दुर्ग विश्वविद्यालय, दुर्ग (छ.ग.)

पाठ्यक्रम

परीक्षा – 2018–19

बी.एससी.बी.एड.भाग–1

B.Sc.B.Ed Part-I

B.Sc. B.Ed I

1. Scheme of Examination
2. Environmental Studies
3. Foundation Course
4. Physics
5. Chemistry
6. Zoology
7. Botany
8. Mathematics
9. Philosophical Perspectives of Education

B.Sc. B.Ed.- I
SCHEME OF EXAMINATION

Subject	Paper	Max. Marks	Total Marks	Min. Marks
Environmental Studies		75	100	33
Fild Work		25		
Foundation Course				
Hindi Language	I	75	75	26
English Language	I	75	75	26
Maths Group				
1. Physics	I	50		
	II	50	100	33
	Practical		50	20
2. Chemistry	I	33		
	II	33	100	33
	III	33		
	Practical		50	20
3. Mathematics	I	50		
	II	50	150	50
	III	50		
Bio Group				
4. Botany	I	50		
	II	50	100	33
	Practical		50	20
5. Zoology	I	50		
	II	50	100	33
	Practical		50	20
6. Chemistry	I	33		
	II	33	100	33
	III	33		
	Practical		50	20
B.Ed. Group				
7. Philosophical Perspective of Education			100	33
PRACTICUM				
Community Activities			**50 (Internal)**	**20**

USE OF CALCULATORS

The Students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986.

1. Student will bring their own Calculators.
2. Calculators will not be provided either by the University or examination centres.
3. Calculators with, memory and following variables be permitted +, –, x, ¸ square, reciprocal, exponentials log, square root, trigonometric functions, wize, sine, cosine, tangent etc. factorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

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Part - I

SYLLABUS FORENVIRONMENTAL STUDIES AND HUMAN RIGHTS

MM. 75

इन्वायरमेंटल साईंसेस के पाठ्यक्रम को स्नातक स्तर भाग–एक की कक्षाओं में विश्वविद्यालय अनुदान आयोग के निर्देशानुसार अनिवार्य रूप से शिक्षा सत्र 2003–2004 (परीक्षा 2004) से प्रभावशील किया गया है। स्वशासी महाविद्यालयों द्वारा भी अनिवार्य रूप से अंगीकृत किया जाएगा।

भाग 1, 2 एवं 3 में से किसी भी वर्ष में पर्यावरण प्रश्न–पत्र उत्तीर्ण करना अनिवार्य है। तभी उपाधि प्रदाय योग्य होगी।

पाठ्यक्रम 100 अंकों का होगा, जिसमें से 75 अंक सैद्धांतिक प्रश्नों पर होंगे एवं 25 अंकक्षेत्रीय कार्य (Field Work) पर्यावरण पर होंगे।

सैद्धांतिक प्रश्नों पर अंक – 75 (सभी प्रश्न इकाई आधार पर रहेंगे जिसमें विकल्प रहेगा)

(अ) लघु प्रश्नोंत्तर – 25 अंक
(ब) निबंधात्मक – 50 अंक

Field Work-25 अंकों का मूल्यांकन आंतरिक मूल्यांकन पद्धति से कर विश्वविद्यालय को प्रेषित किया जावेगा। अभिलेखों कीप्रायोगिकउत्तर पुस्तिकाओं केसमान संबंधित महाविद्यालयों द्वारा सुरक्षित रखेंगे।

उपरोक्त पाठ्यक्रम से संबंधित परीक्षा का आयोजन वार्षिक परीक्षा केसाथ किया जाएगा।पर्यावरण विज्ञान विषय अनिवार्य विषय है, जिसमें अनुत्तीर्ण होने पर स्नातक स्तर भाग–एक के छात्र/छात्राओं को एक अन्य विषय के साथ पूरक की पात्रता होगी। पर्यावरण विज्ञान केसैद्धांतिक एवं फील्ड वर्क के संयुक्त रूप से 33: (तैंतीस प्रतिशत) अंक उत्तीर्ण होने के लिए अनिवार्य होंगे।

स्नातक स्तर भाग–एक के समस्त नियमित/भूतपूर्व/अमहाविद्यालयीन छात्र/छात्राओं को अपना फील्ड वर्क सैद्धांतिक परीक्षा की समाप्ति के पश्चात् 10 (दस) दिनों के भीतर संबंधित महाविद्यालय/परीक्षा केन्द्र में जमा करेंगे एवं महाविद्यालय के प्राचार्य/केन्द्र अधिक्षक, परीक्षकों की नियुक्ति के लिए अधिकृत रहेंगे तथा फील्ड वर्क जमा होने के सात दिनों के भीतर प्राप्त अंक विश्वविद्यालय को भेजेंगे।

UNIT-I THE MULTI DISCIPLINARY NATUREOF ENVIRONMENTALSTUDIES

Definition, Scope and

Importance NaturalResources:

Renewable and Nonrenewable Resources

(a) Forest resources: Use and over-exploitation, deforestation, Timber extraction,mining, dams and their effects on forests and tribal people and relevant forestAct.

(b) Water resources: Use and over-utilization of surface and ground water, floodsdrought, conflicts over water, dams benefits and problems and relevantAct.

(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineralresources.

(d) Food resources: World food problems, changes caused by agriculture andovergrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging ,salinity.

(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energysources.

(f) Land resources: Land as a resource, land degradation, man induced landslides soil erosion anddesertification.

(12Lecture)

UNIT-II ECOSYSTEM

(a) Concept, Structure and Function of andecosystem

- Producers, consumers anddecomposers.
- Energy flow in theecosystem
- Ecologicalsuccession
- Food chains, food webs and ecologicalpyramids.
- Introduction, Types, Characteristics Features, Structure and Function of Forest, Grass, Desert and AquaticEcosystem.

(b) Biodiversity and itsConservation

- Introduction - Definition: genetic. species and ecosystemdiversity
- Bio-geographical classification ofIndia.
- Value of biodiversity: Consumptive use. Productive use, social ethics, aesthetic and option values.

- Biodiversity at global, National and locallevels.
- India as mega-diversitynation.
- Hot spots ofbiodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wild lifeconflict.
- Endangered and endemic species ofIndia.
- Conservation of biodiversity: In situ and Ex-situ conservation ofbiodiversity.

(12Lecture)

UNIT- III

(a) Causes, effect and control measuresof

- Air water, soil, marine, noise, nuclear pollution and Humanpopulation.
- Solid waste management: Causes, effects and control measures of urban and industrialwastes.
- Role of an individual in prevention ofpollution.
- Disaster Management: floods, earthquake, cyclone andlandslides.

(12Lecture)

(b) EnvironmentalManagement

- From Unsustainable to sustainabledevelopment.
- Urban problems related toenergy.
- Water conservation, rain water harvesting, watershedmanagement.
- Resettlement and rehabilitation of people, its problems andconcerns.
- Environmental ethics: Issues and possiblesolutions.
- Climate change, global warming, acid rain, ozone layer depletion,nuclear accidents andholocaust.
- Wastelandreclamation
- Environment protection Act: Issues involved in enforcement of environmental legislation.
- Role of Information Technology in Environment and HumanHealth.

UNIT- IV

General background and historical perspective- Historical development and concept of Human Rights, Meaning and definition of Human Rights, Kind and Classification of Human Rights.

Protection of Human Rights under the UNO Charter, protection of Human Rights under the Universal Declaration of Human Rights, 1948.

Convention on the Elimination of all forms of Discrimination against women.Convention on the Rights of the Child, 1989.

UNIT-V

Impact of Human Rights norms in India, Human Rights under the Constitution of India, Fundamental Rights under the Constitution ofIndia, Directive Principles of State policy under the Constitution of India, Enforcement of Human Rights inIndia.

Protection of Human Rights under the Human Rights Act, 1993- National Human Rights Commission, State Human Rights Commission and Human Rights court in India.

Fundamental Duties under the Constitution of India.

