examination

**Name of Subject: Arabic, Facultly of Arts, Subject Code: 4.06**

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**Arabic pet Exam 2016-2017 Syllabus**

**Unit – I:** Classical Prose

(a) Al-Fakhri (Faslul Awwal)  
By: Ibn-ial Tiqtqa  
Page No.17 to 53

(b) Badiuzzman Hamdani  
First Five Maqamat

(C) Maqamate Hareri  
First Five Maqamat

**Unit- II:** Classical poetry

a) The Muallaqat of Imraul Qais, Zuhair bin  
Abi Salma, amro bin Kulsoom

b) Diwan al- Hamasa (Abu Tamam)  
First 50 Poems

c) Diwan-al-Mutanabbi  
Kafia Al Mim  
Five Qasaid
Unit- III: History of Arabic Literature pre-Islamic Period to Abbasi Period

(a) Literature of pre-Islamic period to Umayyad period
(b) Literature of Abbasi period

Unit – IV: Grammar & Rhetorics

Book Prescribed:
(1) Al Nahvul Wadiha(Thanaviya)
   Part I,II&III By
   Ali - al-Jarim & Mustafa Amin
(2) Al-Balaghat- al - wadiha
   By
   Ali-al- Jarim & Mustafa amin.

Unit- V: History of Islam & Quran and Hadith Literature

(a) Arabia before Islam & Advent of Islam .
(b) Life of the prophet Muhammad at Makkah & at Madina.
(c) The orthodox caliphs and umyyad caliphs.
(D) The literary value of the Holy Quran & the literary contribution of Hadith in Arabic literature.

Unit- VI: Modern Prose

(a) Masrah –al-Mujtama
   By Tawfiq –al- Hakim
   First Four Plays
(b) Majdoleen
   By Mustafa Lutfi Manfaluti
   First 40 Letters

Unit- VII: Modern poetry

(a) Ashshouqiyyat .Vol.III
   By Ahmad Shouqi
   Following selection
   Hafiz Ibrahim ,umar –al-Mukhtar, Mustafa Kamil , Muhammad Abdul Muttalib.
(b) Diwan Khalil MatranVol.I
   Following selection
   Mahmoud Basha sami Al-Barudi, Mustafa Kamil Basha,Ahmad Shouqi Bek.

Unit- VIII: History of Modern Arabic Literature

(b) An Introduction to Arabic Poetry with special reference to Mahmud Sami-al-Barudi , Hafiz Ibrahim, Ahmad Shouqi, Khalil Matran .
Syllabus for Pet – II Examination

Name of Subject: Linguistics, Facultly of Arts, Subject Code: 4.07

Unit – I: Human Communication, Speech Sound, Vocal tract, Respiratory system, Laryngeal system, Supra-laryngeal system, Active and passive articulators, Air stream mechanism, Articulatory, acoustic and auditory phonetics, Consonants and vowels, Manner of articulation, Place of articulation, Phonemic and phonetic transcription, Minimal pairs, Complementary distribution, The psychological reality of the phoneme, Phonetic similarity, Connection to morphology, Neutralization.

Unit – II: Morph, Morpheme and allomorph, Types of morphs, Kinds of affixes, Word Formation, Variation in Morphology, Morphological conditioning, Classification of morpheme, Problems in Morphological Analysis- Zero derivation, Unmarked forms, Discontinuous morphemes etc. Types of universals, Genetic, Typological and Morphological classifications of language, Formal and substantive universals, Implicational and non-implicational universals. Morphological types of language; Agglutinative, Analytical (isolating), Synthetic, Fusional (inflecting), Infixing and Polysynthetic (incorporating) language.


**Unit VIII:** Research Methodology, Research, Objectives of research, Motivation for research, Types of research, Research approaches, Inductive vs Deductive, Methods versus Methodology, Research and Scientific methodology, Research process, Criteria for good research, Synopsis, Abstract, Hypothesis, Criteria for Hypothesis construction, Nature of Hypothesis, Data Collection and Processing, Primary and Secondary data, Methods for data collection/observation, Interview, Questionnaire, Informants, Technique of Field works for Language and sociolinguistic related research, Methods of data collection, Survey and Experiment, Role of computer in linguistics research, Interpretation, Problems of linguistics related research in India.

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### Syllabus for Pet – II Examination

**Name of Subject : Hindi, Faculty of Arts, Subject Code: 4.08**

<table>
<thead>
<tr>
<th>Unit – I:</th>
<th>हिंदी साहित्य का इतिहास : पीढ़ीकाल, पीढ़ीकाल, अनुभविक काल</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit – II:</td>
<td>भारतीय कल्याणशास्त्र: प्रमुख मिश्रधार - अलंकार, रस, घनी, शीतल वर्णाक्त एवं अभिव्यक्ति</td>
</tr>
<tr>
<td>Unit – III:</td>
<td>पारंपरिक कल्याणशास्त्र: पंनी, अरुम, लोकाचार, त्रिप्राय, हिमायद, आई.ए, रिक्षद कल्याणशास्त्र समस्याचे</td>
</tr>
<tr>
<td>Unit – IV:</td>
<td>हिंदी आलोचना : प्रमुख आलोचक-आ. शुक्ल, हज़ारीप्रसाद ढेकडी, गविन्दलाल शर्मा साहित्य के नए विकास (छो विम्याण, दृष्टिविम्याण एवं आर्टिकली विंचर)</td>
</tr>
<tr>
<td>Unit – V:</td>
<td>प्रयोगमुदुल्क हिंदी : प्रयोगमुदुल्क हिंदी का स्थल एवं प्रयोगमुदुल्क राजभाषा हिंदी, पारंपरिक जनशास्त्री हिंदी प्रसारित, मौहिन्य लेखन, सूचनासाठी प्रमाणित</td>
</tr>
<tr>
<td>Unit – VI:</td>
<td>हिंदी भाषा एवं भाषा विज्ञान : हिंदी भाषा का इतिहास, उपभाषाएँ एवं विषयवाद, देवनागरी लिपी, घनी विज्ञान एवं अविनियमण</td>
</tr>
<tr>
<td>Unit – VII:</td>
<td>मध्यकालीन काल : कविता, सूर, तुलसी, नायिका, पत्रात्त्व, विकास</td>
</tr>
<tr>
<td>Unit – VIII:</td>
<td>हिंदी की प्रमुख विधाओं (कविता, कहानी, उपन्यास) : प्रमुख कवित - मिलावत, असेल, नागाजुँ, शृंगार, मुक्तकोप प्रमुख कहानीकार - प्रेमचंद, यशोदार, मनू, भंडारी, उप विप्रकाश प्रमुख उपन्यासकार - प्रेमचंद, राम, अंग्रेज शुकल, संजीव</td>
</tr>
</tbody>
</table>

नोट: एम.ए. हिंदी के पाद्यकालमुत्तास
Syllabus for Pet – II Examination

Name of Subject: Fine Arts,
Facutly of Arts, Subject Code: 4.09

Unit- I:

Traditional Theories Of Art
- Theory Of Imitation: Socrates And Plato – Critique Of The Theory
- Theory Of Expression: Eugeag, Veron, Leo Tolstoy, K.J. Ducasse, Benede Ho Groce, Collingwood, Carrit, Freud, Susanne
- Theory Of Intuition: Langer, Reid

Unit- II:

The Science of Artist Thinking
- The Image As Form Of Artistic Thinking
- The Method Of Art: A Mode Of Figurative Thinking
- Expressionism: An Alienated, Confused Man In A Hostile World
- Surrealism: A Bewildered Man In A Mysterious And Unknowable World
- Existentialism: A Lonely Man In Absurd World
- Abstractionism: The Individual’s Escape From Banal And Illusory Reality
- Pop and Op Art: The Consumer: A Dieselized Individual In A Mass Consumer Society

Unit- III:

Art and Its Aesthetics
- Subject Matter And Purpose Of Aesthetics
- Aesthetic Knowledge As A System
- Aesthetic Activity
- Aesthetics: Filed Of Operation
- The Aesthetics: It’s Essence And Principal Forms
- The Beautiful The Base The Horrible
- Integrity And Fragmentation Aesthetic Notions Aesthetic Categories
- The Quality Of Polyphony And Interrelation Of Aesthetic Qualities In Life And Art

Unit- IV:

- Study of Natyashastra
- Origin and Development of Dance Drama and Music
- Technique of Performing Arts
- Forms of Dance Drama and Music and Types of Theatrical Productions
- Modern Trends in Performing Arts
Unit- V:

- Comparison of Performing Arts:
  - Dance and Drama
  - Drama and Music
  - Music and Dance
  - Drama and Cinema
  - Drama and Television
  - Radio Drama

Unit- VI:

- Visual Arts : Concept And Scope
- Visual Artist : Place And Position In Modern Art-World
- Visual Art : Branches Comparison And Views :

Unit- VII:

- Visual Communication : Concept
- Visual Language – Syntactic
- Study Of Visual Language – Critical Study Of Visual Elements, Features And Principles, Exploration And Creation Of Complex And Meta Patterns

Unit- VIII:

**Art, Design And Society**

- Analysis Of History Of Art. Traditional Arts. Modernity And Post- Modernity
- Analysis Of History Of Design Bauhaus, Ulm.
- Analysis Of History Of Design In India. Analysis In The Context Of India.
- Cultural Studies. Discourse Analysis

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Syllabus for Pet – II Examination

Name of Subject : Pali and Prakrit,
Faculty of Arts, Subject Code: 4.10

N.B. 1) Total Unit – 08
     2) Total Question – 08
     3) Total Marks – 50
     4) Question to solve – Any 05
     5) All Questions carry equal Marks.

Unit – I: Pali, its Development and Dhammapada

1) Linguistic position of Pali language, origin of Pali, Homeland of Pali
2) Classification of the Buddhavachana, the Study of Tipitaka.
3) Buddhist councils – PathamSangitee, DutiyaSangitee, TatiyaSangitee
4) Dhammapada – First Four Vaggas- Yamak, Appamada, Chitta, Puppha.

Reference Books:
5) BouddhaDhammachaAbhyudayAniVikas – Dr. Niraj Bodhi
6) Pande, G. C. Studies in the Origin of Buddhism; MotilalBanarasidas, Delhi, India; 1995
8) Dhammapada: A True way of Life; Prof. AnomaSakhare

Unit – II: VinayaPitaka& Pali Grammar

1) Introduction of the Vinayapitaka with special reference to theMahavagga.
2) Mahavagga- BodhikathatoDutiya Mara katha
3) Pali Grammar - Vanna, Sara, Kal, Sangya
4) Vibhatti,Upasagga, Itthipaccaya

Reference Books:
1) Vinayapitaka – Dr. Rahul Sanskrutyayan
2) Mahavaggo; Tr. SwamiDwarikadasShastri; BouddhaBharti; Varanasi
3) Pali Vyakaran – BhikhuDharmarakshit ; Varanasi, 1986
4) Pali Mahavyakran- BhadantJagdishKashyap.
5) 31 Dinme Pali – Dr. BhandantAnandKausalya
6) Pali Path- BhandantSeelvansa, Dr. Niraj Bodhi
7) Duroiselle, Charles; Practical Grammar of the Pali Language; www.Buddhanet.net
Unit – III: Anupitaka Literature & Sutta Literature

1) Introduction, Importance of the Milindpanho
2) Bahirkatha, LakkhanPannho
3) SanyuttaNikaya – DevataSanyutta

Reference Books:

3) MilindPrashna – BhadantSadanandMahasthavir.

Unit – IV: Vinaya Literature & Anupitak Literature

1) Chullavagga – Kammakhandhako-(1 to 4)
2) Chullavagga – VattaKhandako (1 to 10)
3) Introduction of Visuddhimagga
4) SeelaNiddesa- Seelsarupadikatha to Indriyasanvaseela

Reference Books:

1) Vinayapitaka - Chullavaggapali – V.R.I. ,Igatpuri, Ed.
5) Visuddhimagga – BhikkuDharmarakshit; Varanasi, 1969.

Unit – V: Sutta Literature & Pali Poetry

1) Introduction of Dighnikay, Brahmajalsutta.
2) MajjhimaNikaya – Introduction, Bodhirajkumarsutta, Selsutta,
3) Thergatha – Introduction, Anandther, Sariputtather.

Reference Books:

1) Dighanikaya- BhadantJagdishKashyap, (Navnalandaprakshan)
2) Majjimnikaya- BhadantJagdishKashyap, (Navnalandaprakshan)
3) Dighanikaya- Tr. Swami DwarkikadasShastri
4) Majjimnikaya- Tr. Swami DwarkikadasShastri
5) Theragatha – V.R.I. Igatpuri
6) Therigatha – V.R.I. Igatpuri.
Unit- VI: Abhidhamma&Vipassana

1) Chitta, Chaitasika
2) Rupa, Nibbana
3) Kayanupassana, Vedananupassana
4) Chittanupassana, Dhammanupassana

Reference Books:-

1) Abhidhammatthasangaha– BhandantAnandKousalyayan
2) AbhidhammaDesana – Dr. DharmachandraJain; Kurukshtera, 1982.
3) DighaNikaya; VRI, Igatpuri Edition
4) DighaNikaya; Dr. Swami DwarkadasShastri, Varanasi.
5) BouddaManovidnnyan – Dr. Bhagchandra Jain.

Unit- VII: Sutta Literature & Pali Poetry

1) DighaNikaya– Introduction & Importance; Pathiksutta
2) Majjhimnikaya – Chankisutta, Potaliyasutta, Upalisutta
3) Thergatha – Mahakaccayan, Udayi, Sopak
4) Therigatha – Ambapali, Sujata, Sundarinada

Reference Books: -

1) Pali SahityaKaitihas – Bhadant Rahul Sankrutyayan
2) Majjhimanikay – BhadantJagdishKashyap (Navnaland)
3) Dighnikaya- BhadantJagdishKashyap (Navnala)
4) Dighnikaya- Tr. Dr. Swami DwarkadasShastri
5) Majjhimnikay- Tr. Dr. Swami DwarkadasShastri
6) Thergatha - Tr. Dr. Swami DwarkadasShastri
7) Therigatha - Tr. Dr. Swami DwarkadasShastri

Unit -VIII: Patimokkha&Thinkers

1) Introduction of Patimokka, BhikkhuParajika
2) Pachittiya, Sekhiya
3) Dr. B. R. Ambedkar
4) Dr. BhadantAnandKausalyayan

Reference Books :-

1) VinayPitak –Dr. Rahul Sankrityayan
2) Patimokkha – Tr. Dr. Bhagchandra Jain
4) Babasaheb Dr. Ambedkar: JivanAurChintan - Khairmode, Changdeo
5) Dr. BabasahebAmbedkar - Kirti, Dhananjay
6) Dr. BhadantAnandKausalyayanJivanDarshan – Dr. BhadantSavangiMedhankar

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Syllabus for Pet – II Examination

Name of Subject : Urdu, Faculty of Arts, Subject Code: 4.11

Unit – I: Tareekh-e- Urdu Adab

1) Urdu Zaban-o-Adab Ki Ibteda

2) a) Urdu Adab Ke Ibtedai Nuqoosh
   Mohammad Quli Qutub Shah

   b) Urdu Adab Ke Ibtedai Shoara
   Ibn-e- Nishati
   Abul Fazl

   c) Urdu Adab Ke Ibtedai Nasr Nigar (Sarsari Mutaala)
   Mulla Wajahi (Sab Ras)

Unit – II: Classical Poetry

1) Meer Taqi Meer

   i) Meer Ki Ghazal Goi Ki Numayan Khususiyaat
   ii) Meer Ki Masnawi Nigari Ki Aham Khususiyaat
   iii) Urdu Shaera Par Meer Ke Asrat
   iv) Urdu Shaeri Mein Meer Ka Maqam-o-Martaba

2) Mirza Ghalib

   i) Kalaam-e-Mirza Ghalib Ki Khususiyaat
   ii) Mirza Ghalib Ki Darj e Zail Gazalon Ka Khususi Mutala
   iii) Mirza Ghalib Ke Kalaam Mein Tanz-o-Zarafat
   iv) Urdu Shayeri Mein Mirza Ghalib Ka Maqam-o-Martaba

