NEW
GUIDE TO

Course of Study
for

B.Sc. & B.Com
Part- III Examination
B.R.A. Bihar University

SCIENCE
&
COMMERCE

Revised
Honours & Pass

COURSE OF STUDY
B.Sc. Part - III

GENERA STUDIES

(For General and Honours Course Students)

Time : 3 Hours **Full Marks - 100**

Ten questions in all, shall be set in this paper, five each from the following two groups. The examinees shall be required to answer any five question, slecting at least two questions from each group.

Group-A

Modern History of lndia from 1857 AD.
History of Independence Movement.
Nature and character of nineteenth century resurgence.
Growth of nationalism and attainment of independence.
Current Events - National events and happenings in the States of India.
Elements of Indian Ccnstitution.
Eiementary idea of Physical, Political and Economic Geography of India.
Resources of Indian Economy- Agricultural, Mineral, Hydrological Energy.
Human resources, Animal Husbandry and fisheries, Forests.
Eiementary information on major indusiries of India.
United Nations and its major agencies.

Group-B

What is life? Properties oi living forms. Elementary idea of virus and bacteria, important diseases causes by micro-organisms. Elementary idea of composition of living matters (Proteins, Carbohydrates, fat and minerals), hereditary material. Elementary idea of genetic engineering. Elementary idea of environment and its conservation.
Pollutants (air, water and soil).
Energy-Source and importance.
Fertilisers-Organic and Inorganic.
Elementary idea of fermentation, Preservation.
Preliminarv idea about fundamental particles, atomic structure-atomic energy.
Radiation and its different iorms, idea of transistors.
Elementary idea of artificial satellites and their utility.
Help Book : University Guess Paper to General Studies.

PHYSICS (Hons.) Paper - V

Time :3 hours **Full marks - 100**

Twelve questions to be set. Six to be answered (taking atleast two from each group.)

Group - A

Methods of Mathematicai Physics (Four questions to be set)

Curvilinear co-crdinates, Cartesian, Sphericai polar and cylindrical cocrdinates, Orthogonal transformation of co-ordinates, scalar, vector, scalar and vector fields, Divergence and Curl lin surface and volume integrais, theorems Gauss, stokes and Green. Tensor and iis eiementary propeties

Partial differential equations and their solution by separation of variables, Laplace's equation and its solution, Wave equation and its solution. Poison's equation.

Functions of a complex variables, Cauchy-Reiman equations, Complex potentials and conformal transformation, Cauchy's integral, Besidue Theoiem, Integration of complex functions.

Group- B

Classical Mechanics (Four questions to be set)

Generalised Coordinates, Lagrtnge's and Hamilton's equations of motion for holonmic systems, Lagrangian for a free particle and for systems of particles. Hamilton's principle, Calculus of variation. Euler-Lagrangere's equation Principle of last action, Conservation theorens and symmatry properties, Application of Hamiltonian dynamics to simple problem Charged, particle in an elctromagnetic field (non-relativistic and relativistie cases). Laws of motion of bodies. Moments of inertia and products of Inertia Eulerian equation of of motion or rigid body canonical transformation. Examples of canonical tranformation Poisson brackets, Jacobi identity. Problems in a central force field Kepler's law of planetary motion.

Gyroscopic motion, of symmetrical coriolis and centrifugal foces.

Group - C

Quantum Mechanics (Four questions to set)

Inadequacy of classical mechanics, Dual nature of matter and radiation, De-Broglie's relation, concept of state. The correspondence principle and the uncertainty relation of quantum mechanics.

Schrodinger wave equation & its physical meaning its application of problems of free particle. Transmission of partical through potential step, one dimensional square well, particle in a box, Linear harmonic oscillator, Rigid rotator, Hydrogen atom.

Commutation rules of orbital angular momentum, eigen function and eigen values, spin half angular momentum, Pauli's spin matrices, Pauli's spinors. Symmetric and antisymmetric wave functions, Pauli's exclusion principle.

Help Book : University Guess Paper to Physics (Honours) Paper - V.

PHYSICS (Hons.) Paper - VI

Time : 3 Hours **Full Marks - 100**

12 questions to be set. 6 to be answered (taking at least 2 from each group)

Group-A

Statistical Physics (6 Questions)

The fundamental assumption of statistical mechanics, probability distribution and, entropy, Partition function arid its conversion to thermodynamic functions, Sackur-Tetrode equation and Gibb's paradox, Elements of ensemble theory and Liouville's theorem, canonical ensemble and thermodynamics, Energy fluctuation in the canonical ensemble, Grand canonical ensemble and thermodynamics Density and energy fluctuations in the canonical ensemble, Simple application of ensemble theories to perfect gas.

Boltzman distribution and Helmholtz free energy, Femi-Dirac distribution, Bose- Einstein distribution, Bose-Eintein distribution their simple application, Radial, distribution function and its relation to thermodynamic functions, A brief introduction to first and second order phase transformation, introcal exponent, Ising model in zeroth approximation, Introduction to fluctuations. The probability of a thermodynamic fluctuation.

Group - B

Electronics (6 Questions)

Thermionics : richardson's equation and its experimnetal verification, child-langmuir equation, Schottky's Effect, BJT and FET transistor, Optoelectircal devices, photodevices, LDR, Photovoltaic cell, photo transistor.