Reference/ Books Recommended

1. SK Kapoor- Human rights under International Law and IndianLaw.
2. HO Agrawal- Internation Law and HumanRights
3. एस.के. कपूर —मानव अधिकार
4. जे.एन. पान्डेय — भारत का संविधान
5. एम.डी. चतुर्वेदी —भारत का संविधान
6. J.N.Pandey - Constitutional Law ofIndia
7. Agarwal K.C. 2001 Environmental Biology, Nidi pub. Ltd.Bikaner
8. Bharucha Erach, the Biodiversity of India, Mapin pub. Ltd. Ahmedabad 380013,India, Email:mapin@icenet.net(R)
9. Bruinner R.C. 1989, Hazardous Waste Incineration. McGraw HillInc.480p
10. Clark R.S. Marine pollution, Clanderson press Oxford(TB)
11. Cuningham, W.P.Cooper. T.H.Gorhani, E & Hepworth.M.T,200
12. Dr. A.K.- Environmental Chemistry. Wiley EasternLtd.
13. Down to Earth, Center for Science and Environment(R)
14. Gloick, H.P. 1993 Water in crisis. pacific institute for studies in Deve. Environment& Security. Stockholm Eng. Institute. Oxford University, Press. m473p.
15. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai(R)
16. Heywood, V.H. & Watson, T.T.1995 Global Biodiversity Assessment, Cambridge Univ. Press1140p
17. Jadhav H. & Bhosale, V.H. 1995 Environmental Protection and Law. Himalayapub. House, Delhi284p
18. Mckinney M.L.& School R.M.1996, environmental Science systems & solutions,web enhanced edition,639p
19. Mhadkar A.K. Matter Hazardous, Techno-Sciencepublication(TB)
20. Miller T.G.Jr. Environment Science, Wadsworth publication co.(TB)
21. Odum E.P.1971, Fundamentals of Ecology, W.B. Saunders Co.USA,574p
22. Rao M.N. & Datta, A.K. 1987, Waste water treatment. Oxford & IBH pub.co.pvt.Ltd 345p
23. Sharma B.K. 2001, Environmental chemistry, Goel pub. House,Meerut
24. Survey of the Environment, TheHidu(M)
25. Townsend C. Harper J. And Michael Begon, Essentials of Ecology, Blackwell Science(TB)
26. Trivedi R.K.Handbook of Environment Laws, Rules, Guidlines, Compliancesand Standards, Vol land II, EnvironmentMedia(R)
27. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science publication (TB)
28. Wanger K.D.1998, Environmental Management. W.B. Saunders Co. Philadelphia,USA 499p

आधार पाठ्यक्रम
प्रश्न पत्र प्रथम
हिन्दी भाषा **पूर्णांकः75**

नोट–:

01. प्रश्न पत्र 75 अंक का होगा ।
02. प्रश्न पत्र अनिवार्य होगा ।
03. इसके अंक क्षेणी निर्धारण के लिए जोड़े जावेगे।
04. प्रत्येक इकाई के अंक समान होंगे।

पाठ्य विषय–

इकाई– 01.पल्लवन, पत्राचार तथा अनुवाद एवं पारिभाषिक शब्दावली ।

इकाई –02 मुहावरे– लोकोक्तियॉ,शब्दशुद्धि वाक्य शुद्धि, शुद्धि ज्ञान – पर्यायवाची, विलोम, अनेकार्थी , समश्रुत (समानोचरित) अनेक शब्दों के लिए एक शब्द।

इकाई –03.देवनागरी लिपि की विशेषता, देवनागरी लिपि एवं वर्तनी का मानक रूप।

इकाई– 04.कम्प्युटर में हिन्दी का अनुप्रयोग, हिन्दी में पदनाम।

इकाई– 05.हिन्दी अपठित, संक्षेपण, हिन्दी में संक्षित्तीकरण।

पाठ्य क्रम के लिए पुस्तकें

01. भारतीयातां के स्वर साधन धनंजय वर्मा	–	म.प्र.ग्रंथ अकादमी।
02. नगरी लिपि और हिन्दी	–	अनंत चौधरी – ग्रंथ अकादमी पटना।
03. कम्प्युटर और हिन्दी	–	हरिमोहन – तक्षशिला प्रकाशन, दिल्ली।

FOUNDATION COURSE
PAPER - II
ENGLISH LANGUAGE **M.M. 75**

UNIT-1 **Basic Language skills : Grammar and Usage.**

Grammar and Vocabulary based on the prescribed text.
To be assessed by objective / multiple choice tests.

(Grammar - 20 Marks
Vocabulary - 15 Marks)

UNIT-2 **Comprehension of an unseen passage.** **05**

This should simply not only (a) an understanding of the passage in question, but also.
(b) a grasp of general language skills and issues with reference to words and usage within the passage and (c) the Power of short independent composition based on themes and issues raised in the passage.
To be assessed by both objective multiple choice and short answer type tests.

UNIT-3 **Composition :** Paragraph writing **10**

UNIT-4 **Letter writing** (The formal and one Informal) **10**

Two letters to be attempted of 5 marks each. One formal and one informal.

UNIT-5 **Texts :** **15**

Short prose pieces (Fiction and not fiction) short poems, the pieces should cover a range of authors, subjects and contexts. With poetry if may sometimes be advisable to include pieces from earlier periods, which are often simpler than modern examples. In all cases, the language should be accessible (with a minimum of explanation and reference to standard dictionaries) to the general body of students schooled in the medium of an Indian language.

Students should be able to grasp the contents of each place; explain specific words, phrases and allusions; and comment on general points of narrative or argument. Formal Principles of Literary criticism should not be taken up at this stage.

To be assessed by five short answers of three marks each.

BOOKS PRESCRIBED -

English Language and Indian Culture - Published by M.P. Hindi Grant Academy Bhopal.

PHYSICS

OBJECTIVES OF THE COURSE

The undergraduate training in Physics is aimed at providing the necessary inputs so as to set forth the task of bringing about new and innovative ideas/concepts so that the formulated model curricula in physics becomes in tune with the changing scenario and incorporate new and rapid advancements and multi-disciplinary skills, societal relevance, global interface, self-sustaining and supportive learning.

It is desired that under graduate i.e. B.Sc. level besides grasping the basic concepts of physics should in addition have broader vision. Therefore, they should be exposed to societal interface of physics and role of physics in the development of technologies.

EXAMINATION SCHEME :

1. There shall be 2 theory papers of 3 hours duration each and one practical paper of 4 hours duration. Each paper shall carry 50 marks.
2. Numerical problems of at least 30% will compulsorily be asked in each theory paper.
3. In practical paper, each student has to perform two experiments, one from each group as listed in the list of experiments.
4. Practical examination will be of 4 hours duration-one experiment to be completed in 2 hours.

   The distribution of practical marks will be as follows:

Experiment	:	15 + 15 = 30
Viva Voce	:	10
Internal assessment	:	10

5. The external examiner should ensure that atleast16 experiments are in working order at the time of examination and submit a certificate to this effect.

PAPER - I
MECHANICS, OSCILLATIONS AND PROPERTIES OF MATTER

UNIT-1 Laws of motion, motion in a uniform field, components of velocity and accelerationin different coordinate systems. (Cartesian, Cylindrical and Spherical) uniformlyrotating frame, centripetal acceleration, Carioles force and its applications. Motion undera central force, Kepler's laws. Gravitational law and field.Potential due to a spherical body. System of particles, center of mass, equation ofmotion, conservation of linear & angular momentum, conservation of energy.

UNIT-2 Rigid body notion, rotational motion, moments of inertia and their products, principalmoments & axes, Introductory idea of Euler's equations. potential well and periodicoscillations, case of harmonic small oscillations, differential equation and its solution,kinetic and potential energy, examples of simpleharmonic oscillations, spring andmass system, simple and compound pendulum, tensionalpendulum.

UNIT-3 Bifilar oscillations, Helmholtz resonator, LC circuit, vibrations of a magnet, oscillationsof two masses connected by a spring. Superposition of two simple harmonic motionsof the same frequency, Lissajous figures, case of different frequencies. Dampedharmonic oscillator',powerdissipation, qualityfactor, examples,driven (forced)harmonic oscillator, transient and steady states, power absorption, resonance.