Unit – III: Urdu Drama

1) Drama- Tareef, Haiyat, Saakht-wa Aqsam

   i) Indra Sabha (by-Amanat) – Ka Mutala

2) Yak Babi Drama- Tareef, Haiyat-o-Saakht

   i) Ek Bangala Bane Nyara – Sagar Sarhadi

Unit – IV: Urdu Zaban-O-Adab Ka Ahed-E-Zarrin

1) a) Urdu Ke Ahed-e- Zarrin Ka Taruf

   i) Mughliya Darbar Mein Urdu Ki Parwarish
   ii) Hind Ki Galiyon Mein Urdu Ki Gunj

   b) Urdu Ke Ahed-e- Zarrin Ke Numainda Shoara Ka Mutalla:

      i) Ibraheem Zaoque
      ii) Momin Khan Momin
      iii) Bahadur Shah Zafar
2) a) Ahed-e-Zarrin Mein Urdu Nasr Nigari
   Musannifin Ki Hayat-o-Khidmat
   i) Sir Sayyed Ahmad Khan
   ii) Altaf Hussain Hali
   iii) Molvi Nazeer Ahmad
   iv) Shibli Nomani

**Unit – V: Urdu Novel Aur Afsana Nigari**

1) **Novel:**
   i) Aag Ka Dariya - Qiratul Ain Haidar
   ii) Shab Gazeeda - Quazi Abdul Sattar

2) **Afsana Nigari:**
   i) Munshi Prem Chand - Haj-e-Akbar
   ii) Saadat Hasan Manto - Khalid Miyan
   iii) Asmat Chughtai - Chaothi Ka Joda
   iv) Suraiya Saulat Husain - Mamta Ki Tadap

**Unit – VI: Literary Criticism in Urdu**

**URDU ADABI TANQEED**

1) a) Tanqeed Ki Tareef, Ahmiyat, Maqsad
   b) Tazkron Ki Ahmiyat
   i) Naqqad Ka Tariqaikar Aur Faraiz
   ii) Hali Ki Tanqeed Nigari

2) a) Taraqqi Pasand Tanqeed
   b) Urdu ke Aham Naqqad
   Ehtesham Hussain, Kalimuddin, Aal-e-Ahmad Suroor,
   Majnu Gorakhpuri, Shamsurrahman Farooqi, Gopi Chand Narang

**Unit – VII: Modern Poetry**

1) a) Hali Ki Nazm
   i) Sher Ki Taraf Khitab
   b) Faiz Ki Nazm
   i) Tarana
   c) Sahir Ludhiyanvi Ki Nazm
   i) Aao Ke Koi Khwab Bunein

2) Vidarbh Mein Urdu Shayri
   Vidarbh Ke Maqbool Shoara
   i) Maulana Natique Gulaothuvi
   ii) Shahid Kabir
   ii) Midhat-ul Akhtar
Unit – VIII: Urdu Tahqeeq

1) Tahqeeq Ki Tareef Aur Urdu Adab Mein Tahqeeq Ki Riwayat
   i) Tahqeeq Ke Usool
   ii) Tahqeeq Ki Khususiyaat
   iii) Tahqeeq Ki Aqsaam
   iv) Tahqeeq Ke Chand Masayel

2) Tahqeeq Ke Mauzu Ka Intekhab Aur Khaka Nigari
   (i) Taleemi, Adbi, Tahqeeqi Project
   (ii) Mauzu Ke Intekhab Ke Zaraye
   (iii) Tahqeeq Ka Majuza Khaka

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UNIT - I:

INDIAN CONSTITUTION

1. Preamble
2. Fundamental Duties and Directive Principles of State Policy - New Challenges
   Legal status, underlying object, nature and character of directives, classification and categories of directives.
4. Amendment of the Constitution.

UNIT – II:

INDIAN CONSTITUTION

2. Scope of Art. 19:
   i) Scope of the freedom under Art. 19(1) (a) - New Dimensions
   ii) Scope of other freedoms as guaranteed in Art. 19(1)(b) to (g). & Reasonable Restrictions.
   ii) Cultural and Educational Rights of Minority Communities – Arts. 29 and 30.
UNIT – III:

JURISPRUDENCE AND LEGAL THEORY


2. Characteristics of Analytical Positivism.


UNIT – IV:

JURISPRUDENCE AND LEGAL THEORY

1. Hohfeldian scheme of Jural correlatives and opposites.

2. Concept of Ownership and Possession.

3. Concept of Liability.

4. Concept of Corporate Personality (Legal Persons)
Legal Education and Research Methodology

UNIT – V:

RESEARCH :-

1. Meaning and characteristic of legal research.
2. Objectives of legal research.
3. Doctrinal and Non-doctrinal research.
4. Qualitative and Quantitative Research

UNIT – VI:

RESEARCH DESIGN :-

1. Research Problem and Research Design.
2. Major concepts and variables of the study.
3. Hypotheses and Research Questions.
4. Review of Literature.

UNIT – VII:

SAMPLING AND DATA COLLECTION:-

1. The Universe of the Study and Sampling Mechanism
2. Source of data, Primary and Secondary
3. Data Collection and Data Processing Research Tools like Interview schedule, Questionnaire, Observational schedule.
4. Methods of data collection like Interviewing, Entering the data on the questionnaire and Observation sheet.
UNIT – VIII:

DATA ANALYSIS & INTERPRETATION & REPORT WRITING

1. Analysis of Data

2. Interpretation of data.

3. Research Report Writing

4. Style Manuals

5. IPR and Plagiarism

Books Suggested for Reading:

RESEARCH METHODOLOGY


6) Adem Stott,: Legal Research Series Editor julie Macfarlane 1996.
7) S.K. Agrawal (edn), Legal Education in India (1973). Tripathi, Bombay.


CONSTITUTION


3) Dr. Thrity Patel – Personal Liberty under The Constitution of India (B. Jain Publishers Delhi, 1993).


5) M. P. Jain – Constitutional Law of India.


JURISPRUDENCE


4) Freeman M.D.A. Lloyd’s, Introduction to Swet and Maxwell Jurisprudence (7th Edition).


7) Rajeev Dhawan and Alice Jocab, Selection and Appointment of Superme Court Judges – a Case Study (1978)

Syllabus for PET – II Examination

Name of Subject: Education, Faculty of Education
Subject Code: 6.01

Objectives:

To enable the students to

1. Co-relate Philosophical and Sociological perspective of education
2. Understand the psychological perspective of education
3. Apply theories of learning in classroom situations.
4. Identify strategies for enhancing teacher effectiveness.
5. Understand the perspective of teacher education.
6. Explain the concept & nature of research in education.
7. Explain the terms associated with research.
8. Understand the broad canvas of educational research.

Unit - I: Philosophical Bases of Education

- Modern concept of Philosophy – Logical Analysis, Logical Empiricism and Positive relativism
- Epistemology and Education: Nature and types of knowledge, Methods of acquiring valid knowledge with special reference to Analytical Philosophy, Dialectic approach, Scientific inquiry, Yoga
- Axiology and Education: Concept of Value, Relativity of values
- Indian schools of thoughts: Vedic, Buddhist, and Islamic period
- schools of thoughts: Humanism, Existentialism, Essentialism, Progressivism

Unit - II: Sociological Bases of Education

- Theoretical perspectives to study society: i) Functional ii) Conflict iii) Symbolic interactionism and its significance to education
- Concept of Modernization: individual and social modernity, Role of education in modernization
- Post modernism and its educational implication
- views of Jean François Lyotard, Michel Foucault, Jacques Derrida on post modernism,
- Gender ideology in Society: Meaning, Role of religion, constitution and law in gender ideology
- Gender differentiation, gender stereotyping gender inequality in the society
- Women empowerment: concept, aspects of empowerment, Role of education in empowerment
- Multicultural education, Media awareness, RTE-2009

Unit - III: Advanced Educational Psychology

a. Learning styles: Kolb’s Learning style, Honey & Mumford’s learning styles
- Meta-cognition: Meaning, Difference between cognition and meta-cognition, Models of meta-cognition by Falvell’s and Brown’s.
- Theories of Teaching/ Learning: Tolmans, Gagne, Bandura, Hull, Kurt Levin, Brunner, Ausubel’s, Hebb’s, Roger’s,
b. **Personality theories**: Type, trait, psychoanalytical, and humanistic
   - defense mechanism
   - Approaches of personality, personality test

c. **Theories of Intelligence**: one factor, two factor, Multi factor, Group Factor
   - Multiple Intelligence, Emotional Intelligence, Adversity Quotient, Spiritual intelligence

**Unit - IV: Curriculum Development**

a. **Nature, Principles and Determinants of Curriculum**
   - Components of Curriculum: Objectives, content, transaction mode and evaluation
   - Philosophical and ideological basis of curriculum
   - Theories of curriculum development.

b. **Approaches and types to Curriculum Development**
   - Subject centred, Core curriculum, Learner centred, Community centred.
   - Curriculum Frameworks of School Education and Teacher Education
   - Humanistic Curriculum: characteristics, purpose, role of the teacher, psychological basis of humanistic curriculum

c. **Models of Curriculum Development**

**Unit - V: Teacher Education**

- National Curriculum Framework (NCFTE) -2009 as given by National Council of Teacher Education (NCTE)
- Difference between andragogy and pedagogy
- Reflective models and practices in teacher education
- Profession- Concept, need and components of teacher effectiveness
- Strategies for enhancing teacher effectiveness
- Current trends and procedures in evaluating teacher effectiveness
- Use of sign system, category system, portfolio assessment, academic performance indicators in teacher effectiveness.

**Unit - VI: ICT Supported Teaching Learning Strategies**

- Computer aided learning, E-Learning and Web base learning.
- Co-operative and Collaborative Learning
- Project based Learning
- Communication Tools - Mobile, e-mail, chat Online Conferencing, Blog, Wiki, Internet forum, News Groups, Different mobile app group, Social Networking.
- Educational media, Role of media in instruction, Instructional media, message and methods
- Computerized multimedia, Designing of instructional media

**Unit - VII:** Guidance and Counseling

- Counseling process, Counseling approaches – directive, non-directive
- Group counseling vs. Individual counseling, Counseling for adjustment
- Activities of Group guidance, Procedure and techniques of group guidance
- Eclectic Counseling service and Individual inventory service- Testing Service.
- Information orientation service, placement service and follow up program
- Use of tests in guidance and counseling and Communication of test results as relevant in the context of guidance program
- Principles of mental hygiene and their implication for effective adjustment.
- Mental health and development of integrated personality.

**Unit - VIII:** Research Methodology & Statistics In Education

- Introduction to research in education: - Importance of review of related literature & Online, offline references
- Different terms: Objectives, Assumptions, Hypothesis, Variables-, Operational definitions, Limitations & Delimitations
- Types of Research: Fundamental, Applied,
- Approaches to research: Qualitative, Quantitative and Mixed method
- Ethical consideration in research
- Research Methods : Types (Steps, methods/designs , strengths and weaknesses)
- Techniques of data collection .
- Tools of data collection
- Reliability & validity of tools & techniques.
- Sampling: Sample & population, sampling methods, Probability, non probability, sampling error,
- Data analysis: i) Qualitative ii) Quantitative, Descriptive and
- Inferential analysis\ Testing of hypothesis: one and two tailed tests, Type I and Type II errors, Standard error, Confidence limits
- Parametric and Non Parametric test
Reference Books:


Agarwal, J. C. (2007), Basic Ideas in Educational Psychology, Shipra Publication, New Delhi


Altekur, A.S., Education in Ancient India, Nand Kishore Bros, Banaras, 1951.


Barde, S. & Parasher, G. S. Bharat Ratna Dr. Baba Saheb Ambedkar shaikshanik chintan ,New bismah Kitabghar, New Delhi


Bharote,A.& Parasher, G. S. Acharya Vinoba Bhave Shaikshanik Chintan New bismah Kitabghar, New Delhi

Bhatia, H. R., (2005), A Textbook of Educational Psychology, Macmillan India Ltd., New Delhi


Dandpani, S. (2007), Advanced Educational Psychology, Anmol Publications, New Delhi


Devgowda, A.C., Teacher Education in India, Bangalore Book Bureau, Bangalore, 1973.


Dutt, S., The Teachers and His World, Sukumar Dutt, Soamibagh, Agara, 1972.


I.A.A.T.C., Symposium on Teacher Education in India, The Indian Publications, Ambala Cantt, 1964.


Kadu, S. & Parasher, G. S. Gulab Maharaj Yanche shaikshanik Tatwagyan New bismah Kitabghar, New Delhi


Kazi, N. & Parasher G.S.: Naitik Shiksha Islam ke Sandarbh mein, Sandesh Prakashan, New Delhi

Kazi, S. & Parasher G.S.: Muslim Samaj mein Stri shiksha, Sandesh Prakashan, New Delhi


Lester. D. Crow, (2007), Educational Psychology, Surjeet Publications, Delhi


Lohkare , S. & Parasher, G. S. Dasbodhache shaikshanik tatwagyan va Jeevan mulya , New bismah Kitabghar, New Delhi

Lynch, J and H.D. Many, Teacher Education and Culture Change England France West Ger


Makade, S. & Parasher, G. S. Rashtrasant Tukadoji Maharajanche Shaikshanik mulya, Sandesh prakashan New Delhi

Mangal, S. K., (2002), Advanced Educational Psychology, Prentice Hall of India, Delhi

Mangal, S. K., (2007), Essentials of Educational Psychology, Prentice Hall of India, Delhi


Moharil, S. & Parasher, G. S. Sawarkar Sahitya Shaikshanik Tatwagyan, New bismah Kitabghar, New Delhi


Rajamanikam, M., (2005), Experimental Psychology, Concept Publishing Company, New Delhi
Sharma, Promila (2005), Educational Psychology, APH Publishing Corporation, New Delhi
Sharma, Yogendra, (2004), A Textbook of Educational Psychology, Kanishka Publishers, New Delhi
Sing Yogesh Kumar & Nath R., (2005), Psychology in Education, APH Publishing Corporation, New Delhi
Vaishnav R. - 2014: Continuous And Comprehensive Evaluation System in the Schools of Nagpur City (Research Monograph), Sandesh Prakashan New Delhi,
Vaishnav, R. & Bhujade, K. 2014: Teaching Strategies for Attention Deficit Hyper Activity Disorder ,Scholars Press, Germany
Vaishnav, R. & Gawalpanchi, R. 2015: Teaching Strategies for Mathametical Learning Disability, Scholars Press, Germany
Vaishnav, R. 2013: Learner Controlled Instruction, Lambert Academic Publishing Deutschland, Germany


Weisinger Hendrie, (2006), Emotional Intelligence at Work, Willey India, New Delhi


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**Syllabus for Pet – II Examination**

**Name of Subject : Physical Education,**  
**Faculty of Education**  
**Subject Code: 6.02**

| **Unit – I:** | Physiology of Muscular activity, Neurotransmission and movement mechanism  
Physiology of respiration  
Psychology of blood circulation  
Factors influencing performance in sports  
Bioenergetics and recovery process.  
Athletic injuries their Management and rehabilitation Therapeutic modalities.  
Ergogenic aids and doping |
| --- | --- |
| **Unit – II:** | Joint and their movements planes and axes.  
Kinetics, Kinematics linear and angular, levers  
Laws of Motion, Principles of equilibrium and force, spin and elasticity  
Posture, Postural deformities and their correction.  
Muscular analysis of Motor Movement.  
Mechanical analysis of various sports activities,  
Mechanical analysis of fundamental movements. (Running, Jumping, throwing, pulling and pusing)  
Massage Manipulation and therapeutic exercises. |
| **Unit – III:** | Learning process theories and laws of learning  
Motivation, theories and dynamics of Motivation in Sports.  
Psychological Factors affecting Sports performance Viz, Stress, Anxiety, tension and aggression.  
Personality, its dimensions, theories personality and performance Group dynamics, team cohesions and leadership in Sports. |
| **Unit – IV:** | Health-Guiding principles of health and health education  
Nutrition of dietary manipulations.  
Health-Related fitness, obesity and its Managements.  
Environmental and occupational hazards and first aid.  
Communicable diseases their presentive and therapeutic espect School health programme aned personal hygiene |
| **Unit – V:** | Characteristics and principles of sports training  
Training load and periodization.  
Training Methods and Specific training Programme for development of various Motor qualities  
Tecjimoca; and Tactical preparation for Sports.  
Short term and long term training plans,  
Sports talent identification process and procedures,  
Preparing for competition (build up competitions, main Competition, Competition frequency Psychological preparation). |
| Unit – VI: | Nature Scope and type of research.  
|          | Formulation and Selection of Research Problem.  
|          | Sampling-Process and Techniques.  
|          | Method of research  
|          | Data Collection tools and techniques.  
|          | Statistical Techniques of date analysis- measures of central tendency and variability  
|          | Correction, Normal probability curve. T-test and t-tests Chi-square, 2-test.  
|          | Hypothesis formulation, type and testing  
|          | Writing research report  
|          | Approaches to integrating ICT in Teaching Learning Process  
|          | Project Based Learning (PBL)  
|          | Co-Operative Learning Collaborative Learning  
|          | ICT and constructivism. & Pedagogical Dimension.  
|          | E-Learning & Web Based Learning  
|          | E-Learning  
|          | Web Based Learning  
|          | Visual Classroom |
| Unit – VII: | Concept of test measurement and evaluation.  
|          | Principles of Measurement and evaluation.  
|          | Construction and classification of tests.  
|          | Criteria of test evaluation.  
|          | Concepts and assessment of Physical Fitness, Motor Fitness, Motor ability and Motor Educability  
|          | Skill test for Badminton, Basketball, Hockey, Lawn Tennis, Soccer, Volley ball.  
|          | Testing Psychological variables-competitive anxiety, aggression, team cohesion, Motivation, Self Concept. |
| Unit – VIII: | Concept and principles of Management  
|          | Organisation and functions of sports bodies, Intramurls and Extramural  
|          | Management of Infrastructure, equipments, finance and personnel  
|          | Principles of Planning Physical Education Lessions  
|          | Concept of techniques of Supervision.  
|          | Philosophies of Education as applies to Physical Education idealism, Naturalism, Realism, Pragmatism, Existentialism Humanism.  
|          | Olympic Movement Historical development of Ancient and Modern Plympic Game, Asian Games. |
Syllabus for Pet – II Examination

Name of Subject: Civil Engineering, Facultly of Engg. & Tech., Subject Code: 7.01

Unit – I:

Construction Materials and Management: Construction Materials: Structuralsteel- composition, material properties and behaviour; Concrete - constituents, mix design, short-term and long-term properties; Bricks and mortar; Timber; Bitumen.


Construction Management: Types of construction projects; Tendering and construction contracts; Rate analysis and standard specifications; Cost estimation.

Unit – II:

Engineering Mechanics: System of forces, free-body diagrams, equilibrium equations; Internal forces in structures; Friction and its applications; Kinematics of point mass and rigid body; Centre of mass; Euler’s equation of motion; Impulse-momentum; Energy methods; Principles of virtual work.

Solid Mechanics: Bending moments and shear forces in statically determinate beams; Simple stress and strain relationships; Theory of failure; Simple bending theory, flexural and shear stresses, shear centre; Uniform torsion, buckling of column, combined and direct bending stresses.

Structural Analysis: Statical y determinate and indeterminate structures by force/energy methods; Method of superposition; Analysis of frames; Displacement methods: Slope deflection and moment distribution methods; Stiffness and flexibility methods of structural analysis.

Unit – III:

Concrete Structures: Limit state and ultimate load design concepts; Design of beams, slabs, columns; Bond and development length.

Steel Structures: Limit state design concepts; Design of tension and compression members, beams and beam-columns.

Unit – IV:

Soil Mechanics: Origin of soils, soil structure and fabric; Three-phase systems and phase relationships, index properties; Unified and Indian standard soil classification system; Permeability up lift pressure, piping; Principle of effective stress, capillarity, seepage force and quick sand condition; Compaction in laboratory and field conditions; One-dimension aconsolidation, time rate of consolidation; Mohr’ s circle, effective and to tolshear strength parameters, characteristics of clays and sand.

Foundation Engineering: Sub-surface investigations - scope, drilling bore holes, sampling, plate load test, standard penetration and cone penetration tests; Earth pressure theories - Rankine and Coulomb; Stability of slopes - finite and infinite slopes, Terzaghi’s bearing capacity theory, effect of watertable; Deep foundations - types of piles, dynamic and static formulae, load capacity of piles in sands and clays, negative skin friction.
**Unit – V:**

**Fluid Mechanics:** Properties of fluids, fluid statics; Continuity, momentum, energy and corresponding equations; Potential flow, applications of momentum and energy equations; Laminar and turbulent flow; Flow in pipes.

**Hydraulics:** Forces on immersed bodies; Flow measurement in channels and pipes; Dimensional analysis and hydraulics similarity; Kinematic offlow, Basics of hydraulic machines, specific speed of pumps and turbines; Channel Hydraulics - Energy- depth relationships, hydraulic jump, uniform flow and gradually varied flow.

**Hydrology:** Hydrologic cycle, precipitation, evaporation, evapo-transpiration, watershed, infiltration, unit hydrographs, hydro graph analysis, flood estimation and routing, reservoir capacity, ground water hydrology-steady state well hydraulics and aquifers.

**Irrigation:** Duty, delta, Crop water requirements; Design of lined and unlined canals, headworks, gravity dams and spillways; Canal regulatory works, cross-drainage structures, out let sand escapes.

**Unit – VI:**

**Waste Water Treatment:** Sewage treatment and sewerage system, quantity and characteristics of wastewater. Primary, secondary and tertiary treatment of wastewater, effluent discharge MoEF standards. Domestic waste water treatment, quantity and characteristics of domestic waste water, primary and secondary and tertiary treatment. Unit operation and unit processes of domestic waste water.

**Municipal Solid Wastes:** Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment and disposal).

**Unit – VII:**

**Air Pollution:** Types of pollutants, their sources and impacts, air pollution meteorology, air pollution control, air quality standards and limits.

**Land Pollution:** Sources, Causes and Impacts.

**Noise Pollution:** Impacts of noise, permissible limits of noise pollution, measurement of noise and control of noise pollution.

**Unit – VIII:**

**Transportation Infrastructure:** Highway alignment and engineering surveys; Geometric design of highways - cross-sectional elements, sight distances, horizontal and vertical alignments;

**Highway Pavements:** Highway materials-desirable properties and quality control tests; Design of bituminous paving mixes; Distresses in concrete pavements.

**Traffic Engineering:** Traffic studies on flow, speed, travel time, delay and O-D study, PCU, peak hour factor, parking study, accident study and analysis, statistical analysis of traffic data; Microscopic and macroscopic parameters of traffic flow, fundamental relationships; Control devices, signal design by Webster’s method; Types of inter sections and channelization.
Syllabus for Pet – II Examination

Name of Subject: Electrical Engineering,
Faculty of Social Science, Subject Code: 7.02

Unit - I:
Mesh and Node Analysis, Network Theorems, Laplace Transforms, Transient behavior concepts of complex frequency.

Sources of Energy: Conventional sources, renewable sources like solar, PV and Wind energy.

Unit - II:
Measurements of R,L,C elements, Measurements of Power and Energy, PMMC and MI type instruments, CT and PT, Different type of transducer, Data Acquisition system, Measurements of Force, Torque, Velocity, acceleration, Measurements of temperature, Pressure and Flow Measurements.

Unit - III:
Overview of power semiconductor devices: SCR, Triac, BJT, IGBT, MOSFET, GTO, their turn-on and turn-off methods characteristics, protection and their applications.


Inverters: Three phase, six-pulse inverter (120 degree and 180 degree mode operations), voltage and current source inverters, Voltage and Harmonic control, PWM Techniques

Unit - IV:

Transformer: Differences between power transformer and distribution transformer, Inrush current, calculation of efficiency and regulation.

Drives: Constant power and constant torque drive, four-quadrant operation, different components of load torque.

Unit - V:
Unit - VI:

Power system, Types of transmission lines, Circuit breakers, Relays, protection schemes, Transformer, bus bar and line protection, MCB, ELCB, Fuses, Tariff, Earthing, Load forecasting and generation planning.

Unit - VII:

Control system: Basic components and their definitions, transfer function, open and closed loop system, Time response of system, Stability of control system, State variable methods analysis, Frequency response method of analyzing linear system.

Unit - VIII:


Books:

1. “Thyristorized Power Controller” by Dubey, Joshi Doradla Sinha PHI Publication
5. Electric Utility Planning and regulation – Edward Kahn , University of California- 2005

   1. .Art and Science of Protective Relaying by C.R Mason
   2. Grid Converter for Photovoltaic and Wind Power Systems by Remus Teodorescu,Marco Liserre,Pedro Rodr’iguez IEEE Press John Wiley and Sons
   6. Control System Analysis by Nagrath Gopal,, New Age International Publisher.
   7. Modern Control System Engineering by K.Ogata, Prentice Hall publication India.
Syllabus for Pet – II Examination

Name of Subject : Electronics Engineering
Faculty of Engg./Tech, Subject Code: 7.03

Unit - I: Electronic Devices

P-N junction diode, Zener diode, Simple diode circuits: clipping, clamping and rectifiers, , BJTs and MOSFETs; Single-stage BJT amplifiers: biasing, bias stability, small signal analysis and frequency response, JFET and its characteristics, Pinch off voltage, Drain saturation current, JFET amplifiers, CS,CD,CG amplifiers ,their analysis using small signal JFET model ,Biasing the FET, The FET. MOSFET amplifiers, LED, photo diode .

Principle of Positive and Negative feedback, Concept of Stability in electronics circuits, oscillators and multivibrators, Power Amplifiers.

Unit - II: Analog Circuits

Operational Amplifier: Basic differential Amplifier using transistor and its operation, OP-Amp parameters, characteristic and Definition, Ideal OP-Amp, Equivalent circuit, Inverting and Non-inverting configurations and design,

Op-amp Linear and non linear Applications: Voltage follower, Summing amplifier, scaling and averaging amplifier, Instrumentation amplifier and applications, Integrator and differentiators, Comparators, Schmitt trigger, , Clipper and Clamper, Precision Rectifier, PLL Multivibrators: Bistable, Monostable, Astable multivibrator circuits using IC 555, Sample/Hold circuits, Voltage reference circuits; Power supplies: ripple removal and regulation.

Unit - III: Networks, Signals and Systems

Network solution methods: nodal and mesh analysis; Network theorems: superposition, Thevenin and Norton’s, maximum power transfer; Wye-Delta transformation; Steady state sinusoidal analysis using phasors ; Time domain analysis of simple linear circuits; Solution of network equations using Laplace transform; Frequency domain analysis of RLC circuits; Linear 2-port network parameters: driving point and transfer functions; State equations for networks. Continuous-time signals: Fourier series and Fourier transform representations, sampling theorem and applications;

Digital Signal Processing: discrete-time Fourier transform (DTFT), DFT, FFT, Z-transform, interpolation of discrete-time signals; LTI systems: definition and properties, causality, stability, impulse response, convolution, poles and zeros, parallel and cascade structure, frequency response, group delay, phase delay, digital filter design techniques.
Unit - IV: DIGITAL CIRCUITS & MICROPROCESSOR

Number systems; Combinatorial circuits: Boolean algebra, minimization of functions using Boolean identities and Karnaugh map, logic gates and their static CMOS implementations, arithmetic circuits, code converters, multiplexers, decoders and PLAs; Sequential circuits: latches and flip-flops, counters, shift-registers and finite state machines; Data converters: sample and hold circuits, ADCs and DACs; Semiconductor memories: ROM, SRAM, DRAM; 8-bit microprocessor (8085): architecture, programming, memory and I/O interfacing. 8086: Block diagram, functional description and pins details-addressing modes, complete instruction set and assembler directives-interrupt processing.

Unit - V: CONTROL SYSTEM

Basic control system components; Feedback principle; Transfer function; Block diagram representation; Signal flow graph; Transient and steady-state analysis of LTI systems; Frequency response; Routh-Hurwitz and Nyquist stability criteria; Bode and root-locus plots; Lag, lead and lag-lead compensation; State variable model and solution of state equation of LTI systems.

Unit - VI: COMMUNICATION

Analog communication: amplitude modulation and demodulation, angle modulation and demodulation, spectra of AM and FM, super heterodyne receivers, circuits for analog communications; Information theory: entropy, mutual information and channel capacity theorem;

Digital communication: PCM, DPCM, digital modulation schemes, amplitude, phase and frequency shift keying (ASK, PSK, FSK), QAM, MAP and ML decoding, matched filter receiver, calculation of bandwidth, SNR and BER for digital modulation; Fundamentals of error correction, Hamming codes; Timing and frequency synchronization, inter-symbol interference and its mitigation; Basics of TDMA, FDMA and CDMA.

Unit - VII: ELECTROMAGNETICS

Electrostatics; Maxwell’s equations: differential and integral forms and their interpretation, boundary conditions, wave equation, Poynting vector; Plane waves and properties: reflection and refraction, polarization, phase and group velocity, propagation through various media, skin depth; Transmission lines: equations, characteristic impedance, impedance matching, impedance transformation, S-parameters, Smith chart; Waveguides: modes, boundary conditions, cut-off frequencies, dispersion relations Introduction, Light propagation in optical fibers propagation of light in a cylindrical dielectric rod, Ray model, wave model. Different types of optical fibers, Optical sources and detectors.

Unit - VIII: MICROWAVE ENGINEERING

Introduction, characteristic features, application of microwave, Generation of microwave by vacuum tube - limitation of conventional tubes, klystron amplifier-reflex klystron oscillator, magnetrons-traveling wave tubes, Generation of microwave by solid state devices, bipolar transistor field effect transistors, Gunn oscillator, IMPATT diode, PIN diode, avalanche diode, impedance matching elements, waveguide short circuit, tees and magic tee, phase shiftless, attenuators, isolators, circulators, matched terminations, waveguide slotted section.

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Syllabus for Pet – II Examination

Name of Subject : Mechanical Engineering
Faculty of Engg./Tech, Subject Code: 7.04

Unit - I:
Thermodynamics: Thermodynamic systems and processes; properties of pure substances, behavior of ideal and real gases; zeroth and first laws of thermodynamics, calculation of work and heat in various processes; second law of thermodynamics; thermodynamic property charts and tables, availability and irreversibility; thermodynamic relations

Fluid Mechanics: Fluid properties; fluid statics, manometry, buoyancy, forces on submerged bodies, stability of floating bodies; control-volume analysis of mass, momentum and energy; fluid acceleration; differential equations of continuity and momentum; Bernoulli’s equation; dimensional analysis; viscous flow of incompressible fluids, boundary layer, elementary turbulent flow, flow through pipes, head losses in pipes, bends and fittings

Unit - II:
Heat-Transfer: Modes of heat transfer; one dimensional heat conduction, resistance concept and electrical analogy, heat transfer through fins; unsteady heat conduction, lumped parameter system, Heisler’s charts; thermal boundary layer, dimensionless parameters in free and forced convective heat transfer, heat transfer correlations for flow over flat plates and through pipes, effect of turbulence; heat exchanger performance, LMTD and NTU methods; radiative heat transfer, Stefan-Boltzmann law, Wien’s displacement law, black and grey surfaces, view factors, radiation network analysis.


Unit - III:
Theory of Machines: Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of linkages; cams; gears and gear trains; flywheels and governors; balancing of reciprocating and rotating masses; gyroscope.
Vibrations: Free and forced vibration of single degree of freedom systems, effect of damping; vibration isolation; resonance; critical speeds of shafts.

Unit - IV:
Machine Design: Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as bolted, riveted and welded joints;
Unit - V:

Engineering Materials: Structure and properties of engineering materials, phase diagrams, heat treatment, stress-strain diagrams for engineering materials. Casting, Forming and Joining Processes: Different types of castings, design of patterns, moulds and cores; solidification and cooling; riser and gating design. Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy. Principles of welding, brazing, soldering and adhesive bonding.

Unit – VI:

Machining and Machine Tool Operations: Mechanics of machining; basic machine tools; single and multi-point cutting tools, tool geometry and materials, tool life and wear; economics of machining; principles of non-traditional machining processes; principles of work holding, design of jigs and fixtures. Metrology and Inspection: Limits, fits and tolerances; linear and angular measurements; comparators; gauge design; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly. Computer Integrated Manufacturing: Basic concepts of CAD/CAM and their integration tools.

Unit - VII:

System design: factory location- plant layout - methods based; applications of engineering economic analysis and break- even analysis for product selection, process selection and capacity planning; predetermined time standards. System planning; forecasting methods based on regression and decomposition, design and balancing of multi model and stochastic assembly lines; inventory management – probabilistic inventory models for order time and order quantity determination; JIT systems; strategic sourcing; managing inter plant logistics.