Note :(The emphasis here should be on the mechanical aspects and not on the details ofthe apparatus mentioned, which are indicated as applications of principles involved)

UNIT-4 E as an accelerating field, electron gun, case of discharge tube, linear accelerator,E as deflecting field- CRO sensitivity,
Transverse B field, 180^{o} deflection, mass spectrograph, curvatures of tracks for energy determination, principle of a cyclotron.Mutually perpendicular E and B fields-velocity selector, its resolution.Parallel E and B fields, positive ray parabolas, discovery of isotopes, elements of mass spectrography, principle of magnetic focusing (lens.)

UNIT-5 Elasticity, small deformations, Hooke's law elastic constants for an isotropic solid and relations between them beams supported at both the ends, cantilever, torsion of cylinder, bending moments and shearing forces. Kinematics of moving fluids, equations of continuity. Euler's equation, Benaulli's theorem, viscous fluids, steamline and turbulent flow. Poiseulle's law. Capillary tube flow, Reynold's number, Stokes law, surface tension and surface energy, molecular interpretation of surface tension, pressure on a curved liquids surface, wetting.

TEXT AND REFERENCE BOOKS:

E M purcell, Ed Berkely physics course, vol. Mechnics (Mc. Gr. Hill) R P Feynman, R B lighton and M Sands, the feynman lectures in physics, vol I (B) publications, Bombay, Delhi, Calcutta, Madras

D P Khandelwal, Oscillations and waves (Himalaya Publishing House Bombay) R. K. Ghosh, The Mathematics of waves and vibrations (Macmillan 1975) . J.C. Upadhyaya- Mechanics (Hindi and English Edition.)

D.S. Mathur- Mechanics and properties of matter.

Brij lal and subramanium- Osccillations and waves.

Resnick and Halliday- Volume I

PAPER - II

ELECTRICITY, MAGNETISM AND ELECTROMAGNETIC THEORY

UNIT-1 Functions of two and three variables, partial derivatives, geometrical interpretation of partial derivatives of functions of two variables.Total differential of a function of two and three variables.Repeated integrals of a function of more than one variable, definition of a double and triple integral. Scalars and vectors, dot and cross products, triple vector product, gradient of a scalar field and its geometrical interpretation, divergence and curl of a vector field, line, surface and volume integrals, flux of a vector field. Gauss's divergence theorem, Green's theorem and Stokes theorm.

UNIT-2 Columbus law in vacuum expressed in Vector forms calculations of E for simpledistributions of charges at rest, dipole and quadrupole fields.

Work done on a charge in a electrostatic field expressed as a line integral, conservative nature of the electrostatic field. Electric potential φ,$E= -\nabla\varphi$, torque on a dipole in auniform electric field and its energy, flux of the electric field, Gauss's law and its application for finding E for symmetric charge distributions, Gussian pillbox ? Fields at the surface of a conductor screening of E field by a conductor, capacitors,electrostatic field energy, force per unit area of the surface of a conductor in an electric field, conducting sphere in a uniform electric field, point charge in front of a grounded infinite conductor.

UNIT-3 Dielectrics parallel plate capacitor with a dielectric, electric susceptibility, permittivityand dielectric constant, polarization and polarization vector, displacement vector $_D$, molecular interpretation of Claussius- Mossotti equation.

Steady current, current density J, non-steady currents and continuity equation, Kirchhoff's law and analysis of multiloop circuits, rise and decay of current in LR andCR circuits, decay constants, transients in LCR circuits, AC circuits, complex numbers and their applications in solving AC circuit problems, complex impedance and reactance, series and parallel resonance, Q factor, power consumed by an a AC circuit, power factor,.

UNIT-4 Force on a moving charge, Lorentz force equation and definition of B, force on a straightconductor carrying current in a uniform magnetic field, torque on a current loop, magnetic diploe moment, angular momentum and gyro magnetic ratio.

$\nabla \cdot B = O$,$\nabla \times B = \mu J$. Biot and Savart's law, Ampere's law field due to a magnetic dipole,magnetization current, magnetization vector, magnetic permeability (Linear cases), interpretation of a bar magnet as a surface distribution of sinusoidal current.

UNIT-5 Electromagnetic induction, Faraday's law, electromotive force,ε =E.dr, integral anddifferential forms of Faraday's law Mutual and self-inductance, Transformers, energy in a static magnetic field. Maxwell's displacement current, Maxwells' equations, electromagnetic field energy density.

The wave equation satisfied by E and B, plane electromagnetic waves in vacuum, Poyning's vector.

TEXT AND REFERENCE BOOK:

Berkeley Physics Course, Electricity and Magnetism, Ed. E.M. Purcell (Mc Grew - Hill)Holliday and Resnik, Physics, Vol. 2

D J Grifith, Introduction to Electrodynamics (Prentice-Hall of India) Raitz and Milford, Electricity and Magnetism (Addison-Wesley)

A S Mahajan and A Rangwala, Electricity and Magnetism (Tata Mc Graw-hill)

A M Portis, Electromagnetic fields.

Pugh & Pugh, Principles of Electricity and Magnetism (Addison-Wesley)

Panofsky and Phillips, Classical Electricity and Magnetism, (India Book House)

S Atwood, Electricity and Magnetism (Dover).

PRACTICAL

Minimum 16 (Eight from each group)

EXPERMENTS OUT OF THE FOLLOWING OR SIMILAR EXPERIMENTS

OF EQUAL STANDARD

GROUP-A

1. Study of laws of parallel and perpendicular axes for moment of inertia.
2. Study of conservation of momentum in two dimensional oscillations.
3. Study of a compound pendulum.
4. Study of damping of a bar pendulum under various mechanics.
5. Study of oscillations under a bifilar suspension.
6. potential energy curves of a 1- Double system and oscillations in it for various amplitudes.
7. Study of oscillations of a mass under different combinations of springs.
8. Study of bending of a cantilever or a beam.
9. Study of torsion of wire (static and dynamic methods)
10. Study of flow of liquids through capillaries.
11. Determination of surface tension of a liquid by different methods.
12. Study of viscosity of a fluid by different methods.

GROUP-B

1. Characteristics of a ballisticgalvanometer.
2. Setting up and using an electroscope or electrometer.
3. Use of a vibration magnetometer to study a field.
4. Study of B field due to a current.
5. Measurement of low resistance by Carey-Foster bridge or otherwise.
6. Measurement of inductance using impedance at different frequencies.
7. Study of decay of currents in LR and RC circuits.
8. Response curve for LCR circuit and resopapce frequence and quality factor.
9. Sensitivity of a cathode-ray oscilloscope.
10. Characteristics of a choke.
11. Measurement of inductance.
12. Study of Lorentz force.
13. Study of discrete and continuous LC transmission lines.
14. Elementary Fortran programs, flowcharts and their interpretation.
15. To find the product of two matrices.
16. Numerical solution of equation of motion.
17. To find the roots of quadratic equation.

TEXT AND REPERENCE BOOKS:

B saraf et al Mechanical Systems (Vikas Publishing House, New Delhi)

D.P. Khandelwal, A Laboratory Manual of Physics for Undergraduate classes (Vani Publication House, New Delhi)

C G Lambe Elements of Statistics (Longmans Green and Co London New York, Toronto)

C Dixon, Numerical Analysis.

S Lipsdutz and A Poe, Schaum's Outline of theory and problems of programming with fortran (MC Graw-Hill Book Company, Singapore 1986)

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CHEMISTRY

The new curriculum will comprise of Three papers of 33.33 and 34 marks each and practical work of 50 marks. The curriculum is to be completed in 180 working days as per the UGC norms & conforming to the directives of the Govt. of Chhattisgarh. The theory papers are of 60 hrs. each duration & the practical work of 180 hrs. duration.

PAPER-I

INORGANIC CHEMISTRY M.M. 33

UNIT-1 A. ATOMIC STRUCTURE

Idea of de-Broglie matter-waves, Heisenberg Uncertainty principle, Schrodinger waveequation, significance of , radial & angular wave functions and probabilitydistribution curves, Atomic orbital and shapes of s, p, d orbital's, Aube and Pauli exclusion principles, Hand's Multiplicity rule, electronic configuration of the elements, effective nuclear charges.

B. PERIODIC PROPERITIES

Ionization energy, electron gain enthalpy and electro negativity, trend in periodic table and applications in predicting and explaining the chemical behavior.

UNIT-2 CHEMICAL BONDING

Covalent Bond: Valence bond theory and its limitations, directional charectaristics of covalent bond, various types of hybridization & shapes of simple inogranic molecules

and ions. Valence shell electron pair repulsion $(VSEPR)^2$ theory to

NH3, H3O+, SF4, CIF3,

ICl^-_2 and H_2O . M.O. Theory, homonuclear & hetronuclear bond strength & bond energy,

percentage ionic character from dipole moment & electronegativity difference.

UNIT-3 CHEMICAL BONDING

Ionic Solids- Ionic structures, radius ratio & co-ordination number, limitation of radius, ratio rule, lattice defects, semiconductors, lattice energy Born-Haber cycle, Solvation energy and solubility of ionic solids, polarising power & polarisabilitry of ions, Fajans rule, Metallic bond-free electron, Valence bond & band theories.

UNIT-4 A.s-BLOCK ELEMENTS

Comparative study, salient features of hydrides, solvation & complexation tendencies including their function in biosystems and introduction to alkyl & aryls, Derivatives of alkali and alkaline earth metals.

B. CHEMISTRY OF NOBLE GASES

Chemical properties of the noble gases, chemistry of xenon, structure binding in xenon compounds.

UNIT-5 A. p-BLOCK ELEMENTS

Halides hydrides, oxides and oxyacids of Boron, Aluminum, Nitrogen and Phosphorus, boranes, borazines, fullerenes and silicates, interhalogens and pseudohalogens.

B. INORGANIC CHEMICAL ANALYSIS

Chemical principles involved in the detection of acids and basic radicals including interfering radicals.

REFERENCE BOOKS:

1. Basic Inorganic Chamistry, F.A Cotton, G. Wilkinson and P.L. Gaus, Wley
2. Conciso Inorganic Chemistry, J.D. Lee, ELBS
3. Concepts of models of Inorganic Chemistry, B. Douglas, D. Mc Daniel and J Alexander,
   John Wiley.
4. Inorganic Chemistry, D.E. Shriver, P.W. Atkins and C.H.L. angford, Oxford.
5. Inorganic Chemistry, W.W. Porterfield, Addison- Wesley.
6. Inorganic Chemistry, A.G. Sharp, ELBS.
7. Inorganic Chemisty, G.L. Micssels and D.A. Tarr, Prentice Hall.
8. Advanced Inorganic Chemistry, Satya Prakash
9. Advanced Inorganic Chemistry, Agarwal & Agarwal
10. Advanced Inorganic Chemistry, Puri & Sharma, S. Naginchand
11. Inorganic Chemistry, Madan, S. Chand
12. Aadhunik Akarbnic Rasayan, R.K. Shrivastav & P.S. Jain, Goel Publication.
13. Uchchattar Akarbnic Rasayan, Satya Prakash & G.D. Tuli, Shyamal Prakashan.
14. Uchchattar Akarbnic Rasayan, Puri & Sharma
15. Akarbnic Rasayan, Bhagchandni, Sahitaya Publication.
16. Rasayan Vigyan, Bhatnagar, Arun Pablication.

PAPER - II

ORGANIC CHEMISTRY M.M. 33

UNIT-I ELECTONIC STRUCTURE & BONDING

A. Resonance, Hyper conjugation, Inductive and other field effects, Aromaticity, hydrogen bonding.

B. MECHANISM OF ORGANIC REACTIONS

Homolytic & heterolytic bond breaking, types of reagents-electrhpiles & nucleophiles. Structure and reactivity of reaction intermediates-Carbocation, carbanions free radicals, carbenes and niterenes.

UNIT-2 STEREOCHEMISTRY OF ORGANIC COMPOUNDS

A. Optical Isomerism - enantiomers, diastereomers, threo and erythro meso compound, resolution of enantiomers, inversion, retention and recemization,

Relative and absolute configuration, Sequence rules, D and L and R & S systems of nomenclature.

B. Geometrical isomerism - Syn and anti forms, E & Z system of nomenclature, properties of cis-trans isomers.

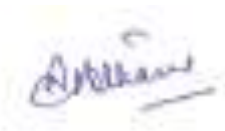
UNIT-3 ALIPHATIC AND AROMATIC RING COMPOUNDS

A. Cycloalkanes- Nomenclature, methods of formation, chemical reactions, Baeyer's strain theory and its limitations. Ring strain in small rings (cyclopropane and cyclobutane), theory of strainless rigns. The case of cyclopropane ring: banana bonds.

B. Mono-nuclear and polynuclear aromatic ring. Structure of benzene & naphthalene.

Molecular formula and Kekule structure.Aromatic electrophilic substitution.

General pattern of the mechanism, role of σ and complexes. Electrophilic substitution in naphthalene.



UNIT-4 ALKENES, DIENES AND ALKYNES

A. Mechanism of dehydration of alcohols.

B. Chemical reactions of alkenes- Mechanisms involved in electrophilic and free radical additions, hydroboration-oxidation, oxymercuration-reduction. epoxidation.
Substitution at the allylic and vinylic positions of alkenes. Structure of allenes and butadiene, chemical reaction- 1,2 and 1,4 addition, Diel-Alder reaction.
Chemical reactions of alkynes and acidity of alkynes.Electrophilic and nucleophilic addition reactions, hydroboration and oxidation with ozone and $KMnO_4$.

UNIT-5 ARENES AND AROMATICITY

A. Alkyl halides and Aryl Halides

Mechanism and stereochemistry of nucleophilic substitution reactions and alkyl halides and aryl halides with energy profile diagrams. SN1, SN2, SNi mechanisms.

B. Mechanisms and stereochemistry of elimination reaction and alkyl halides. Elimination Vs Substitution.

REFERENCE BOOK :

1. Organic Chemistry, Morrison and Boyd, Prentic- Hall
2. Organic Chemistry, L.G. Wade Jr, Prentice-Hall
3. Fundamentals of Organic Chemistry, Solomons, John Wiley
4. Organic Chemistry, Vol. I, II, III, S.M. Mukherjee, S.P. singh and R.P. Kapoor, wiley-eastern (New-Age).
5. Organic Chemistry, F.A. Carey, MC Graw Hill
6. Introduction to Organic Chemistry, Struiweisser, Heathock and Kosover, Macmillan.
7. Organic Chemistry, P.L.Soni.
8. Organic Chemistry, Bahi & Bahl
9. Organic Chemistry, Joginder Singh.
10. Carbanic Rasayan, Bashi & Bahi
11. Carbanic Rasayan, R.N. Singh,. S.M.I. Gupta, M.M. Bakodia & S.K. Wadhwa.
12. Carbanic Rasayan, Joginder Singh.
13. Carbanic Rasayan, P.L. Soni.
14. Corbanic Rasayan, Bhagchandani, Sahitya Bhawan Publication.
15. Rasayan Vigyan, Bhatnagar, Arun Prakashan.

PAPER - III
PHYSICAL CHEMISTRY

UNIT-1 MATHEMATICAL CONCEPTS FOR CHEMIST AND COMPUTER

A. Logarithmic relations, curve sketching linear graphs, Properties of straight line, sloped and intercept, Differentiation of functions, Partial differentiation, Integration of some useful and relevant functions, Maxima and minima, Permutation and combination, Probability.

B. General introduction to computers, components of computer, hardware and software, input and output devices; binary numbers, Introduction to computer languages, Programming, Operation systems.

UNIT-2 A. MOLECULAR VELOCITIES:

Root mean square velocity average and most probable velocities, Maxwell's law of distribution of molecular velocities of gases, (Graphical interpretation), effect of temperature on distribution of molecular velocities, collision frequency, mean free path, Joule- Thompson effect, Liquefaction of gases.