Unit – VIII:

System operations and control: Scheduling algorithms for job shops; applications of statistical methods for product and process quality control - applications of control charts for mean, range, percent defective, number of defectives and defects per unit; quality cost systems; management of resources, organizations and risks in projects. System improvement: Implementation of systems, such as total quality management, developing and managing flexible, lean and agile organizations. Production Planning and Control: Forecasting models, aggregate production planning, scheduling, materials requirement planning. Inventory Control: Deterministic models; safety stock inventory control systems. Operations Research: Linear programming, simplex method, transportation, assignment, network flow models, simple queuing models, PERT and CPM.

Recommended Text Books:

1. Design of Machine Elements, B.D. Shiwalkar, Central Techno Publications
15. A Course in Power Plant Engineering, Arora & V.M. Domkundwar, Dhanpat Rai & Sons
21. Industrial Engineering & Production Management, Martand Telsang, S. Chand & co.
24. Computer Aided Fixture design, Rongi Yeming, Marcel Dekker Inc. NY.
30. Instrumentation Measurement and Analysis, B.C. Nakra, K.K. Choudhary, TMH
35. CAD, CAM, CIM, P. Radhakrishnan and S. Subramanyam, New Age International Pvt. Ltd.
37. Pneumatics Systems Principles and Maintenance, S.R Majumdar, Tata Mcgraw Hill Company.
39. Refrigeration and Air Conditioning, S.N. Sapali, PHI.

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Syllabus for Pet – II Examination

Name of Subject: Chemical Engineering, Facult of Engg. & Tech., Subject Code: 7.05

**Unit - I:** Non ideal flow: RTD function, characteristics of RTD, Zero-parameter models, one-parameter models, two-parameter models.

**Heterogeneous catalysis:** Diffusion with reaction in porous catalyst, Mechanism of catalytic reactions. Langmuir - Hinshelwood model, Rideal - Eiley Mechanism, Rate controlling steps, Development of rate equations for solid catalysed fluid phase reactions; External/internal mass and heat transfer resistances in catalyst particles, catalyst deactivation

**Unit - II:** Enzyme Kinetics, Major metabolic pathways, bioenergetics, Glucose metabolism, metabolism of nitrogenous compounds, respiration, metabolism of hydrocarbons, anaerobic metabolism, autotrophic metabolism, Bioreactors, Sterilization techniques, Biological waste water treatment

**Unit - III:** Multicomponent distillation: Bubble point and dew point calculations, Lewis and Matheson calculation, Method of Thiele and Geddes; Azeotropic distillation; Extractive distillation; Molecular distillation; Reactive distillation, Membrane Separation

**Unit - IV:** Control of complex processes Process modeling and dynamic response of gas absorber, steam jacketed kettle, heat exchanger, distributed parameter model, non-interacting continuous stirred tank reactors, non-interacting stirred tank heaters. Industrial control system. Control configuration of Supervisory control and data acquisition SCADA, Working control components and network communication of SCADA. Industrial examples of SCADA. Control configuration of distributed control system DCS. Working of Programmable logic controller PLC. Real time monitoring control.

**Unit - V:** Equations of continuity, equation of motion, the equation of mechanical energy, application of Navier-Stokes equation to solve problems, the equations of change for incompressible non-Newtonian fluids.

Equations of energy, the energy equation in curvilinear coordinates, use of equations of change to set up steady state heat transfer for problems. Unsteady state heat conduction expression for rectangular, spherical and cylindrical coordinate system from 1st principles, Numerical methods for 2 dimensional steady state conduction and Schmidt method for unsteady state heat conduction with / without surface resistance for obtaining temperature profiles.
Unit - VI: Principles of Formulation, fundamental laws, Parameter estimation techniques in theoretical as well as numerical models, population balance, stochastic, and empirical models, Modeling of various mass and heat transfer equipment: distillation, absorption, extraction columns; evaporators; furnaces; heat exchangers; flash vessels etc., Modeling of Chemical Reactors: single phase and multiphase reactors


Unit - VIII: Applications of Nanotechnology in Chemical Engineering, Renewable energy sources, Recent Development in the wastewater treatment and solid waste

References:


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Syllabus for Pet – II Examination

Name of Subject: Chemical Technology, Facult of Engg. & Tech., Subject Code: 7.06

Unit - I: Ideal Gas laws and their applications. Material balance with or without chemical reaction. Energy balance with or without chemical reaction.
Properties of fluids, Classification of fluids, Shearing and flow characteristics of Newtonian and Non-Newtonian fluids, Shear stress distribution of fluids, Pressure measurement, U-tube, Inverted U-tube, Differential and Inclined manometers, Reynolds number

Unit - II: Types of chemical reactions such as alkylation, Esterification, hydrogenation. Their mechanism.
Polymers: General introduction, types of polymerization. Study of biodegradable polymers like polylactic acid, polyvinyl esters, polybutyric hydride.

Unit - III: Industrial gases: Manufacture of CO, CO₂, H₂, N₂ & O₂, rare gases C₂H₂, and their industrial applications
Industrial acids: Manufacture of nitric acid, sulphuric acid, Phosphoric acid and their industrial applications

Unit - IV: Composition and characterization of waste water. Pollution load and their determination. Unit operations and unit processes involved in the treatment of water and waste water. Preliminary, primary, secondary and tertiary treatment methods of waste water. Municipal and industrial solid waste management.


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Syllabus for Pet – II Examination

Name of Subject: Architecture Engg.
Facutly of Engg. & Tech., Subject Code: 7.07

Unit – I: The basics of Architecture:
   a) Theories of architecture basic definitions of architecture,
   b) Construction techniques and building material,
   c) Role of structures in architecture.

Unit – II: Environment and Architecture:
   a) Climate and weather and its impact on architecture,
   b) Climate responsive architecture,
   c) Energy saving techniques,
   d) Rating systems and principles of rating,
   e) Energy audit of the building,
   f) Life cycle assessment of architecture.

Unit – III: Society and Architecture:
   a) Impact of tradition and culture on architecture,
   b) Semiotics,
   c) Tribal architecture, vernacular architecture.

Unit – IV: Design in Architecture:
   a) Design Process,
   b) Prevailing design approaches,
   c) Theories of design.

Unit – V: Urban context of Architecture:
   a) Urban design theories,
   b) Urban planning issues,
   c) Urban infrastructure.

Unit – VI: Low cost Techniques:
   a) Appropriate technologies,
   b) Re-cycling of building materials,
   c) Project managements:
**Unit – VII: Transmission of knowledge in Architecture:**

a) Aims and objectives of architecture education,
b) Methods of teaching/learning architecture,
c) Role and eligibility of teachers,

**Unit – VIII: Conservation of heritage architecture:**

a) Conservation, restoration, preservation, principles and techniques,
b) Public awareness and participation,
c) Values associated with heritage,
d) Tourism potential,
e) Impact on environment.
Syllabus for Pet – II Examination

Name of Subject: Computer Science & Technology,
Facutly of Engg./Tech., Subject Code: 7.08

(Computer Science and Technology)

Unit - I: Computer Organization and Architecture.

Machine instructions and addressing modes, ALU, control unit. Memory hierarchy: cache, main memory and secondary storage, instruction level parallelism, data dependences and hazards, reducing branch cost, dynamic scheduling

Unit - II: Programming and Data Structures.

Programming in C, recursion, arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.

Unit - III: Algorithms.

Searching, sorting, hashing. Asymptotic time and space complexity. Algorithm design techniques: greedy, dynamic programming and divide-and-conquer. Graph search, minimum spanning trees, and shortest paths.

Unit - IV: Theory of Computation.

Regular expressions and finite automata, Context free grammars and push down automata. Regular and context free languages, pumping lemma. Turing machines and undecidability.

Unit - V: Compiler Design.


Unit - VI: Operating Systems.

**Unit - VII: Data bases.**

ER-model. Relational model: relational algebra, tuple calculus, SQL. Integrity constraints, normal forms. File organization, indexing (e.g., B and B+ trees). Transactions and concurrency control. Architecture of Parallel Databases, Database design in parallel Database, Architecture of Distributed Database, Storage Management in parallel Database and Distributed Database, horizontal and vertical fragmentation, Data partitions and clusters, indexing techniques.

**Unit - VIII: Computer Networks.**


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Syllabus for Pet – II Examination
Name of Subject: Information Technology & Computer Science,
Facutly of Engg./Tech., Subject Code: 7.09

Unit - I: Basic Processing Unit, Arithmetic, Design Of Fast Adders, Array Multiplier, The Memory System, Input/output Organization, Computer Peripherals, RISC Philosophy, Pipelining, Multiprocessors

Unit - II: Parallel Computer Models, Dynamic Instruction Scheduling, Instruction Level Parallelism, Dynamic Scheduling, Data Level and Thread Level Parallelism, Memory Hierarchies, Parallel and Scalable Architecture, Virtual Memory Organization, Vector Processing Principles


Unit - VIII: Parallel Databases, Parallel Query Processing, Statistical Inference: Populations and Samples, Machine Learning: Supervised Learning, Unsupervised Learning: Kernel Density Estimation, K-Means, Naive Bayes, Data and Data Scraping, Classification, Ranking, Logistic Regression, Graph Analytics: Structure, Traversals, Analytics, Page Rank, Community Detection, Recursive Queries, Semantic Web Fundamentals Of Data Visualization, Basic Principles, Ideas and Tools For Data Visualization

References:


6. Advanced Computer Networks By Forouzan


8. “Data Mining: Concepts and Techniques” Jiawei Han, Micheline Kamber and Jian Pei. Third Edition.
Syllabus for Pet – II Examination

Name of Subject: Physics,
Faculty of Science, Subject Code: 8.01


Unit - III: Electromagnetic Theory

Unit - IV: Quantum Mechanics
Wave-particle duality. Schrödinger equation (time-dependent and time-independent). Eigenvalue problems (particle in a box, harmonic oscillator, etc.). Tunneling through a barrier. Wave-function in coordinate and momentum representations. Commutators and Heisenberg uncertainty principle. Dirac notation for state vectors. Motion in a central potential: orbital angular momentum, angular momentum algebra, spin, addition of angular momenta;

Unit - V: Quantum Mechanics II
Unit - VI: Thermodynamic and Statistical Physics


Unit - VII: Solid State Physics


Unit - VIII: Nuclear Physics

# Syllabus for Pet – II Examination

**Name of Subject : Chemistry**  
**Faculty of Science, Subject Code: 8.02**

## Unit – I


1) Spectrophotometric Method (job’s and mole ratio method)  
2) Potentiometric Method(Living-Rossotti Method)


**B) Reaction Mechanism of Transition metal complexes:**  

## Unit – II

**Cluster compounds**

**A) Boron hydrides:** Classification, Nomenclature, structure, bonding and topology of boranes, 4-digit coding (s,l,y,s) numbers of higher boranes and their utilities, Chemistry of diboranes : Study of Metalloboranes, Carbones and Metallocarboranes with reference to preparation of structures. Occurrence of metal-metal bond, Classification of metal clusters, Binuclear, trinuclear, tetrannuclear, pentannuclear and hexannuclear with reference to halide, exide, alkoxide and acetate clusters.

**B) Metal carbonyls and nitrosyls:** Structure and bonding. Vibrational spectra of metal carbonyl clusters with reference to classification, EAN rule, synthesis and structures. Nitrosylating agents for synthesis of metal nitrosyls, vibrational spectra and X-ray diffraction studies of transition metal nitrosyls for bonding and structure elucidation, important reactions iof transition metal nitrosyls, structure and bonding Wilkinson’s catalyst and Vaska’s compound
# Organic Chemistry

## A) Nature and Bonding in Organic Molecule
- Hyperconjugation
- Aromaticity in benzenoid and non-benzenoid compounds, alternant and non-alternant hydrocarbon Huckel's rule, energy level of n-Molecules orbitals, annulenes, antiaromaticity. Homo-aromaticity. Aromatic character and chemistry of cyclopentadienyl anion, trophylum cation, tropone and tropolone. Bonds weaker than covalent-addition compounds, crown ether complexes and cryptands, inclusion compounds, cyclodextrins, catenanes and rotaxane.

## B) Stereochemistry
- Conformational alalysis of cycloalkanes (5-8 membered rings), substituted, cyclolejanes, mono substituted, disubstituted and trisubstituted cyclohexanes, decalines, effect of conformation on reactivity, Cahn-Ingold-Prelog system to describe configuration at chiral centers. Elements of symmetry, chirality, molecules with more than one chiral center, meso compounds, threo and erythro isomers, method of resolution, optical purity, enantiotopic and distereotopic atoms, groups and faces, prochirality, addition-elimination reactions, stereospecific and stereoselective synthesis. Asymmetrical synthesis, optical activity in absence of chiral carbon(biphenyl and allenes).

## C) Reaction Mechanism
- Generation, structure, stability and chemical reactions involving carbocations, carbanions, free radical carbenes, and nitrenes. Types of mechanism, Types of reaction, thermodynamics and kinetics requirements, kinetic and thermodynamic control, Hammond's postulate, Curtin-Hammett principle, potential energy diagrams, transition states and intermediates, methods of determining mechanisms, isotope effects. Hard and soft acids and bases.

## D) Substitution reaction
- Aliphatic nucleophilic substitution: The SN1, SN2, mixed SN1, SN2 and SET and SN, mechanisms, Nucleophilicity, effect of leaving group, ambient nucleophiles and ambient substrates regiospecificity, substitution and allylic and vinylic carbon atoms, phase transfer caralysis, Concept of neighboring group participation. Anchimeric assistance with mechanism, neighboring group participation by a and o bonds, classical and non classical carbocycles, Intramolecular displacement by hydrogen, oxygen, nitrogen, sulphur and halogen, Ajky1, cycloalkyl1, ary-1 participation, participation in bicyclic system, migratory aptitude, carbocation rearrangements and related rearrangements in neighboring group participation.

### Aromatic Nucleophilic substitution
- A general introduction to different mechanisms of aromatic nucleophilic substitution Sn, Ar, SN” benzene and Sn1 mechanisms, arynes as reaction intermediate, Reactivity- effect of substrate structure leaving group and attacking nucleophile. The Von Richter, Sommet Hauser and Smiles rearrangements.

### Aromatic electrophilic substitution
- The arenium ion mechanism, orientation and reactivity, energy profile diagrams. The o/p ratio, jps0 attack, orientation in benzene ring with more than one substituents, orientation in other ring system. Friedel-Crafts reaction. Vilsmeir-Hack reaction, Gatterman- Koch reaction, Pechman reaction, Reimer-Tieman reaction, Diazonium coupling.
### Unit – IV: A) Addition reaction:

**Addition in carbon-carbon multiple bond**: Mechanistic and stereochemical aspects of addition reaction involving electrophiles, nucleophiles and free radicals, region and chemoselectivity, Orientation and stereochemistry, Addition to cyclopropanes, Hydrogenation, Michael reaction, Robinson annulations

**Addition to carbon-hetero atom multiple bond**: Mechanism of metal hydride reduction of saturated and unsaturated carbonyl compounds, acids, esters and nitriles, Addition of Grignard reagents, organozine and organolithium reagents to carbonyls and unsaturated carbonyl compounds, Witting reaction, Mechanisms of condensation reactions involving enolates- Aldol, Knoevengel, Claisen, Mannich, Benzoin, Perkin, Stobbe reaction. Hydrolysis of esters and amide.

B) The E1, E2 and E1CB mechanisms and orientation of the double bond, Saytzeff and Hoffman’s rule Effect of substrate structure, attacking base, leaving group and medium, Mechanism and orientation in Pyrolytic elimination


D) Free radical reactions: Generation of free radicals, Type of free radical reactions, free radical substitution mechanism at an aromatic substrate, aliphatic substrate, reactivity at a bridgehead position. Neighbouring group assistance, reactivity for aliphatic and aromatic substrates, reactivity in attacking radicals, effect of solvent on reactivity. Halogenation at an alkyl carbon allylic carbon (NSB), hydroxylation at an aromatic carbon by means of Fenton’s reagent. Auto-oxidation, chlorosulphonation (Reed Reaction coupling of alkynes and arylation of aromatic compounds by diazonium salts, Sandmeyer reaction, Free radical Rearrangement, Hunsdiecker reaction, iododecarboxylation, Barton reaction, Hoffmann Loefler-Freying reaction.

### Unit – V: Physical Chemistry

A) Chemical Thermodynamics

Recapitulation of Laws of thermodynamics, Exact and inexact differentials, condition of exactness, Pfaff differentialin expression and equations, Applications of Pfaff differential equations to first and second law of thermodynamics, Caratheodory’s principle and its equivalence to the Kelvin Plank and Clausius statement of the Second law of Thermodynamics, Homogeneous functions of degree 0 and 1, extensive and intensive properties, derivation of thermodynamic equations of state, Maxwell’s relations. Third law of thermodynamics, Nernst Heat Theorem, unattainability of absolute zero.

B) Chemical Kinetics

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<td><strong>B) Solid State Chemistry</strong></td>
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<tr>
<td>Introduction to crystals, Unit Cell and lattice parameters, symmetry elements in crystals, absence of Five Fold axis, Space Groups, The Bravais lattices, miller indices, Bragg’s Equation. Seven crystal system, Packing in crystals, Hexagonal Closest Packing (HCP) Cubic Closest Packing (CCP), Voids, packing fraction, Numericals, Crystal Defects and Non-Stoichiometry: Perfect and imperfect crystals, point defects, line and plane defects. Thermodynamics of Schottky and Frenkel defect formation, colour centers, non-stoichiometry and defects.</td>
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<th>Unit – VII:</th>
<th><strong>Analytical Chemistry</strong></th>
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<tr>
<td><strong>A) Statistical analysis and validation:</strong> Efforts in chemical analysis Classification of errors systematic and random, additive and proportional, absolute and relative. Accuracy and precision. Mean, median, average deviation and standard deviation. Significant figures and rules to determine significant figures. Calculations involving significant figures. Correlation coefficient and regression analysis. Validation of newly developed analytical method. Certified reference materials (CRMs)</td>
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<td><strong>B) Principles of Separation:</strong> Principle, instrumentation and applications of</td>
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<td>* Paper chromatography</td>
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<td>* Thin Layer chromatography</td>
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<td>* Column chromatography</td>
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<td>* Ion exchange</td>
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<td>* High performance liquid chromatography</td>
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<th>Unit – VIII:</th>
<th><strong>A) Atomic and molecular Spectroscopy:</strong> Principle, instrumentation and applications of</th>
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<td>* Spectrophotometry</td>
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<td>* Flame Photometry</td>
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<td>* Atomic absorption spectroscopy</td>
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<td><strong>B) Electroanalytical techniques:</strong></td>
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<tr>
<td>Conductance studies: Concepts of electrical resistance, conductance, resistivity and conductivity, Specific, Molar and equivalent conductance. Conductometric titration curves. EMF studies: Circuit diagram of simple potentiometer, Indicator electrodes: hydrogen electrode, quinhydrone electrode, antimony electrode and glass electrode, Reference electrodes: Calomel electrode and Ag/AgCl electrode, Nernst equation, standard electrode potential Buffers and Buffer capacity. pH of buffer mixtures based on Henderson-Hasselbalch equation. Polarography: Principle, instrumentation with special reference to dropping mercury electrode, working and applications of Polarography. Introduction to pulse, AC, Oscillographic and square wave techniques.</td>
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# Syllabus for Pet – II Examination

**Name of Subject: Mathematics, Faculty of Science, Subject Code: 8.03**

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<tr>
<th>Unit – VI:</th>
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<th>Unit – VII:</th>
<th>RELATIVISTIC MECHANICS</th>
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<td></td>
<td>The principle of covariance, The principle of equivalence, Geodesic principle, Newton’s equations of motion as an approximation of geodesic equations, Poisson’s equations as an approximation of geodesic equations, Poisson’s equations as an approximation to Einstein field equations.</td>
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<th>Unit – VIII:</th>
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**Note:** Syllabus and Books covered From M.Sc. Mathematics Curriculum of R.T.M. Nagpur University, Nagpur.
Syllabus for Pet – II Examination

Subject : Statistics, Faculty of Sciences, Subject Code- 8.04

Unit. – I:
Probability Theory

Sets, classes of sets, sequences of sets, lim sup and lim inf of sequences of sets field, σ field. Borel σ fields set functions and their properties. Probability measure on a σ field, properties of probability measure, Independence of sequences of events. Borel cantelli lemma;

Weak & strong law of large numbers: Chebyshev’s WLLN, Khinchins WLLN Kolmoqrov strong law of large numbers (Statement only)

Central Limit theorem: De – Moiré Laplace, Lindeberg Levy,

Elementary concepts of stochastic processes, Markov chains, classification of states of Markov chain, Poisson process, Birth and death process.

Unit. – II:
Distribution Theory

Definition of Distribution function, characteristic function, Probability generating function & their properties. Independence of random variables,

Standard discrete & continuous probability distributions: Bernoulli, uniform, Binomial Poisson, Geometric, Rectangular, Exponential Normal, Cauchy, Hypergeometric Multinomial, Laplace, Negative binomial, Beta, Gamma, Lognormal.

Unit. - III:
Statistical Inference (Parametric)

Estimation Theory: Characteristics of good estimators, unbiasedness, sufficiency and consistency.


Hypothesis Testing: Simple and composite hypotheses, Two kinds of errors, critical region, power function, most powerful and uniformly most powerful tests, Neyman-pearson fundamental lemma. Unbiased test,

Unit.- IV:
Sampling Techniques

Basic concepts in sampling, concept of population and sample, Need for sampling, complete enumeration versus sampling. Simple random sampling with and without replacement, Estimation of population mean and population proportions and their standard errors.

Sampling with probability proportional to size (with and without replacement method). Des raj and Horvitz – Thomson’s estimator.

Stratified random sampling, proportional and optimum allocation. Ratio and regression method of estimation. Estimation of population mean, evaluation of bias and variance to the first order of approximation, comparison with simple random sampling, systematic sampling, cluster sampling.
Unit. – V:

**Designs of Experiments**

Gauss-Markov theorem, Analysis of variance Need for design of experiment, Basic principles of experimental design. Complete analysis and layout of Completely randomized design, Randomized block design, Latin square design, BIBD, Youden square desing, split plot design.

Factorial experiments and confounding in $2^n$ factorial experiments.

Unit. – VI:

**Multivariate Analysis**

Multiple and partial correlation coefficient and their tests of significance. Multivariate normal distribution, maximum likelihood estimators of parameters of the distribution. Distribution of sample mean vector.

Wishart matrix; its distribution and properties. Hotelling's $\tau^2$ and its sampling distribution. Applications of Hotelling's $\tau^2$.

Classification problem: Standards of good classification, procedure of classification based on multivariate normal distribution.

Unit. – VII:

**Computational Statistics**

**Exploratory data analysis**

Components of EDA, transforming data, clustering, similarity measures, similarity coefficient, Hierarchical clustering methods, single. Complete and average linkage methods dendrograms.

**Stochastic simulation:** Generating random variables from discrete and continuous distributions.

MCMC methods – Metropolis-Hasting algorithm.

Unit. – VIII:

**Nonparametric inference and survival analysis:**


REFERENCES:

2) Basu A. K. :Measure Theory and Probability
3) Bhat B. R. : Modern Probability theory
4) Das M. N. and Giri N (1997) : Design and Analysis of experiments . Wiley Eastern
7) Kale B. K. : First course on Parametric inference
8) Kshirsagar A. M. : Multivariate analysis
9) Lehmann E. L. : Testing statistical hypothesis
12)Rohatgi V. K. : An introduction to probability theory and mathematical statistics
14)Sidney Siegel : Nonparametric Statistics For The Behavioral Sciences
15)Sukhatme : Sampling theory of surveys with applications.
Syllabus for Pet – II Examination

Name of Subject: Geology, Facultly of Science, Subject Code: 8.05

Subject : Geology
Faculty : Science

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<td>VI</td>
<td>ECONOMIC GEOLOGY, MINERAL ECONOMICS AND MINERAL EXPLORATION</td>
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<td>VIII</td>
<td>HYDROGEOLOGY AND WATERSHED MANAGEMENT</td>
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Unit - I:

MINERALOGY, CRYSTALLOGRAPHY AND GEOCHEMISTRY


Unit - II:

IGNEOUS AND METAMORPHIC PETROLOGY


Unit - III:

SEDIMENTOLOGY, STRATIGRAPHY AND PALEONTOLOGY


Unit - IV:

STRUCTURAL GEOLOGY AND GEOTECTONICS


Unit - V:

GEOMORPHOLOGY, REMOTE SENSING AND GIS


Unit - VI:

ECONOMIC GEOLOGY, MINERAL ECONOMICS AND MINERAL EXPLORATION


Unit - VII:

ENGINEERING AND ENVIRONMENTAL GEOLOGY


Concepts and principles in environmental geology. Natural hazards-preventive/precautionary measures-floods, landslides, earthquakes, river and coastal erosion. Impact assessment of anthropogenic activities such as urbanization, open case mining and quarrying, river-valley projects, disposal of industrial and radio-active waste, excess withdrawal of groundwater, use of fertilizers, dumping of ores, mine waste and fly-ash. Organic and inorganic contamination of groundwater and their remedial measures. Soil degradation and remedial measures. Environmental protection- legislative measures in India.
Unit - VIII:

HYDROGEOLOGY AND WATERSHED MANAGEMENT


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**Unit - I:**

**Prokaryotes and viruses**

Koch’s Postulates.

Bacteria: Structure, morphology, reproduction.

Viruses: General account; Morphology and ultrastructure of TMV, Bacteriophage; Introduction to viroids, prions and interferon.

Archaeobacteria and bacteria: General account; ultrastructure, nutrition and reproduction, biology and economic importance; Cyanobacteria: *Microcystis, Lyngbya, Nostoc, Scytonema, Gloeotrichia* and *Stigonema*.

**Phycology**

Criteria for classification of algae: Chlorophyta, Charophyta, Xanthophyta, Bacillariophyta, Pheophyta and Rhodophyta; pigments, reserved food, flagella.

Algae in diversified habitats (terrestrial, freshwater, marine), thallus organization; cell ultrastructure; reproduction (vegetative, asexual, sexual); algal blooms, algal biofertilizers; algae as a food, feed and uses in industry.

**Mycology**

General account: Classification of Fungi (recent trends and criteria used in classification); Physiology of Fungi (with reference to biotrophs, hemibiotrophs, symbionts); Fungal Cytology; Heterothallism, heterokaryosis, parasexual cycle.

Comparative study, classification and evolutionary trends in the following:

- Myxomycota: Protist characters and general account with special reference to *Physarum* and *Plasmodiophora*.
- v. Deuteromycetes: *Helminthosporium, Fusarium, Colletotrichum*.

**Plant pathology**

Plant Pathology: Symptomology, histopathology, etiology and identification of diseases with reference to following fungal, bacterial and viral diseases (Paddy blast, wheat rust, bunt of wheat, smut of jowar, black arm of cotton, red rot of sugarcane, citrus canker, gummosis, leaf curl of papaya, potato blight.)

**Bryophytes**

General characters, distribution, classification, ecology of Bryophytes, fossil history of bryophytes, cytology of bryophytes, regeneration in bryophytes, evolution of sporophyte- Retrogressive and Progressive theory.

General account of- Hepaticopsida: Sphaerocarps, Takakiales; Anthocerotopsida: Anthocerotales; Bryopsida: Sphagnales, Polytrichales.
**Unit - II:**

**Pteridophytes**

General characters, distribution, classification, evolution of stele, heterospory and seed habit, apospory and apogamy; Important contributions of Indian Pteridologists, General account of Ryniopsida, Psilopsida, Lycopsida [Lycopodiales, Selaginales, Isoetales], Sphenopsida [Hyeniales, Equisetales], Filicopsida [Ophioglossales, Filicales, Salvinales, Marsileales].

**Gymnosperms**

Systems of classification; economic importance.

Comparative morphology and evolutionary tendencies of:

1. Pteridospermales - Lycinoptridaceae (*Calymotheca hoeninghausii*, *Hetarngium*, *Spherostoma*); Medullosaceae (*Medullosa*, *Trignocarpus*).
2. Cycadales - Cycadaceae; Fossil history (*Baenia*, *Nilssonia*, *Androstrobus*).
3. Cycadeoidales - Williamsoniaceae, Cycadoeoidaceae
4. Cordaitales, Caytoniales, Glossopteridales, Pentoxylales, Gnetales
5. Ginkgoales (*Ginkgo*, *Baiera*, *Trichopitys*)
6. Coniferales
7. Taxales

**Unit - III:**

**Angiosperms general account**

Probable ancestors of angiosperms, primitive living angiosperms, speciation and extinction.

Angiosperm Morphology, structural units and floral symmetry, dicot and monocot flower; structure, diversity origin and evolution of stamen, carpels; placentation types and evolution.

Floral adaptation to different pollinators

**Angiosperm Taxonomy:**

Taxonomic structure: taxonomic hierarchy, concept of taxa, concept of species, concept of genus and family; Taxonomic character: HETEROBATHMY, ANALYTIC versus synthetic character, qualitative versus quantitative characters.

**Taxonomic evidences and tools**

Morphology, anatomy, embryology, palynology, cytology, phytochemistry, genome analysis, herbarium, floras, monographs, botanical gardens, biochemical and molecular techniques, computers and GIS.

**Biosystematics**

The population concept phenotypic plasticity, biosystematic categories, methods of biosystematics studies. Numerical taxonomy: principles, aims and objectives, cladistics in taxonomy, polarity of characters, homology, homoplasy, monophyly, polyphyly.

Salient features of ICBN
Families
Cucurbitaceae, Cactaceae, Asteraceae, Amentiferae, Lemnaceae, Palmae, Orchidaceae.

Biodiversity Conservation
IUCN categories of threat, distribution and global pattern of biodiversity.
Biological diversity concept and levels, role of biodiversity in ecosystem functions and stability, Endemism, hotspots and hottest hotspots, invasions and introductions, local plant diversities and its socioeconomic importance.

Unit - IV:

Photosynthesis
Evolution of photosynthetic apparatus, pigments, Light, light harvesting complex, Mechanism of electron transport, Photo protective mechanism, CO2 fixation, C3, C4 and CAM pathway, Photorespiration, the chemiosmotic-coupling hypothesis and ATP Synthesis, , ATP Synthesis in chloroplast.

Respiration
Glycolysis, Citric acid cycle, oxidative pentose phosphate pathway, Plant mitochondrial electron transport and ATP synthesis (oxidative phosphorylation) alternate oxidase.

Plant hormones
Biosynthesis, storage, breakdown and transport of hormones, physiological effect and mechanism of action of hormones auxins, gibberellins and cytokinin

Sensory photobiology
Structure, function and mechanism of phytochromes, cryptochromes and phototropins, stomatal movement. Photoperiodism and biological clock

Enzymes
Nomenclature and classification of Enzymes, properties of enzymes, factors affecting enzyme activity, enzyme kinetics, Michaelis-Menten equation, mode and mechanism of Enzyme action (Regulation of Enzyme activity), Activators & Inhibitors of enzymes, isozymes.

Solute transport and photo-assimilate translocation
Uptake transport and translocation of water, ion, solutes and macromolecules from soil through cell, across membranes, through xylem and phloem , transpiration, mechanism of loading and unloading of photo-assimilates

Metabolism
Carbohydrate- Composition, structure and function of carbohydrates, synthesis of starch and Sucrose, catabolism (degradation) of starch and sucrose
Lipid- Composition, structure and function of lipids, fatty acid biosynthesis, membrane Storage lipids.
Protein- Composition, structure (Ramchandra plot. secondary, tertiary and quaternary structure)and function of Proteins
Amino acids- Composition, structure and function of amino acids, amino acid biosynthesis in Plants.
Nitrogen- Nitrate and ammonium assimilation
Latent life
Dormancy; Importance and types of dormancy; seed dormancy; overcoming seed dormancy; bud dormancy.
Senescence and Programmed Cell Death
Basic concepts; types of cell death, PCD in life cycle of plants; metabolic changes associated with senescence and its regulations; influence of hormones and environmental factors on senescence.

Physiology of flowering
Florigen concept and photoperiodism, Genetics of floral organ differentiation; homeotic mutants in Arabidopsis and Antirrhinum.

Stress biology:
Biotic stress: Plant defence mechanism (passive and active); HR and SAR; modulation of plant metabolism in response to biotic stress: early and late response; production of ROS, induction of enzymes; PR proteins; R-genes.
Abiotic stress: Effect of water, temperature, salt and light stress on plants; developmental and physiological mechanisms protecting plants against environmental extremes.

Unit - V:
Plant development
Shoot Development: Organization of shoot apical meristem; regulation of cell fate in meristem; tissue differentiation in the shoot.
Root Development: Organization of root apical meristem; vascular tissue differentiation; lateral root hairs; root microbe interactions.
Leaf growth and differentiation: Determination; phyllotaxy; control of leaf form; differentiation of epidermis (with special reference to stomata & trichomes) and mesophyll.