B. Deviation from ideal behavior, Real gases, Vander Waal equation of state, Relationship, Vander waal constant and critical constants, Law of corresponding state.

UNIT-3 A. LIQUID STATE

Inter molecular forces, magnitude of intermolecular force, structure of liquids,Properties of liquids, viscosity and surface tension.

B. Ideal and non ideal solutions, modes of representing concentration of solutions, activity and activity coefficient.

Dilute solution : Colligative Properties, Lowering of vapor pressure of solvent, Roults law, Osmosis, Vant Hoff Theory of dilute solutions, measurements of Osmotic pressure, relationship between lowering of vapour pressure and osmotic pressure. Elevation of boiling point, Depression in freezing point, abnormal molar masses, Depress of dissociation and association of solutes, Vant Hoff factor.

UNIT-4 A. LIQUID CRYSTALS :

Defference between liquid Crystal, solids and liquids, Classification, Structure of nematic and cholestic phases, Thermography, Seven segment cell, applications of liquid Cristals.

B. COLLOIDAL STATE :

Classification, Optical, Kinetic, and Electrical Properties of colloid, Coagulation,

Handy Schulze law, flocculation value, Protection, Gold number, Emulsion, micelle.Gel, Syneresis and thixotrophy, Application of colloid.

C. SOLID STATE

Space lattices, unit cells, Elements of Symmetry in crystallize solids, X-rays diffraction, Mills indices, identification of unit cell by Broggs Spectrometer, Powder method, Neutron and electron diffraction (Elementry idea only)

UNIT-5 A. CHEMICAL KINETICS

Rate of reaction, Factors influencing rate of reaction, rate constant, Order andmolecularity of reactions, Zero, first and second order reaction, methods of determining order of reaction, Complex reactions : Consecutive, opposing and side reactions, Chain reactions.

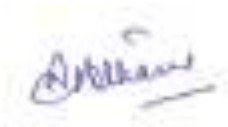
Temperature dependence of raction rate, Arrhenius theory, Physical significance of Activation energy, collision theory, demerits of collision theory, non mathematical concept of transition state theory.

B. CATALYSIS :

Homogeneous and Heterogeneous Catalysis, types of catalyst, characteristic ofCatalyst, Enzyme Catalysed reactions, Micellor catalysed reactions, Industrial applications of Catalysis.

REFERENCE BOOKS:

1. Physical chemistry, G.M. Barrow, International student edition, MC Graw Hill
2. Basic programming with application, V.K. Jain, Tata Mc Graw-Hill
3. Computers & Common sense, R. Hunt & Shelly, Prentice-Hall
4. University general chemistry, C.N.R. Rao Macmillan.
5. Physical Chemistry, R.A. Alberty, Wiley Eastern.
6. The elemetns of Physical Chemistry, P.W. Atkin, Oxford.
7. Physical Chemistry throught problems, S.K. Dogra & Dogra, wiley Eastern.
8. Physical Chemistry, B.D. Khosla
9. Physical Chemistry, Puri & Sharma
10. Bhoutic Rasayan, Puri, Sharma & Palhania, Vishal Publishing Company.
11. Bhoutic Rasayan, P.L. Soni
12. Bhoutic Rasayan, Bahi & Tuli. Pb^{2+},
13. Bhoutic Rasayan, I. R. Gambin
14. Bhoutic Rasayan, Bhagchandani, Sahitya Bhawan Publication.
15. Rasayan Vigyan, Bhatnagar, Arun Prakashan.



PAPER - IV
LABORATORY COURSE

The following experiments are to be conducted during the curriculam

1. Inorganic Chemistry

Semimicro Analysis - cations analysis, separation and identification of ions from

Bi^{3+}, Cu^{2+}, Cd^{2+}, Sb^{3+}, $Sn^{2+,4+}$, Fe^{3+}, Al^{3+}, Cr^{3+}, Ni^{2+}, Co^{2+}Zn, $^{2+}$, Mn $^{2+}$, Ba $^{2+}$, Sr $^{2+}$, Ca^{2+}, Mg^{2+}, $NH^{4+}$and Anions CO_3^{2-}, SO_3^{2-}, S^{2-}, SO_4^{2-}, NO_2^{-}, NO_3^{-}, Cl^{-}, Br^{-}, I^{-}, CH_3COO^{-}, $C_2O_4^{2-}$, BO_3^{3-}, F^{-}.

2. Organic Chemistry

.i Calibration of Thermometer

$80^{o} - 82^{o}$(Naphthalene), $113.5^{o} - 114^{o}$(Acetanilide), $132.5^{o} - 133^{o}$(Urea), 100^{o}
(Distilled Water)

i. Determination of Melting Point

$80^{o} - 82^{o}$(Naphthalene), Benzoic and $121.5^{o} - 122^{o}$, Urea $132.5^{o} - 133^{o}$, Succinicacid $184.5^{o} - 185^{o}$, Cinnamic acid $132.5^{o} - 133^{o}$, Salicylic acid $157.5^{o} - 158^{o}$, Acetanilide $113.5^{o} - 114^{o}$, m- Dinitrobenze 90^{o}, p-Dichlorobenzene 52^{o} Aspirin135^{o}.

i. Determination of boiling points

Ethanol = 78^{o}, Cyclohexane 81.4^{o}, Toluene 110.6^{o}, Benzene 80^{o}.

iv. Mixed Meting point Determination

Urea- Cinnamic acid mixture of various compositions (1 : 4, 1 : 1, 4 : 1)

v. Distillation (Demonstration)

Simple distillation of ethanol- water mixture using water condensor.

Distillation of nitrobenzene and aniline using air condenser.

vi. Crystallization

Phthalic acid from hot water (using fluted filter paper and stemless funnel).

Acetanilide from boiling water

Naphthalule from ethanol

Benzoic acid from water.

Vii. Decolorisation and crystallisation using charcoal

Decolorisation of brown sugar with animal charocal using gravity filteration

Crystallization and decolorisation of impure naphthalene (100g of naphthalene mixed with 0.3g of congo red using 1g of decolorising carbon) from ethanol.

Viii. Sublimation

Camphor, Naphthalene, Pthalic acid and Succinic acid

ix. Qualitative Analysis

Detection of elements (N, S and halogens) and functional groups (Phenolic, Carboxylic, CarbonyI, Esters, Carbohydrates, Amines, Amides, Nitro and Anilide) in simple organic compounds.

3. Physical Chemistry

(i) Chemical Kinetics

To determine the specific rate of hydrolysis of methyl/ ethyl acetate catalysed by hydrogen ions at room temperature.

To study the effect of acid strength on the hydrolysis of an ester
To compare the strengths of HCl &H_2SO_4 by studying the kinetics of hydrolysis of ethyl acetate
To study kinetically the reaction between H_2O_2& Iodide

(i) Distribution Law
To study distribution of iodide between water &CCI_4
To study distribution of benzoic acid between benzene & water.

(i) Colloids

To prepare arsenious sulphide sol & compare the precipitating power of mono-, bi, & tri valent anions.

(iv) Viscosity & Surface Tension
To determine the of % composition of a given mixture (Non interacting system) by viscosity mehtod.

To determine the viscosity of amyI alcohol in water at differnt concentrations & calculate the excess viscosity of these solutions.

To determine the % composition of a given binary mixture by surface tension method(acetone & ethyl methyl ketone).