Reproduction
Male Gametophyte: Structure of anther, microsporogenesis, tapetum; pollen development and gene expression; male sterility; sperm dimorphism; pollen germination; pollen tube growth.
Female Gametophyte: Ovule types; megasporogenesis; organization of embryo sac; structure of embryo sac cells.
Pollen-pistil interaction, self-incompatibility and fertilization; Structure of the pistil; pollen-stigma interactions, double fertilization; in vitro fertilization.
Seed Development and fruit growth: Endosperm development; embryogenesis; ultrastructure and nuclear cytology; storage proteins of endosperm and embryo; polyembryony; apomixes; embryo.
Fruit development and growth

Ecology
Vegetation development: Temporal changes (cyclic and non-cyclic); mechanism of ecological succession (relay floristics and initial floristic composition; facilitation, tolerance and inhibition models).
Community function- Dynamics and succession, laboratory model, trends in succession, climax concept, General introduction to autecology.
Ecosystem organization
Structure and functions; primary production (methods of measurement, global pattern, controlling factors); energy dynamics (trophic organization, energy flow pathways, ecological efficiencies); litter fall and decomposition (mechanism, substrate quality and climatic factors); global biogeochemical cycles of C, N, P and S. Nutrient budget in forest and aquatic ecosystem.

Unit - VI:
Genetics
Mendel’s laws of inheritance; Deviations from Mendel’s findings: incomplete dominance, co-dominance, penetrance, expressivity, multiple alleles and isoalleles (example Corn, Drosophila and Nicotiana), gene interactions (non-epistatic and epistatic), Linkage; Chromosome theory of inheritance; Modifiers, suppressors and pleiotropic genes; sex determination in plants, Drosophila, C. elegans.
Cytoplasmic inheritance and maternal effect
Hardy-Weinberg equilibrium; Factors affecting Hardy-Weinberg equilibrium; Quantitative trait loci (Kernel colour in wheat, corolla length in Nicotiana longifera).
Epigenetics: Introduction; histone code; base modification; paramutations in maize; Callipygh sheep; Epigenetics and Lamarckism; Epigenome and epigenomics (Introduction).
Gene structure
Chemical nature of gene; Fine structure of gene: Classical and modern concept of gene, Cis-trans test; fine structure analysis in eukaryotes.
Genetic recombination and genetic mapping
Genetic recombination in phage and mapping phage genes
Mapping of bacterial genes through transformation, conjugation and transduction
Recombination; independent assortment and crossing over; molecular mechanism of recombination; role of RecA and RecBCD enzymes; homologous, non-homologous and site-specific recombination; chromosome mapping- linkage group, genetic markers, types of maps, construction of molecular maps, correlation of genetic and physical maps; Somatic cell genetics - an alternative approach to gene mapping.
Cytology
Chromatin organization: Chromosome structure and packaging of DNA, molecular organization of centromere and telomere, rRNA genes, euchromatin and heterochromatin; Karyotype analysis and evolution, banding patterns; C-value paradox, Cot curve and its significance; specialized types of chromosomes: polytene, lampbrush, B-chromosome, sex chromosome; molecular basis of chromosome pairing.
Structural and numerical (heteroploidy) changes in chromosomes; origin, breeding behaviour of duplications, deficiency, inversion and translocation heterozygotes; effect of aneuploidy on plants; transmission of trisomics and monosomics and their use in chromosome mapping; complex translocation heterozygotes, translocation tester sets; Robertsonian translocation.
Mutations
Spontaneous and induced; physical and chemical mutagens- classification, mode of action; molecular basis of gene mutations; transposable genetic elements; site directed mutagenesis- definition, applications and PCR based oligonucleotide mutagenesis; role of mutations in crop improvement; induction of polyploidy

Plant breeding: Methods of breeding sexually (self and cross pollinated) and vegetatively propagated crops; heterosis and inbreeding depression and their genetic basis; use of male sterility in hybrid production.

Unit - VII:
Cell Biology
Cell wall: Structure; function; biogenesis and growth.
Plasma membrane: Membrane architecture (fluid mosaic model); sites for ATPases; membrane transport-ion carriers, channels, pumps and aquaporins; receptors.
Plasmodesmata: Structure, role in movement of molecules and macromolecules.
Ultra-structure and function of: Golgi complex, lysosomes, peroxisomes, endoplasmic reticulum, mitochondria, chloroplast and plant vacuoles.
Cytoskeleton: organization and role of microfilaments, intermediate filaments and microtubules; motor movements, implications in cell division, flagellar & other movements.
Nucleus: Ultrastructure, nuclear pores, nucleolus, DNA structure A, B and Z forms, replication in prokaryotic and eukaryotic cells, DNA replication proteins, damage and repair.
Ribosomes: Structure and function

Gene expression and regulation
Transcription: Transcription in prokaryotic and eukaryotic cells, plant promoters, transcription factors, types of RNA and their function, RNA splicing, mRNA transport
Translation: In prokaryotic and eukaryotic cells, structural levels of proteins, post-translational modification; structure and role of rRNA and tRNA.
Regulation of gene expression: Prokaryotes- Positive and negative control, inducible and repressible operons, lac operon, trp operon, attenuation, riboswitch; Eukaryotes- Regulation at DNA, transcription, translation and post translational level, Epigenetic regulation

Protein sorting
Protein glycosylation; vesicles involved in protein transport; protein targeting to plastids, mitochondria, peroxisomes, nucleus, vacuoles; modification during transport.

Unit - VIII:
Cell cycle and apoptosis
Control mechanisms, role of cyclins and cyclin dependent kinases; retinoblastoma and E2F proteins; cytokinesis and cell plate formation; Apoptosis and its pathway.
Signal transduction
Overview, receptors and G-proteins, phospholipid signaling, role of cyclic nucleotides, calcium-calmodulin cascades, diversity in protein kinases and phosphatases, specific signaling mechanisms e.g. two-component sensor-regulator system in bacteria and plants, sucrose sensing mechanism

Techniques
Electrophoresis, immunotechniques, FISH, GISH, confocal microscopy

rDNA technology
Recombinant DNA technology: Gene cloning- Principles and technique; vectors-types (cloning & expression; plasmid & viral) and their properties; construction of DNA libraries (gDNA and cDNA); splicing of insert into the vector; screening of DNA libraries and introduction of the recombinant DNA into the host cells.

Genetic engineering of plants: Aims, strategies for development of transgenics (with suitable examples); Agrobacterium-the natural genetic engineer; T-DNA and transposon mediated gene tagging.

Microbial genetic manipulation: Bacterial transformation, selection of recombinants and transformants, genetic improvement of industrial microbes and nitrogen fixers, fermentation technology.

DNA synthesis; DNA sequencing; polymerase chain reaction and applications of PCR

Plant tissue culture
Basic concepts; Principles and scope; tissue culture media; callus induction and cell suspension; aspects of morphogenesis; haploid and triploid production; production of somatic embryos; applications of plant tissue culture; protoplast isolation and culture; production of cybrids

Bioinformatics
Introduction, History, Definition and applications of bioinformatics; Database: Sequences (nucleotide and amino acid); nomenclature- IUPAC symbols, nomenclature of DNA & protein sequences, directionality of sequences, types of sequences used in bioinformatics; Definitions, types and classification of databases- Primary Databases, Secondary databases, Literature database and Taxonomy database.
Syllabus for Pet – II Examination

Name of Subject: Zoology,
Facutly of Science, Subject Code: 8.07

**Unit - I: Nonchordata**

- Locomotion in Protozoa: Ultrastructure of protozoan locomotory organs and mechanism of various modes of locomotion.
- Skeletal organization in calcareous sponges, Hexactinilida and Demospongiae.
- Polymorphism and mutagenesis in Coelenterata.
- Bioluminiscence in Insects.
- Larval forms in free living (Coelenterates, Annelides, Arthropodes, Molluscsans, Echinoderms) and parasitic invertebrates (Helminthes).
- Organization and general characters of minor phyla: Ctenophora, Rotifera and Entoprocta.

**Unit - II: Chordata**

- Vertebrate integuments and its derivatives (Pisces, Amphibia, Reptilia, Aves and Mammals).
- Evolution of heart in Vertebrates.
- Evolution of Man.
- Comparative anatomy of the brain in Vertebrates (Teleost, Frog, Lizard, Fowl and Rat).
- Migration in birds.
- Breeding of fishes: Natural and induced.

**Unit - III: General Physiology and Endocrinology**

- Enzymes: Classification, mechanism of enzyme action, factors affecting enzyme activity, regulation of enzyme activity.
- Neurotransmitters: Chemical nature, biosynthesis and mechanism of synaptic transmission.
- Thermoregulation in poikilotherms and homeotherms, adaptations and regulatory mechanism.
- Osmoregulation in Pisces and Amphibia, mechanism of salt and water transport by gill and kidney.
- Endocrine glands in Insects: Structure, hormones and function.
- Endocrine glands in Vertebrates: Pituitary, Thyroid, Parathyroid, Adrenal, Pineal and Gonads: Structure, hormones and function.
**Unit - IV: Molecular Cell Biology and Genetics**
- Molecular composition and structure of bio-membranes, mechanism of transport.
- Cell division and cell cycle: Phases of cell cycle, checkpoints of cell cycle, regulation of cell cycle.
- Isolation and sequencing of DNA, gene amplification, PCR, RAPD, RFLP.
- Transcription and its mechanism of regulation.
- Gene interactions, linkage and crossing over and mutation.

**Unit - V: Developmental Biology**
- Metamorphosis in Insects and Amphibia.
- Cryopreservation of gametes and embryos.
- Implantation in Mammals.
- Multiple ovulation and embryo transfer technology (MOET).
- Apoptosis- Mechanism and significance.
- Immunocontraception- Fertilization inhibition and pregnancy termination.
- In vitro fertilization (IVF).

**Unit - VI: Parasitology and Immunology**
- Dengue and H1N1 virus- Life cycle, mode of transmission, infection and treatment.
- Malaria and Leishmaniasis- Pathogen, Vector, Life cycle, mode of transmission, infection and treatment.
- Cells and organs of immune system.
- Antigen and antibodies: Antigenisity, immunogenesity, antigen antibody interactions, superantigens and antibody diversity.
- Immunotechniques: Precipitation reaction, Agglutination reaction, Radioimmunoassay (RIA), ELISA.

**Unit - VII: Ecology and Toxicology**
- Biodiversity- Definition, types, hotspots of biodiversity and conservation.
- Wild life: Wild life in India, endangered species of mammals, birds, amphibians and reptiles.
- Plankton, Nekton and Benthos- Nature, distribution, qualitative and quantitative analysis.
- Productivity: Concept, primary and secondary productivity, measurement of productivity by light and dark bottle method.
- Animal behaviour: Innate or inherent behavior, learned behavior and social behavior.
- Toxicology: Definition, Bioassay studies- purpose, methodology, calculation of LC50 value and significance.
- Bioaccumulation, Biomagnification and Biotransformation of xenobiotics.

**Unit - VIII: Biotechniques, Biostatistics and Bioinformatics**

- Chromatographic separation: Thin layer and gas chromatography and HPLC.
- Electrophoretic separation techniques.
- Hybridization techniques: Southern and Northern hybridization, microarray.
- Sampling- types, standard error (SE), standard deviation (SD), Significance tests- t-test, z-test, Chi square test-assumption, importance and examples.
- Phylogenetic analysis: tree style and tree building methods.
- Multiple sequence alignment and family relationship.
Syllabus for Pet – II Examination

Name of Subject: Electronics, Faculty of Science, Subject Code: 8.08

Unit - I:

Electronic transport in semiconductor; PN junction, diode equation and diode equivalent circuit; breakdown in diodes, zener diodes, tunnel diode, semiconductor diodes; characteristics and equivalent circuits of BJT, JFET, MOSFET; IC fabrication methods, metallization, bonding, thin film active and passive devices

Characteristics of solid state power devices: SCR, DIAC, Triac, UJT; triggering circuits, converters, choppers, inverters; ac regulators, speed control of ac and dc motors

Optical sources: LED, spontaneous emission, simulated emission, semiconductor diode LASER; Photo-detectors: PN and PIN photodiodes, phototransistors, opto-couplers, solar cells, display devices

Unit - II:

Superposition, Thevenin, Norton and Maximum power transfer theorems; Network elements, network graphs, nodal and mesh analysis; zero and poles, Bode plots; Laplace, Fourier and Z-transforms; time and frequency domain response, image impedance and passive filters; Two port network parameters, transfer functions, signal representation, state variable method of circuit analysis, AC circuit analysis, transient analysis

Unit - III:

Rectifiers, regulated power supply and voltage regulated ICs; biasing of bipolar junction transistors and JFET; Single stage amplifiers, multistage amplifiers; feedback in amplifiers, oscillators, function generators, multivibrators; operational amplifiers (OPAMP): characteristics and applications, computational applications, integrator, differentiator, wave shaping circuits, F to V and V to F converters, Active filters, Schmitt trigger, phase locked loop (PLL)

Unit - IV:

Logic families, flip-flops, gates, Boolean algebra and minimization techniques; multivibrators and clock circuits; counters: ring, ripple, synchronous, asynchronous, up and down; shift registers; multiplexers and demultiplexers; arithmetic circuits, memories; A/D and D/A converters

Architecture of 8051, addressing modes, instruction set, interrupts, programming memory and I/O interfacing, serial communication protocols

Unit - V:

Introduction to high level programming language, introduction of data in C, operators and its precedence, various data types in C, storage classes in C, decision making and forming loop in program, handling characters, arrays in C, structure and union, user defined function, pointers in C, advanced pointer, pointer to structure, pointer to functions, dynamic data structure, file handling in C, command line argument; graphic video modes, video adaptors, drawing various objects on screen, interfacing to external hardware via serial/parallel port using C, applying C to electronic circuit problems, introduction to object oriented programming and C++
Unit - VI:

Maxwell's equations, time varying fields, wave equation and its solution, propagation of EM waves in homogeneous, conducting and dielectric media, Poynting vector, antenna parameters, half wave antenna; Microwave sources: reflex klystron, principle of operation of magnetron; Microwave components: scattering matrix, attenuators, Tees, circulators, isolators, phase shifters, solid state microwave devices, basic theory of Gunn, GaAs FET, PIN diode for detection of microwaves

Principle of optical communication, optical fiber cable, light propagation in fiber, types of fibers, characteristic parameters, modes, fiber splicing, fiber optic communication system, coupling to and from the fiber, modulation, modulation

Unit - VII:

Transducers: resistance, inductance, capacitance, piezo-electric, thermoelectric, Hall effect, photoelectric, techogenerators, measurement of displacement, velocity, acceleration, force, torque, strain, speed, sound, temperature, pressure, flow, humidity, thickness, pH, position

Measuring Equipments: Measurement of R, L and C, voltage, current, power, energy, frequency/time, phase, bridges and potentiometers, CRO, digital storage oscilloscope, spectrum analyser, noise and interference in instrumentation, instrumentation amplifiers

Analytical instruments: biomedical instruments- ECG, blood pressure measurements, spectrophotometers, electron microscope, X-ray diffractometer

Unit - VIII:

Open loop and close loop control system, error amplifier, on-off controller, proportional integral derivative (PID) controller, dynamic behavior of control systems- servo mechanism characteristics, parameters of control system- accuracy, sensitivity, disturbances, transient response, stability, Routh-Hurwitz criterion, Bode plots, Nyquist criterion

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Syllabus for Pet – II Examination

Name of Subject: Sericulture,
Faculty of Science, Subject Code: 8.09

Unit - I: General Sericulture and Biology of Silkworm

1. History and present status, Geographical distribution.
2. Types of silkworm, classification, host plants, mulberry and non-mulberry sericulture in India.
3. Silk production, Mulberry silk and non-mulberry silk production, Export and National income
4. Recent trends in Sericulture, Modernization of culture, high yielding hybrid races of silkworm.

Unit - II: Host Plants

1 Moriculture: Characteristics, Mulberry varieties, Relationship between growth and environment, mulberry cultivation, sexual and asexual propagation, Methods of plantation & their management.
2 Tasar, Muga, Eri host plant: Distribution, Morphology, Taxonomy and anatomy of tasar host plants; Arjun (Terminalia arjuna), Ásan (T. tomentosa), Sal (Shorea robusta), Oak (Quercus serrata), Muga host plants; Som (Machilus bombyciana), Soalu (Litsaea polyantha), Eri of host plants; Castor (Ricinus communis), Kesseru (Heteropanax fragans).
4. Pests: Leaf eating caterpillars-Diacrisia oblique, Apochema cinarareus, jassids, thrips, mealy bugs (Scale insect), gall midges, stem girdle beetle, powder pest beetle, and control methods.

Unit - III: Silkworm Biology

1. Morphology of Bombyx mori: Egg – shape, size and external structure, incubation period, Larva- Instars, morphological characters, individual life span, sexual dimorphism in the last instar larvae, Pupa- Male and Female pupae pupal period and sexual dimorphism, Adult- Male and female moths, adult life and sexual dimorphism.
2. Morphology of Tasar, Muga and Eri: Egg – shape, size and external structure, incubation period, Larva- Instars, morphological characters, individual life span, sexual dimorphism in the last instar larvae, Pupa- Male and Female pupae pupal period and sexual dimorphism, Adult- Male and female moths, adult life and sexual dimorphism
3. Structure and function of Mouth parts of the larva, External genitalia of adults, Digestive system in larva, Circulatory system in larva, Reproductive system in larva and adults.

Silk gland: Morphological structure, Histological Differentiation, Functional differentiation, Silk gland secretory cycle and silk synthesis, degeneration, silk proteins.
Neuroendocrines: Central nervous system, Neuroendocrine systems, hormones in development, Pheromones.

**Unit - IV: Silkworm protection**
1. Diseases: Pebrine, Grasserie, Flacherie, Muscardine
2. Control of diseases: Preventive measures, Use of disinfectants, dusting, drug treatment
3. Insect pests and control: Uzi fly, Demisted beetle and Ants
4. Vertebrate pest and control: Lizards, Birds, Squirrels and Rats

**Unit - V: Silkworm Seed Production (Grainage)**
1. Seed Cocoons: Selection, preservation, incubation, Grainage Equipment.
3. Eggs: Disease free egg laying (DFLs) preparation, Loose egg preparation. Egg preservation
4. Egg hatching/Development: Embryonic development, Inhibition of embryonic development. Artificial hatching,(Hot and Cold acid treatment) Shipment of DFLs

**Unit - VI: Silkworm rearing**
1. Rearing method/requirements: Selection of silkworm race for rearing, Collection of Seeds (DFLs), Rearing Equipment, Rearing house (Model and Thatched Roof)
2. Rearing requirements/method: Disinfections of rearing house and appliances, brushing of newly hatched larvae, Bed cleaning, Spacing and Dusting of disinfectants. Maintenance of temperature, photoperiod and humidity during rearing.
3. Food and Feeding: Quality, harvesting and storage of mulberry leaves, Feeding and rearing of early stage larvae, Feeding and rearing of late stage larvae, Schedule of feeding, artificial diet.
4. Cocoon formation and adult: Ripening of worms, spinning of cocoon, adult emergence, Pre-pupal moulting, pupation and of worms. Types of mountages, harvesting of cocoons. Emergence of adult moths from cocoons.

**Unit - VII: Reeling of cocoons**
1. Cocoon preparations: Selection and preservation of cocoons for reeling, Drying/Stifling, Boiling, Top Boiling System, One Pan Boiling System, Three Pan boiling system, Sunken system, Brushing
2. Reeling appliances: Country Charkha, Cottage basin/Domestic machine, Filature/Multiend machine, Automatic reeling machine, Skeining unit
3. Reeling methods: Charkha reeling, Cottage basin reeling, Filature
Unit - VIII: Marketing

1 Cocoon marketing: Gradation of seed and reeling cocoons, Marketing of multivoltine, bivoltine and hybrid cocoons

2 Yarn marketing: Gradation of yarn, Twisted/untwisted yarn, Marketing of yarn.


4 Cost benefit ratio: Cost of land and soil preparation, Cost of mulberry plantation and management, Cost of silkworm rearing, Reeling of yarn, selling of the cocoons / yarn.

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Syllabus for Pet – II Examination

Name of Subject: Biochemistry, Faculty of Science, Subject Code: 8.10

Unit - I:
Biopolymers: Structural chemistry, Synthesis of Proteins, Nucleic acids, Carbohydrates, Applications in Nanotechnology, Biological membranes and membrane properties.

Unit - II:

Unit - III:
Enzymes and Inhibitors: Nomenclature, Kinetics, Inhibitor Kinetics, Multienzymes, Immobilization techniques and applications of Industrial enzymes.

Unit - IV:
Molecular biology techniques: Isolation of Nucleic acids (DNA & RNA), protein-DNA interactions, Gene regulatory network, applications of RFLP, RAPD, PCR, Cloning vectors, Microarray, etc.

Unit - V:
Immunology: Innate and adaptive immunity, Immunological techniques and their applications, (Qualitative and quantitative), autoimmunity.

Cell Biology: Structure, organization antibiotic resistance by membranes

Unit - VI:
Methodology of scientific research: Nature of scientific research, Design of experiments, parameters used, data analysis, interpretation and summary of results. Policies of regulating research, Guidelines for use of human and animals in research, Preparation of scientific report, Thinking and planning, information ideas, order of paragraph writing, Proper use of nouns, pronouns, articles and tenses, spellings, etc. presentation of review.

Unit - VII:
Computer applications: Use of computers in biology, spreadsheet tools, presentation tools, network pharmacology, web search.

Measure of central tendency and dispersion, probability distribution, parametric and nonparametric statistics, correlation and regression, testing of hypothesis. ANOVA, Chi square test, One way and two way ANOVA.

Unit - VIII:
Tissue culture techniques

Animal cell culture techniques: Sterilization, Media preparation, Difference between primary culture and cancerous cell line, cell counting, proliferation, and cytotoxicity assays.

Plant tissue culture techniques: Callus, hybridization, organogenesis, clonal propagation, genetic modification to produce improved varieties, Protoplast formation and fusion.
## Syllabus for Pet – II Examination

**Name of Subject : Microbiology,**  
**Faculty of Science, Subject Code: 8.11**

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<thead>
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<th><strong>Unit – I:</strong></th>
<th><strong>General Microbiology:</strong></th>
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<th><strong>Unit – II:</strong></th>
<th><strong>Microbial Metabolism:</strong></th>
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<tr>
<td><strong>Carbohydrates as informational Molecules:</strong></td>
<td>Sugar code, Viral::HA, VPI, Bacterial:: LT, CT. Reverse TCA cycle, Biosynthesis of cell wall polysaccharides and bacterial peptidoglycan.</td>
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<td><strong>Lipid:</strong></td>
<td>Membrane lipids, biosynthesis of membrane phospholipids, ketone bodies.</td>
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<td><strong>Proteins:</strong></td>
<td>Determination and characteristics of alpha-helix and B-sheets. Concept of protein domain and motif, common motifs and their role in metabolism, protein folding and denaturation curves, role of chaperones and chaperonins, biosynthesis of all amino acids.</td>
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<tr>
<td><strong>Nucleic acids:</strong></td>
<td>Structural details of Duplex DNA, Unusal structures: palindrome, inverted repeats, mirror repeats, triplet DNA,G tetraplex secondary structure of RNA purine and pyrimidine biosynthesis, degradation and regulation, salvage pathway, Inhibitors.</td>
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<td><strong>Nitrogen fixation:</strong></td>
<td>Symbiotic, nonsymbiotic. Nitrification, Nitrate reduction and denitrification.</td>
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<th><strong>Unit – III:</strong></th>
<th><strong>Enzymology :</strong></th>
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<tr>
<td><strong>Enzymes Kinetics:</strong></td>
<td>Overview of Michaelis- Menten equation and its transformation, Evaluation of Kinetic parameters, Kinetics of bisubstrate reaction, multistep reactions, kinetics of enzyme inhibition, Classification of enzymes</td>
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<td><strong>Catalytic mechanisms:</strong></td>
<td>Concept of active site, determination of active site, acid-base catalysis, covalent catalysis, metal ion cofactors, proximity and orientation effects, preferential binding. Active site determination and mechanism of lysozyme, Active site determination and mechanism of serine protease.</td>
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<tr>
<td><strong>Regulation of enzyme activity:</strong></td>
<td>Allosterism, Kinetic analysis of allosteric enzymes Covalent Modification, Feed-back inhibition</td>
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| Unit – IV: | **Advance Techniques in Microbiology:**  
Determination of size, shape and Molecular weight of Macromolecules:- by Viscosity, CD/ORD, Light scattering, diffusion sedimentation and Centrifugation techniques.  
**Electrophoresis:** Agarose Gel, SDS-page, two-dimensional gel electrophoresis, capillary electrophoresis, immune-electrophoresis.  
**Electron Microscopy:** SEM, TEM, Staining procedures and microscopy. Fluorescent **Microscopy:** Staining procedures and Microscopy, FISH. Laser scanning, confocal microscopy. Scanning tunneling and atomic force microscopy. Immunoelectron microscopy, cryoelectron microscopy.  
**Blotting Technique:** Western, southern, northern blotting, Radioimmunoassay |
| --- | --- |
| Unit – V: | **Membrane Transport & Signal Transduction:**  
Active and Passive transport, uniport, ATP powered pumps, non-gated ion channels, cotransport by symporters and antiporters, transepithelial transport.  
General concept of cell signaling, G-protein coupled receptors and their effectors.  
RTK and MAP Kinasdes. Down regulations of pathways. Cytokine receptors and their mechanism (JAK-STAT pathway).  
Basic two component system. Histidine Kinase pathway Sporulation as a model of bacterial signal transduction |
| Unit – VI: | **Microbial Metabolites :**  
**Biopolymers:** Polypeptides (collagen, casein and serumalbumin), Polynucleotides and Polysaccharides (amylose, amlopectin, alginate, cellulose) and other biopolymers like chitin, Xanthan, dextrin, Gellan, Pullulan, curdlan and hyluronic acid.  
**Polyamines:** Brief outline and functions of polyamines. Synthesis of linear polyamine-putrescine, cadoverine, spermidine and spermine.  
**Antibiotics:** History and discovery of antibiotics, Antibiotic resistance, Mechanisms of antibiotic resistance.  
**Structure and mode of action of antibiotics:** Aminoglycosides(Amikacin), (Carbapenems(Imipenim), microlids(Azithromycin), Nitrofurans (nitrofurantoin) Penicillin (Amoxicillin), Quinolones (gatifloxacin/Ciprofloxacin), Sulphonamides (sulfamethoxazoler), Tetracyclines (doxycyclines), Chloramphenicol, Fucanazole.  
**Microbial pigments:** Bacteriochlorophylls, Carotenoids of prokaryotes |
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<th>Unit – VII</th>
<th>Immunology</th>
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<tr>
<td><strong>Cell Mediated Immunity</strong>: General properties of effect or T cells, Cytotoxic T Cells, Natural Killer cells, Antibody-Dependent cell mediated cytotoxicity. T-Cell dependent and T-cell independent defense mechanisms.</td>
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<td><strong>Cancer and the Immune system</strong>: Origin and Terminology, Malignant Transformation of cells, oncogenes and cancer induction, Tumor antigens, Immune surveillance theory, Tumor evasion of the Immune system, Cancer Immunotherapy.</td>
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<td><strong>Transplantation Immunology</strong>: Immunological basis of Graft Rejection, Mechanism of Graft rejection. Immunosuppressive therapy: General and specific. Clinical Transplant.</td>
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<td><strong>Tolerance</strong>: Central and peripheral tolerance to self antigens, Mechanism of induction of natural tolerance.</td>
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<td><strong>Autoimmunity and autoimmune diseases</strong>: RA (Rheumatoid arthritis), Grave’s disease; Goodpasture syndrome, Autoimmune haemolytic disease; Pernicious anaemia.</td>
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<td><strong>Hypersensitivity</strong>: Type 1, Type II, Type III &amp; Type IV</td>
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<th>Unit – VIII</th>
<th>Molecular Biology, Genetics &amp; Recombinant DNA Technology</th>
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<tbody>
<tr>
<td><strong>Replication</strong>: Initiation, Elongation and Termination in E. coli and Eukaryotes.</td>
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<tr>
<td><strong>Transcription</strong>: Comparative study of prokaryotic and eukaryotic transcription process.</td>
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<td><strong>Translation</strong>: Initiation, elongation and termination mechanism. Post translational midifications.</td>
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<tr>
<td><strong>Post transcriptional events</strong>: mRNA, Rrna and tRNA processing through splicing mechanism, trans splicing, RNA editing, post transcriptional control of gene expression, gene silencing, RNA interference, Catalytic RNA and antisense RNA</td>
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<tr>
<td><strong>DNA Repair</strong>: Direct reversal of DNA damage, Base excision repair by nucleotide excision</td>
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<td><strong>Gene Regulation</strong>: Lac, Arabino and trp operons</td>
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<tr>
<td><strong>Genetics of Bacteria</strong>: Gene mapping in bacteria by conjugation, transformation and transduction Transposons: Bacterial, P elements and retroposons</td>
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<tr>
<td><strong>DNA cloning</strong>: restriction enzymes, cloning vectros, genomic library, cDNA library and chromosome libraries. <strong>PCR</strong>: Steps, advantages, limitations, application, RT-PCR Restricrion mapping: DNA fingerprinting, S1 Mapping, Dnasefootprinting, DMS footprinting</td>
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</table>
Syllabus for Pet – II Examination

Name of Subject : Environmental Science,
Faculty of Science, Subject Code: 8.12

UNIT - I: Fundamentals of Pollution

**Basic Concepts of Air Pollution**: Definition, Sources (Natural and Anthropogenic), Chemistry of Air Pollutants, Classification—Primary Air Pollutants, Secondary Air Pollutants & their Adverse Effects of Air Pollutants, Air quality standards and Index, Environmental Segments and Structure of the Atmosphere.

**Global Problems Associated with Air Pollution**: Ozone Layer Depletion, Green House Effect, Global Warming and Climatic Changes, EL-Nino and LA-Nino, Acid Rain, Photochemical Smog, Indoor Air Pollution and Vehicular air pollution, Air Pollution Episode

**Air Pollution Control Technology**: Methods of Control of Air pollution, Air Pollution Control Equipment (Gravity Settling Chamber, Electrostatic Precipitator, Cyclone Collector, and Wet Scrubbers), Air pollution modeling and predictions, Sampling of gases and particulate pollutants, analytical methods for monitoring pollutants.

**Basic Concepts of Noise Pollution**: Sources of Noise Pollution, Properties of Sound, Sound Pressure and Intensity Levels, Measurement of Noise, Measurement and Analysis of Sound, Equipment Used for Noise Measurements, Effects of Noise Pollution, Approaches for Noise Control, Noise Pollution Control in India, Standards Prescribed for Noise with reference to Indian Context.

**Basic Concepts of Water Pollution**: Sources and Effects of Water Pollution, Types of Water Pollutions, Marine pollution, Effects of oil pollution & counter measures against oil spills, Eutrophication its Effects & Control Measures, Self Purification, Oxygen Sag Curve, Zones of Pollution,

**Water Pollutants**: Classification of Water Pollutants and their Detrimental Effects, Pesticides pollutants, Chemical Speciation Scheme, Speciation of Mercury (Hg), Lead (Pb), Cadmium (Cd) & Chromium (Cr), Water Sampling, Objectives, Selection of Sampling Site, Types of Water Samples, Sampling Equipment, Classification of Water Quality Parameters (Organic, Inorganic, Nutrient & Heavy metals), Basic Concept, Significance and Measurement of DO, BOD, COD, Phenol, Polynuclear Aromatic hydrocarbon (PAH) in Water and Wastewater, Bacteriological and Biological examination of water, Approaches to Prevent & Control of Water Pollution, Legislative Measures, Rain Water Harvesting methods for water conservation.

**Thermal Pollution**: Definition, Sources, Effects of Thermal Pollution, Control Measures and Methods, Prevention Selection of Site and Clean Technologies for Coal Fired Thermal Power Plants.
**Unit - II: Fundamentals of Soil Sciences**


**Soil Pollution:** Sources, Consequences, and Control Measures. Land Use Planning, Soil Surveys in Relation to Land Use Planning, Methods of Site Selection and Evaluation, Bioremediation and Restoration of Contaminated Soil.

**UNIT - III: Environmental Chemistry**

**Introduction to Environmental Chemistry:** Basic Principles Involved in the Analysis Various Constituents Present in the Environment, Water Structure and Anomalous Behavior of Water, Acid base reactions, solubility product, solubility of gases in water, the carbonate system, unsaturated and saturated hydrocarbons, radionuclides.