BOOK :

1. ogeps qualitive analysis, revised svehla, orient longman
2. Standered methods of chemical analysis, W.W. scott, The Technical Press
3. Experimental Organic Chemistry, Vol. I & II, P.R. Singh, D.S. Gupta & K.S. bajpai, Tata Mc Graw Hill
4. Manual ingorganic chemistry, R.K. Bansal Wiley Eastern
5. vogel's text book of practical organic chemistry, B.S. Furnis A.J. Hannaford, V. Rogers, P.W.G. Smith & A.r. Tatchel, ELBS
6. Experiments in general chemistry, CNR Rao & U.C. Agarwal
7. Experiments in physical chemistry, R. C. Das & B. Behara Tata Mc Graw Hill
8. Advanced practical physical chemistry,. J.B. Yadav, Goel publishing house

PRACTICAL EXAMINATION **05 Hrs.**

Three experiments are to be performed

1. Inorganic Mixture Analysis, four radicals two basic & two acid (insoluble, Interfering & combination of acid radicals) any one to be given. 12 Marks.
2. Detection of functional group in the given organic compound and determine its MPt/BPt. 8 Marks

O R Crystallization of any one compound as given in the prospectus along with the determination of mixed MPt.

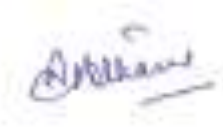
O R Decolorisation of brown sugar along with sublimation of camphor/ Naphthlene.

3. Any one physical experiment that can be completed in two hours including calculations.

14 marks

4. Viva 10 marks
5. Sessionals 06 marks

In case of Ex-Students two marks will be added to each of the experiments.



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ZOOLOGY

PAPER - I

(CELL BIOLOGY & INVERTEBRATES) **M.M. 50**

UNIT-1 The Cell (Prokaryotic & Eukaryotic)
Methods in cell biology (Microscopy light & Electron)
Organization of cell extra nuclear and nuclear (Plasma membrane, mitochondria,chromosomes, ER. Golgi bodies, Ribosomes)

UNIT-2 Cell divisions (Mitosis & Meiosis)
An elementary idea of cell transformation & Cancer Immunity (elementary

UNIT-3 General Characteristics & Classification of invertabrates upto orders with examplesProtozoa - type study Paramoecium, protozoa & diseasePorifera - type sutdy SyconCoelenterata - type sutdy Obelia.

UNIT-4 Helminths - type sutdy fasciola
Annelida - type sutdy Pheretima
Arthropoda - type sutdy Palaemon

UNIT-5 Mollusca - (Pila)
Echinodermata-Asterias (Star-fish)
Protochordata - type sutdy Balanoglossus

PAPER - II **M.M. 50**

(VERTEBRATES & EMBRYOLOGY)

UNIT-1 Origin and classification of Chordates.
Protochordata - type sutdy Amphioxus.
A comparative account of Petromyzon & Myxine

UNIT-2 Fishes - Skin and scales
Migration in fishes
Parental care
Amphibia - Parental care
Neoteny
Reptilia - Poisonous & nonpoisonous shakes, Poison apparatus, snake venom.

UNIT-3 Aves - Flight adaptation in birds
Discuss - Birds are glorified reptiles
Mammals- comparative account of prototheria, metatheria & Eutheria and Affinities.

UNIT-4 Gametogenesis, Fertilization & Parhenogenesis.
Development of frog upto formation of three germ layers

UNIT-5 Development of Chick upto formation of three germ layer, Extra embryonic membranes. Placenta in mammals. Embryonic induction organisers & differentiation

PARACTICAL M.M. 50

The practical work will, in real be based on the syllabus prescribed in theory and the candidates will be required to show a knowledge of the following.

1. Dissection of earth worm.
2. Dissection of Cockroach, Palaemon, Pila.
3. Minor Dissection- Appendages of Prawn & hastate plate, Mouth-parts of Insects, Radula of Pila.
4. Mounting-Setae, Spermatheca, Septal Nephridia, Nerve ring & ovary of earth worm/

   Parapodia of Nereis Salivary gland of Cockroach, ctenidium of pila, Malpighian tubules.
5. Cytological preparation- Onion root-tip "Squash Preparation" for mitosis/Grasshopper testis squash for meiosis.
6. Osteology-Frog & Rabbit
7. Museum Specimen invertebrate & Vertebrate, frog embryology.
8. Slides-Chick embryology, Cytology, Mammal Histology, Bird feather & invertebrate Slides.

Scheme of Practical Exam. **Time 3 Hrs, M.M. 50**

1.	Major Dissection	8 Marks
2.	Minor Dissection	6 Marks
3.	Mounting	5 Marks
4.	Cytological Preparation	5 Marks
5.	Spots- 8 (Slides-4, Specimens-2, & Bones-2)	16 Marks
6.	Sessional	10 Marks

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BOTANY

PAPER - I

(GENERAL DIVERSITY OF MICROBES AND CRYPTOGAMS)

M.M.50

UNIT-1 Viruses and Bacteria: General account of viruses and mycoplasma; bacteria structure;nutrition, reproduction and economic importance; general account of cyanobacteria.

12 Hrs.

UNIT-2 Algae: General characters, classification and economic importance; important featuresand life history of Chlorophyceae-Volvox, Oedogonim, Coleochaete; Xanthophyceae-Vaucheria; Phaeophyceae- Ectocarpus, Sargassum; Rhodophyceae- Polysiphonia.

12 Hrs

UNIT-3 Fungi: General characters, classification and economic importance; important featuresand life history of Mastigomycotina- Pythium, Phytophthora; Zygomycotina- Mucor,Ascomycotina-Saccharomyces, Eurotium, Chaetomium, Peziza; Basidiomycotina-Puccinia, Agaricus; Deuteromycotina-Cercospora, Colletotrichum; general account of Lichens.

12 Hrs.

UNIT-4 Bryophyta: Amphibians of plant kingdom displaying alternation of generations;structure, reproduction and classificaiton of Hepaticopsida (e.g. Riccia Marchantia);Anthocerotopsida (e.g. Anthoceros), Bryopsida (e.g. Funaria)

12 Hrs.

UNIT-5 Pteridophyta: The first vascular plants; important characteristics of Psilopsida,Lycopsida, Sphenopsida and Pteropsida; structure, Reproduction in Rhynia, LycopodiumSelaginella, Equisetum, Pteris and Marsilea.

BOTANY

PAPER - II

CELL BIOLOGY AND GENETICS

UNIT-1 The cell envelope: Plasma membrane; bilayer lipid structure; functions; the cell wall.Ultra structure and function of nucleus: nuclear membrane; nucleolus and otherorganelles: Golgi bodies, ER, peroxisomes, Vacuoles.

12 Hrs.

UNIT-2 Chromosome organization: Morphology; centromere and telomere; chromosomealterations; deletions, duplications, translocations, inversions; variations in chromosome number aneuploidy, polyploidy; sex chromosomes. Cell division : Mitosis; meiosis

12 Hrs.

UNIT-3DNA the genetic material: DNA structure; replication; DNA- protein interaction; thenucleosome model; genetic code; satellite and repetitive DNA.Extranuclear genome: Presence and function of mitochondrial and plastid DNA;plasmids.

12 Hrs

UNIT-4 Gene expression: Structure of gene; transfer of genetic information; transcription,translation, protein synthesis; tRNA; ribosomes; regulation of gene expression inprokaryotes and eukaryotes; proteins, 1D, 2D and 3D structure.

12 Hrs

UNIT-5 Genetic Variations: Mutations, spontaneous and induced;transposablegeneticelements; DNA damage and repair:Genetic inheritance: Mendelism; laws of seggregation nd independent assortment:linkage analysis; allelic and non-allelic interactions.

12 Hrs

BOTANY PRACTICAL

Time : 3 Hrs

1.	Algae/Fungi	10
2.	Bryophyta/ Pteridophyta	10
3.	Disease Symptoms/Gram's Staining	05
4.	Cytology/Genetics	05
5.	Spots (1-5)	10
6.	Viva Voce	05
7.	Sessionals	05
		50 marks

MATHEMATICS

PAPER - I

ALGEBRA AND TRIGONOMETRY

UNIT-1 Symmetric, Skew symmetric, Hermitian and skew hermitian, matrices. Elementaryoperations on matrices, Inverse of a matrix. Linear independence of row and column matrices, Row rank, Column rank and rank of a matrix. Equivalence of column and row ranks. Eigen values, Eigen vectors and the characterstic equations of a matrix.

Cayley Hamilton theorem and its use in finding inverse of a matrix.