**Green Chemistry for Sustainable Future:** Reagents, Media, Special Importance of Solvents, Water the Greenest Solvents, Synthetic and Processing Pathways, Role of Catalyst, Biological Alternatives, Biopolymers, Principles and Application of Green Chemistry.


**Basic Concepts from Quantitative Chemistry:** Buffers & pH, Colorimeter, Lambert’s Law, Beer’s Law, Principles of Colloidal Chemistry, Emulsions.


**UNIT - IV: Solid and Hazardous Waste Management**

Introduction, Classification, Origin, Characteristic of Solid Waste, Methods of Solid Waste Treatment and Disposal, Pyrolysis, Recycling and Reuse of Solid Waste and Management,

Solid Waste Handling Methods, Segregation and Salvage, Status of Municipal Solid Waste.

**Solid Waste Management:** Introduction, Vermiculture, Composting, Biogas from MSW, Land Fill (Site Selection, Site Investigation and Site Characterization), Landfill Planning and Designing, Construction& Operational Practices, Landfill Quality and Control, Municipal Solid Waste (Management and Handling Rules 2000), Biomedical waste and its management, Categories, recycling techniques.


**UNIT - V: Water & Waste Water Treatment**


**Wastewater Treatment**: Sources of Wastewater, Objectives of Treatment, Preliminary Treatment, Selection and Applications of Screens (Bar Screens, Fine Screens, Self Cleaning and Cutting Screens), Grit Chambers (Aerated & Plain), Primary Treatment-Sedimentation (Septic Tank & Imhoff Tank), Primary Treatment: Plane Sedimentation with Coagulation, Filtration & Disinfection Methods, Secondary Treatment (Biological Methods): Activated Sludge Process, Oxidation Pond & Trickling Filter and Up-flow Anaerobic Sludge Blanket Reactor, Tertiary Treatment: Adsorption, Ion Exchange, Electrolysis, Reverse Osmosis & Treatment with Activated Carbon, Sludge Handling Treatment and Disposal, Composition & Characteristics of Sludge, Need for Disposal, Operation & Maintenance of Wastewater Treatment Plant

**UNIT - VI: Energy Resources & Environmental Management**

**Natural Resources**: Conservation and Management, Definition, Broad Classification, Renewable, Non Renewable and Mineral Resource

Non Renewable (Conventional Source of energy): Thermal Power, Hydro Energy, Atomic Energy, Nuclear Energy (Fission and Fusion) and Fossil fuels (Coal, Petroleum Oil and natural Gas).

Environmental Management:- Environmental Impact Assessment, Environmental Audit, Concept of ISO 9000 and ISO 14000 in Environmental System Management, Basic Concept of Sustainable Development, Constitutional and Statutory Laws in India, Salient Features of Coastal Zone Regulations (CZR) Notification, the Convention of Biodiversity. (Several Case Studies to be given as Assignment), Environmental laws in India with reference to: - The Environmental Protection Act 1986

UNIT - VII: Instrumental Techniques in Environmental Analysis & Errors


Errors in Environmental Analysis: Determinate and Indeterminate Errors, Methods of Minimization, Accuracy and Precision, Rejection of Measurement, Measures of Central Tendencies: Mean, Median Range, Average deviation, Standard deviation, Confidence limit and Numerical Problems.

UNIT - VIII: Foundation Course on Ecology, Biodiversity and Wildlife Biology

Introduction of Ecology; - Definition, Subdivision, Modern Branches of Ecology, Applications and Significance to Human Beings

Ecosystems: Types of Ecosystem-Aquatic Ecosystem-Ocean and Pond Ecosystem, Terrestrial Ecosystem- Forest, Desert and Grassland Ecosystem. Structure and functions of Abiotic and Biotic components, Energy flow, Food chains, Food web, Ecological pyramids, Biogeochemical Cycles in environment (Gaseous & sedimentary type), Hydrological cycles


Syllabus for Pet – II Examination

Name of Subject: Computer Science, Facutly of Science, Subject Code: 8.13

**Unit - I : Discrete Mathematical Structure**

Fundamental – Sets and Subsets, Logic-Proposition and Logical Operation

Conditional Statements, Methods of Proof, Mathematical Induction, Mathematics Logic, Connectives ,Normal Forms ,The Theory of Interface for the statement

Calculus ,Inference Theory, Counting- Permutation, Combination, The pigeonhole Principle, Recurrence Relations. Relations and Digraphs, Permutation Functions, Growth of Functions. Graph Theory, Other relations and Structure, Lattices, Finite Boolean-Algebra, Tree, Minimal Spanning Trees, Semigroups and Groups,

**Unit - II : Advanced DBMS and Administration**

Relational Database design: Functional dependencies, and Normalization Normal forms based on primary keys (1 NF, 2 NF, 3 NF, BCNF, 4 NF, 5 NF), Query Processing, Methods for Joining Tables (Nested Loop, Merge Join, Hybrid Join, Multiple Join) Structure of a Query Optimizer, Transaction Processing & Concurrency Control, Crash Recovery, Client/Server database, Oracle Database Architecture and Administration, Oracle Backup and Recovery Strategies, Oracle Tuning and Troubleshooting, Security, Specifications in SQL, Introduction to Database Security issues, Authorization and use.

**Unit - III : Theory of Computation and Compiler Construction**


Introduction to Compilers, Lexical Analysis, Syntax analysis, Intermediate code Generation, Optimization, Code Generation, Book keeping, Error Handling, Compiler writing tools. Basic parsing Techniques, predictive parsers, automatic construction of efficient parsers, constructing SLR parsing tables, constructing LALR parsing tables, Ambiguous grammar. Syntax directed translation,, parse tree and syntax trees, three- address code, quadruple, triple, translation of Symbol Table, Code Optimization, Loop optimization, The DAG Representation of basic blocks, Value number and algebraic laws, Global data-flow analysis. Code Generation,

Code Generation from DAG’s, Peephole Optimization.

**Unit - IV: Computer Graphics**

Unit - V : Data Communication and Network


Unit - VI : Software Engineering


Unit - VII : Data Mining

Introduction to Data Mining, Definitions, Origins of Data Mining, Data Mining Tasks, Classification, Clustering, Association Rule Discovery, Sequential Pattern Discovery, Regression, Challenges of Data Mining, Data Mining-Data, Types of data sets, Data Quality, Data Preprocessing, Aggregation, Sampling, Dimensionality Reduction, Feature subset selection, Feature creation, Discretization and Binarization, Attribute Transformation, Density. Exploring Data, Data Exploration Techniques, Measures of Location, Measures of Spread, Visualization, Representation, Arrangement, Selection, Visualization Techniques, Other Visualization Techniques, OLAP , Data Mining Classification, Decision Trees, and Model Evaluation: Classification: Definition, Classification Techniques, Practical Issues of Classification, ROC curve, Alternative Techniques of Data Mining Classification, Data Mining Association Analysis and Algorithms, Association Rule Discovery, Tree Projection, Rule Generation, Pattern Evaluation, Statistical Independence, Properties of A Good Measure, Support-based Pruning, Subjective Interestingness Measure. Data Mining Cluster Analysis and algorithms, Applications of Cluster Analysis, Types of Clusters, Clustering Algorithms, Data Mining Anomaly Detection.
Unit - VIII : Artificial Intelligence & Expert System


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# Syllabus for PET – II Examination

**Name of Subject: Biotechnology, Faculty of Science, Subject Code: 8.14**

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<thead>
<tr>
<th>Unit – I:</th>
<th>Introductory Biotechnology</th>
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<tbody>
<tr>
<td></td>
<td>Chemistry of Carbohydrates, Lipids, Proteins and Nucleic acids</td>
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<tr>
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<td>Structures &amp; Functions of Cell organelles</td>
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<td></td>
<td>Enzymes: Overview, Concept of Multienzyme complexes, Mechanism of enzyme action &amp; regulation, Enzyme kinetics, Prokaryotic &amp; Eukaryotic Gene structure</td>
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<tr>
<td></td>
<td>Fundamental concepts in Immunology</td>
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<td></td>
<td>Basic concepts in Biostatistics, Bioinformatics, Ethics &amp; Patenting, Research Methodology</td>
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<tr>
<th>Unit – II:</th>
<th>Biophysical techniques:</th>
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<tbody>
<tr>
<td></td>
<td>Spectroscopy and its applications</td>
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<td>Chromatography and its applications</td>
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<td>Electrophoresis and its applications</td>
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<td>Centrifugation and its applications</td>
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<td>Isotopes and Applications of isotopes in Biotechnology</td>
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<tr>
<th>Unit – III:</th>
<th>General Microbiology &amp; Immunology:</th>
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<tr>
<td></td>
<td>Bacteria, Fungi, Algae and Viruses</td>
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<td>Bacterial Growth and Nutrition</td>
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<td>Microbial control</td>
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<td>Anatomy of the immune system and Clinical Immunology</td>
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<td>Microbial Classification: 16s rRNA Sequence and Phylogeny</td>
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<td>Bacterial Genetic System</td>
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<td>Vaccine Technology</td>
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<tr>
<th>Unit – IV:</th>
<th>Molecular Biology &amp; Genetic Engineering:</th>
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<tr>
<td></td>
<td>Restriction endonucleases &amp; other enzymes needed in Genetic Engineering</td>
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<td>Isolation and purification of DNA, Replication, Transcription, Genetic Code and Translation, Regulation of gene expression</td>
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<td></td>
<td>Construction of Genomixc DNA library and DNA Sequencing, Methods of transformation and ligation of DNA, Cloning vectors, Recombination and Genome Mapping, Anti sense, Ribozymes and Epigenetics</td>
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<td>Cell Cycle, Cell Signaling, Cancer Biology, angiogenesis</td>
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<td>Gene mutation, Gene therapy</td>
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<tr>
<th>Unit – V:</th>
<th>Plant Biotechnology</th>
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<tr>
<td></td>
<td>Detailed concepts of Plant Tissue culture and techniques used.</td>
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<td>Plant transformation technology and Applications of plant transformation</td>
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<td>Plant metabolic engineering and industrial products</td>
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<td>Molecular marker aided breeding</td>
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<td>Green House Technology</td>
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<tr>
<th>Unit – VI:</th>
<th>Industrial Biotechnology</th>
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<tr>
<td></td>
<td>Bioreactors, Types, Immobilized reactor, Downstream processing</td>
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<td>Bioprocess Engineering Concepts: Process Optimization and Control:</td>
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<td>Scale up &amp; Biosensor Technology:</td>
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<td>Production of Primary &amp; Secondary Metabolite:</td>
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<td>Unit – VII:</td>
<td>Environmental Biotechnology</td>
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<tr>
<td>Basic concepts of environmental science</td>
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<tr>
<td>Ecosystem: Structures &amp; Functions</td>
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<tr>
<td>Energy and biofuels, Biogeochemical cycles, Biotechnological processes, Biofertilizers, Biopesticides and Integrated pest management: Bioremediation &amp; Phytoremediation</td>
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<td>Solid waste pollution and its management</td>
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<td>Bioabsorption and Bioleaching of heavy metals</td>
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<td>Waste water Treatment</td>
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<td>Xenbiotics in environment</td>
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<tr>
<th>Unit – VIII:</th>
<th>Animal Biotechnology</th>
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<tbody>
<tr>
<td>Detailed concepts of animal tissue culture and technique.</td>
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<tr>
<td>Primary cultures</td>
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<tr>
<td>Established cell line cultures</td>
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<td>Viability and cytotoxicity</td>
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<td>Cell transformation</td>
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<tr>
<td>Stem cell culture</td>
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<td>Commercial applications of cell culture</td>
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<tr>
<td>Three dimensional cultures and tissue engineering</td>
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Syllabus for Pet – II Examination

Name of Subject : Pharmaceutical Sciences
Faculty of Medicine, Subject Code: 9.01

UNIT - I:
ANALYTICAL TECHNIQUES

1. Chromatographic Techniques:
   Gas chromatography
   Liquid chromatography
2. UV-Visible Spectroscopy
3. Infra-Red Spectroscopy
4. Nuclear Magnetic Resonance Spectroscopy
5. Mass Spectrometry
6. Thermal spectrometry

UNIT - II:
DRUG REGULATORY AFFAIRS

1. The Pharmacy Act 1948
2. Intellectual Property Rights Law:
   a. Indian Patent Act 1970 and amendments there under,
   b. Copyright (Indian) Act
   c. Guide lines for filing patents in countries like US & UK.
   d. Good Clinical Practice Guideline, Good Laboratory Practice Guidelines,
      GMP Guidelines
5. Study of Compendia: IP, USP, BP, EP & GP.
6. NDA, INDA, ANDA.

UNIT - III:
VALIDATION and cGMP

1. Validation:
   a) Validation, Qualifications, Validation master plan.
   b) Validation of medical devices, biotechnology processes, pharmaceutical ingredients, Parenteral area, equipment’s, HVAC systems, aseptic processes and sterilization methods, water system, water for injection.

2. cGMP: Concepts and Philosophy of cGMP, Organization and Personnel, Buildings and Facilities, Raw materials
UNIT - IV:

BIOLOGICAL EVALUATION
1. Principles of Pharmacological and Pre-clinical Evaluation of drugs.
2. Bioassays.
3. Toxicology
4. Modern Methods of Pharmacological Evaluations
5. Alternatives to animal screening procedures: Cell line, In-vitro testing of drugs.
6. Preclinical Evaluation: Preclinical models employed and organization of screening of new drugs of following categories:
   i) Sedatives, hypnotics, anxiolytics, antidepressants, antipsychotics, nootropics, antiparkinsonian agents, analgesics, antipyretics.
   ii) Anti-inflammatory agents, anticonvulsants, local anesthetics, CNS stimulants.
   iii) Cardiac glycosides, antiarrhythmic, antihypertensive, antianginal, anti-atherosclerotic.
   iv) Antiulcer agents, Laxatives, Bronchodilators, antitussives.
   v) Diuretics.
   vi) Histamine antagonists.
   vii) Muscle relaxants, Anticholinesterases, anticholinergics, adrenalytics.
   viii) Hypoglycemias, antifertility agents, androgens.
   ix) Anti-thyroid agents, Dermatological agents, Antitumor agents.
   x) Anthelminetics, Antimalarials, Antileprotics.
   xi) Drugs used for glaucoma, cataract and eye inflammation.

UNIT - V:

PHARMACEUTICAL CHEMISTRY
1. Various Reaction Mechanisms:
   a. Substitution Reaction
   b. Elimination Reaction
   c. Addition Reaction
   d. Free Radical Reaction
2. Esterification reactions and ester hydrolysis.
3. Heterocyclic chemistry
4. Oxidation and reduction reactions
5. Modern synthetic methods:
   a) Green Synthesis
   b) Microwave assisted synthesis

UNIT - VI:

NOVEL DRUG DELIVERY SYSTEMS
1. Fundamentals of controlled release drug delivery systems
3. Parenteral controlled release system
4. Mucosal drug delivery models
5. Transdermal drug delivery system
6. Ocular Drug Delivery
7. Site specific drug delivery system
8. Protein & peptide drug delivery system
9. Regulatory consideration in controlled release
UNIT - VII

PHARMACOLOGY AND PHARMACOTHERAPEUTICS

1. Basic Principles of Clinical Pharmacology
2. Drug Therapy of Cardiovascular Disorders
3. Drug Therapy of Neurological Disorders
4. Drug Therapy of Psychiatric Disorders
5. Drug Therapy of Endocrine Disorders
6. Drug Therapy of Inflammatory Disorders
7. Drug Therapy of Respiratory Diseases
8. Drug Therapy of Gastrointestinal Diseases
9. Drug Therapy of Metabolic and Sexual Disorders
10. Pharmacology of Chemotherapeutic and Antimicrobial Agents
11. Pathophysiology of cancer and Antineoplastic Agents
12. Drug Therapy of Infectious Diseases

UNIT - VIII:

PHARMACOGNOSY AND PHYTOCHEMISTRY

1. Neutraceuticals
2. Study of herbal extracts
3. Extraction, isolation, purification and estimation of following phytoconstituents:
   - Alkaloids: Caffeine, Atropine, Berberine, Piperine
   - Glycosides: Sennosides, Digoxin
   - Flavonoids: Rutin, Hesperidin
   - Terpenoids: Taxol, Andrographolide
   - Saponins: Diosgenin, Glycyrrhizin
4. General aspects of cultivation and collection
5. Drug discovery from Natural Products.
7. Adverse reactions and safety in herbal medicine