UNIT-2 Application of Matrices to a system of linear (both homogeneous and nonhomogeneous)equations.Theorems consistancy of a system of linear equations.Relation between the roots and coefficients of general polynomial equations in one variable.Transformation of equations.Descarte's rule of signs. Solutions of cubic equations

(Cardons Method), Biquadratic equation.

UNIT-3 Mappings, Equivalence relations and partitions. Congruence modulo n. Definition of agroup with examples and simple properties. Cyclic groups generators, Coset decomposition, Lagranges theorem and its consequances. Formate and Euler's theorems.Normal subgroups. Quotient group, Permutation groups, Even and odd permutations the alternating groups. Cayley's theorem An.

UNIT-4 Homomorphism and Isomorphism the fundamental theorems of homomorphism.Introduction, properties and examples of Rings, Subsings, Integral domain and fields Characterstic of a ring and field.

TRIGONOMETRY :

UNIT-5 De Moivres theorem and its applications.Direct and inverse Circular and Hyperbolicfunctions.Logarathim of a complex quantity. Expansion of Trignometrical functions.

Gregory's series.Summation of series.

TEXT BOOK :

1. I.N. Herstein, Topies in Algebra Wiley Eastern Ltd., New Delhi, 1975
2. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd.New Delhi, 2000.
3. Chandrika Prasad, Text-Book on Algebra and Theory of equations, Pothishala Private Ltd., Allahabad.
4. S.L. Loney, Plane Trigonometry Part II, Macmillan and Company, London.

REFERENCES :

1. I.N. Herstein, Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975.
2. K.B. Datta, Matrix an linear algebra, Prentics Hall of India Pvt. Ltd. New Delhi, 2000.
3. P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, First Course in linear Algebra, Wiley Eastern, New Delhi, 1983.
4. P.B. Bhattacharya, S.K.Jain and S.R. Nagpaul, Basic Abstract Algebra (2 edition),

   Cambridge University Press, Indian Edition, 1997.
5. S.K. Jain, A. Gunawardena and P.B. Bhattacharya, Basic linear Algebra with MATLAB, Key College Publishing (Springer-Verlag), 2001.
6. H.S. Hall and S.R. Knight, Higher Algebra, H.M. Publications, 1994.
7. Chandrika Prasad, Text-Book on Algebra and Theory of Equations, Pothishala Private Ltd., Allahabad.
8. S.L. Loney, Plane Trigonometry Part II, Macmillan and Company, London.
9. R.S. Verma and K.S. Shukla, Text Book on Trigonometry, Pothishala Pvt. Ltd., Allahabad.

PAPER - II

CALCULUS

DIFFERENTIAL CALCULUS : **M.M. 50**

UNIT-1 $\varepsilon - \delta$definition of the limit of a function.Basic properties of limits. Continuous functionsand classification of discontinuties. Differentiability.Successive differentiation.Leibnritz theorem.Maclaurin and Taylor series expansions.

UNIT-2 Asymptotes curvature.Tests for concavity and convexity.Points of inflexion.Multiplepoints.Tracing of curves in Cartesian and polar coordinates.

INTEGRAL CALCULUS:

UNIT-3 Integration of irrational algebraic functions and transcendental functions. Reductionformulae.Definite integrals.Quadrature.Rectification.Volumes and surfaces of solids of revolution.

ORDINARY DIFFERENTIAL EQUATIONS :

UNIT-4 Degree an order of a differential equation. Equations of first order and first degree.Equations in which the variables are separable.Homogeneous equations.Linear equations and equations reducible to the linear form.Exact differential equations. First order higher degree equations solvable for x, y, p. Clairaut's form and singular solutions. Geometrical meaning of a differential equation.Orthogonal trajectories.Linear differential equations with constant coefficients.Homogeneous linear ordinary differential equations.

UNIT-5 Linear differential equations of second order.Transformation of the equation by changingthe dependent variable/the independent variable.Method of variation of parameters.Ordinary simultaneous differential equations.

TEXT BOOK :

1. Gorakh Prasad, Differential Calculaus, Pothishala Private Ltd. Allahabad.
2. Gorakh Prasad, Integral Calculus, Pothishala Private Ltd. Allahabad.
3. D.A. Murray Introductory Course in Differential Equations, Orient Longman (India), 1976.

REFERENCES :

1. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
2. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum's outline series,

   Schaum Publishing Co. New York.
3. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
4. P.K. Jain and S.K. Kaushik, An Introduction to Real Analysis, S. Chand & Co. New Delhi, 2000.
5. Gorakh Prasad, Differential Calculus, Pothishala private ltd. Allahabad.

6. Gorakh Prasad Integral Calculus, Pothishala Private ltd. Allahabad.
7. D.A. Murray, Introductory Course in Differential Equations, Orient Longman (India), 1967.
8. G.F. Simmons, Differential Equations, Tata Mc Graw Hill, 1972.
9. E.A. Codington, An Introduction to Ordinary Differential Equaitons, Prentics Hall of India, 1961.
10. H.T.H. Piaggio, Elementary Treatise on Differential Eidations and their Applications, C.B.S. Publishe & Distributors, Dehli, 1985.
11. W.E. Boyce and P.O. Diprima, Elementary Differential Equations and Boundary Value
12. Problems, John Wiley, 1986.

Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and Sons, 1999

PAPER - III
VECTOR ANALYSIS AND GEOMETRY

VECTOR ANALYSIS:

UNIT-1 Scalar and vector product of three vectors.Product of four vectors.Reciprocal Vectors.

Vector differentition.Gradient, divergence and curl.

UNIT-2 Vector integration. Theorems of Gauss, Green, Stokes and problems based on these.

UNIT-3 General equation of second degree.Tracing of conies.System of conies.Confocalconies.Polar equation of a conic.

UNIT-4 Plane the Straight line and the plane. Sphere cone. Cylinder.

UNIT-5 Central Conicoids.Paraboloids.Plane sections of conicoids.Generaing lines.ConfocalConicoids.Reduction of second degree equations.

TEXT BOOKS :

1. N. Saran and S.N. Nigam, Introduction to vector Analysis, Pothishala Pvt. Ltd. Allahabad.
2. Gorakh Prasad and H.C. Gupta, Text Book on Coordinate Geometry, Pothishala Pvt. Ltd., Allahabad.
3. R.J.T. Bill, Elementary Treatise on Coordinate Geometry of three dimensions, Machmillan India Ltd. 1994.

REFERENCES :

1. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Company, New York.
2. Murray R. Spiegel, Vector Analysis, Schaum Publishing Company, New York.
3. N. Saran And S.N. Nigam Introduction to Vector Analysis, Pothishala Pvt. Ltd., Allahabad.
4. Erwin Kreysizig, Advanced Engineering Mathematics, John Wiley & Sons, 1999.
5. Shanti Narayan, A Text Book of Vector Calculus, S. Chand & Co., New Delhi.
6. S.L. Loney, The Elements of Coordinate Geometry, Macmillan and Company, london.
7. Gorakh Prasad and H.C. Gupta, Text Book on Coordinate Geometry, Pothishala Pvt. Ltd., Allahabad.
8. R.J.T. Bill, Elementary Treatise on Coordinate Geometry of three Dimensions, Macmillan India Ltd., 1994.
9. P.K. Jain and Khalil Ahmad, A Text Book of Analytical Geometry of two Dimensions, Wley Eastern Ltd., 1994.
10. P.K. Jain and Khalil Ahmad, A Text Book of Analytical Geometry of three Dimensions, Wiley Eastern ltd., 1999.
11. N. Saran and R.S. Gupta, Analytical Geometry of three Dimensions, Pothishala Pvt. Ltd. Allahabad.

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B.SC. B.ED.

PAPER - I

PHILOSOPHICAL PERSPECTIVES OF EDUCATION

COURSE OBJECTIVES:

To enable the student-teacher to understand-

(i) The relationship between philosophy and education and implications of philosophy on education;

(ii) The importance and role of education in the progress of Indian society;

(iii) The contribution of great educators to the field of education;

(iv) The need to study education in a sociological perspective. The process of social change and socialization in order to promote the development of a sense of commitment to the teaching profession and social welfare;

(v) Their role in creation of a new social order in the country and learn about various social welfare opportunities in which they can participate fully; and

(vi) The means and measures towards the promotion of national integration and protection of human rights.

Course Outline

Unit - I: Aims of Education

- Education: Nature & its meaning, objectives/aims in relation to the time and place.

- Educational Aims in the Western Context: With specific reference to Western thinkers such as Russell & Dewey. Their impact on educational thoughts and class room practices in terms of progressive trends in education.

- Educational Aims in the Indian Context: With specific reference to Indian thinkers such as Gandhi & Tagore.

- Philosophy and Education: Significance of studying philosophy in understanding educational practices and problems.

Unit - II: Philosophical Systems

Major Philosophical Systems: their salient features and their impact on education.

- Realism with reference to Aristotle and Jainism.
- Naturalism with reference to the view of Rousseau and Rabindra Nath Tagore.
- Idealism with reference to Plato, Socrates and Advaita Philosophy.
- Pragmatism with reference to Dewey's "Instrumentalism & Experimentalism".
- Humanism: Historical & Scientific and Buddhists.

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Unit - III: Indian Thinkers

Educational thinkers and their contribution in developing principles of education.

- M.K. Gandhi: Basic tenets of Basic Education.

- Gijju Bhai: The world of the child.

- Swami Vivekananda: Man making education.

- Sri Aurobindo: Integral education, its basic premises, stages of development.

- J. Krishna Murthy: Child Centerd Education.

Unit - IV: Western Thinkers

- JJ Rousseau

- John Dewey

- Antonio Gramsci (Neo-Gramscian Theory)

- Paulo Friere (Democratic Education)

Unit - V: Contemporary Thought

- Critical and comparative study of the period and socio-political perspective of the Western and Indian Thinkers.

- Contemporary philosophical perspectives of Education, Modernization & Globalization in thought and education.

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Suggested Readings:

1. Anand C.L. et al.: Teacher and Education in Emerging India, NCERT, New Delhi.

2. Anant Padmnabhan: Population Education in Classrooms, NCERT, New Delhi.

3. Bhatnagar, S.: Adhunik Bhartiya Shiksha Aur Uski Samasyayen. Lall Book Depot, Meerut.

4. Chakravorty M.: Gandhian Dimension in Education. Daya Publishing House, New Delhi.

5. Mani R.S.: Educational ideas and ideals of Gandhi and Tagore. New Book Society, New Delhi.

6. Ministry of Human Resource Development: National Policy on Education, 1986, New Delhi.

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7. Mohanty, Jagannath: Indian Education in Emerging Society. Sterling Publication, New Delhi.

8. Pandey, Shyam Swaroop: Shiksha ki Darshanik evam Samajshastriya Prishtbhoomi. Vinod Pustak Mandir, Agra.

9. Pathak and Tyagi: Shiksha ke Samnya Siddhant. Vinod Pustak Mandir, Agra.

10. Pathak, RD. and Tyagi, I.S.D.: Shiksha ke Samanya Siddhant. Vinod Pustak Mandir, Agra.

11. Saxena, N. R. &Swaroop, Shikha: Shiksha ke Samanya Siddhant. Lall Book Depot, Meerut.

12. Singh B.P.: Aims of Education in India. Ajanta Publication, New Delhi.

13. Agrawal, J.C..: Nai Shiksha Niti. Prabhat Prakashan, Delhi.

14. Bhatnagar, R.P.: Technology of Teaching.International Publishing House, Meerut.

15. Freire, Paulo: Pedagogy of the oppressed, Translated by Myra Bergaman Ramos.The Continuum Publishing Corporation, New York, NY, 1987.

16. Freire, Paulo: The Politics of Education- Culture, Power, Liberation, Translated by Donoldo Mecedo, Bergin & Garvey, New York, NY, 1985.

17. Bhatnagar, Suresh: Shiksha Ki Samasyaen. Lall Book Depot, Meerut.

18. Bhooshan, Shailendra & Anil Kumar: Shikshan Taknik. Vinod Pustak Mandir, Agra.

19. Manav Sansadhan Vikas mantralaya: Rashtriy Shiksha Niti, 1986, New Delhi.

20. Safaya, Raghunath: School Sangathan.Dhanpat Rai& Sons, Delhi.

21. Sampath, K.: Introduction to Educational Technology.Sterling Publishers, New Delhi.

22. Saxena, N.R. & Swaroop: Shikshan Kala Ewam Paddatiyan. Lall Book Depot, Meerut.

23. Sharma & Sharma: Secondary Education and teacher Functions. Radha Prakashan Mandir, Agra.

24. Higher Education in India.Albach.

(Format A)

TEACHING REFLECTIVE LOG FORMAT

(This is to be completed daily during the week you teach)

Objectives for day:

Materials for day:

Instructional Strategies used (explain how the strategies were implemented):

What I did well:

What my students did well:

What I didn't do so well:

What my students didn't do so well:

What I would keep the same:

What I would Change:

What did I learn about teaching today? (If you had to modify your lesson to help students, briefly explain here)

05.02.2018 5/2/2018

(Format B)

SCORE SHEET FOR REFLECTION LOG ON FOCUS LESSON

(*To be filled by the trainee, based on student reflection)*

Name of the Trainee:

Duration: **Class:** **Section:**

Unit of teaching:

S.No.	CRITERION ON STUDENT RESPONSE	0	1	2	3	4
1	Ability to identify specific and/or varied instructional strategies.					
2	Examples to support the strategy.					
3	Connectivity across disciplines.					
4	Ability to identify learning styles.					
5	Examples to reflect according to learning styles.					
6	Ability to display personal reflections					
7	Examples reflected in support of personal reflection					
8	Group conformity					
9	Contribution to activity/strategy					
10	Acceptance in group/solo activity or Strategy					

Any other remarks by the trainee:

Mentor's Remarks:

Mentor's Signature **Trainee's Signature**

05.02.2018 5/2/2018

***(Format* C)**

MENTOR'S EVALUATION REPORT OF TRAINEE

Name of the Trainee: ……

Period of Evaluation: From……to……..

Focus Lesson No.: …….

Subject: ……..

S.NO.	CRITERION	0	1	2	3	4
I	INSTRUCTIONAL STRATEGIES USED-					
1	Are appropriate for the topic/topics.					
2	Has scope for learner engagement.					
3	Has suitability of learning materials.					
4	Assess learner's understanding throughout the Lesson.					
5	Has effective displays.					
6	Are consistent with the objectives.					
II	LEARNER'S (LEARNING STYLES) IN CLASS-					
7	Identification of personalities and talents of learners					
8	Identification of learning styles of learners.					
9	Ensuring learner participation.					
10	Identification of learner's pace.					
III	LEARNING ENVIRONMENT-					
11	Learners are motivated, appreciated and involved.					
12	Learners are relaxed and confident.					
13	Management of classroom.					
14	Teacher-Student relationship					
15	Class control					
16	Overall performance					

Strengths of the Trainee:

(May use separate papers for detailed report)

Areas of Improvement:

(May use separate papers for detailed report)

Sign of Mentor with Name

05-02-2018 5/2/2018

(Format D)

Weekly Reflective Diary Format

We learn by doing and reflecting on what we do. (John Dewey)

Use this template to record your observations weekly. This document will be turned in every Monday following each week in the field. The weeks you teach will have a different format to follow. Please note that your document will be longer than one page.

Name:
Date:

Analyze your observations to identify specific teaching and learning strategies you observed involving the classroom teachers and their students. You may include your behavior if you are involved in the teaching process. Include more than one strategy.

Instructional Strategies (Include more than one strategy)	**Specific example describing how the strategy was implemented**
Learning Styles observed	**Specific examples how the learner was supported through instructional delivery**

1. What have you learned about teaching this week?
2. What have you observed/learned about students and their learning this week?

Theory base observed	**Specific example from classroom to apply/support theory**

Personal Reflection: Reflect specifically on something you observed and connect to personal opinions.