Circuit Theory : Coupled LCR circuits, Superposition theorem, Thevein in, Norton and Reciprocity theorems, Maximum power transfer theorem, One port and two port networks (only h-parameter) and Piequivalance of two port network Ladder network and constant K filtters (low, high and band pass), Attenuatiors.

Solid stae Electronic Circuits : Equivalent circuit of BJT and FET, Half-wave and full-wave rectifiers, Power supply with special reference to smoothing circuit and voltage stabilization by a cold dicathode valve and Zenerdiode A.E. ampitiers (R.C.) feedbak amplifiers, Push-Pull power amplifier, Simple circuits for oscillation. B-C (Harley and Colpitt's) Oscillator R.C. Oscillater, Astable Multivibratior, Principle of amphatude modulation. Solid state amplitude modulator, Avergae and envelope detection, radio receivers, Superthodyne receivers, Simple idea of transmitters, receivers (with block diagrams) CRO and its applications, Logic circuits AND, OR, NAND, NOR operation with the help of simple logic gates.

Types of computers and their basic components, Input-Outpur devices, concept of hardware and software, BITS and BYTES. Computer programming of some simple mathematical problems in BASIC and FORTRAN languages.

Help Book : University Guess Paper to Physics (Honours) Paper - VI

PHYSICS (Hons.) Paper - VII

(Electromagnetic Theory, Electrodynamics, Statistical & Atomic Physics)

Time : 3 Hours **Full Marks - 100**

12 questions to be set. 6 to be answered (taking at least 2 from each group)

Group-A

Plasma & Classical Electrodynamics (4 Questions)

Microscopic and macrosopic properties of Plasma, Plasma oscillations, Debye's potential, Wave propagation in istropic plasma, plasma oscillation, Debye's Alfven wave Saha's Theory of Ionisation.

Retarde and advanced potentials, Field due to and oscillating current element and oscicillating dipole, Liennand Wiechaert potentials, Potential and field due to uniformaly moving charge.

Convariance of Maxwell equatiosn under Lorentz tranformation, transformation equation under Lorentz transformation, Transformation equations for electromagnetic fields.

Group - B

Solid State Physics (4 Questions)

Elements of crystallography, Bravais lattice, Miller indices, seven crystal systems, simple crystal strcuture of Indices, seven crystal systems, simple crystal structure of NaCl, Cacl and damond.

Interaction of X-rays, Neutrons, and Electrons with matter, Diffraction of X-ray from a perfect crystal. Bragg's law, Reciprocal lattice, Ewald construction and Brillouin zones.

Crystal binding-lonic, metallic, covalent and vanderwal's binding. Vanderwaal's London interactin and cohesive energy of inert gas crystal, Madelung energy and Madelung constant.

Free electron theory of metal. Heat capacity f electron gas, Electrical conductivity of metals. Boltzman transport equation, Sommerfeld theory of electrical conductivity. Band Theory of Solids, Bloch's Theorem, Kronig-Penny model, Distinction between metal, semiconductor and insulator, Intrinsic and Extrinsic semiconductors. transistors, P-n junction rectifier, Hall Effect.

Group-C

Physcial of Atoms Molecules and Nuclei (4 Questions)

Origin of atomic spectra, Bohr's theory and merfeld theory of hydrogen atoms, spectra of all and alkaline earth metals, selection rules, ionization pertential. Find strcuture, Stem-Gerlach Experiment, Vectormodel of atom, Moseley's Law origin of X-ray spectra.

Rotational vibrational spectra of diatomic molecules, Rotation, vibration and Electronic bands, introduction to NMR, ESR and Laswer spectrescope.

General properties of nuclear mass, charge, spin, state magnetic moment, size and stability nuclear modeis liquid drop model and mass fourmula, The shell model, classical theory of Rutherford scattering.

Help Book : University Guess Paper to Physics (Honours) Paper - VII

PRACTICAL (Hons.) Paper - VIII

Time : 6 Hours **Full Marks- 100**

The course shall include the following experiments.

Group-A

1. Janction diode and Zener diode characteristic.
2. BJT characteristic.
3. FEt characteristic.
4. Static characteristic of tetrode.
5. Verification of Child-Langmuir law.
6. Frequency response of R.Camplifer.
7. Effect of negative feed back in R-Camplifier.
8. Properties of Hartley oscillator.
9. Study of a plate modulated amplifier.
10. Frequency response of a tuned I-amplifier.
11. Sensitivity study of a grid leak detector.
12. Diode detector and its use as a voltmeter.
13. Study of load charecteristic of a rectifier.
14. Multi-vibrator and study of its wave forms.
15. Study of Logic gates (AND, NAND, OR, NOR)

Distribution of Marks

(a) Practical-One exercise to be Pertiomed 40 Marks
(b) Viva 05 Marks
(c) Note-Book 05 Marks

Group - C

The course shall include the following experiments :-

1. Verification of Brewster's law.
2. Verification of Fresnel's law of reflection and retraction of polerised light.
3. Analysis of elliptically polarised light.
4. Inductancy by Anderson bridge.
5. Mutual inductance by Carey-Foster bridge.
6. Frequency characteristic of low pass filter.
7. e/m by Braun's tube
8. e/m by Helical method.
9. Measurement of Hall Coefficient.
10. Band gap of semiconductor.
11. Planck's constant by photo-cell method.
12. Power factor of A.C. fan by (i) three ammeter method (ii) three voltmeter method.
13. Copper loss and iron loss of a transformer.
14. Insertion loss variation with load of the T-sectioin of an attenuater.
15. Beta ray absorption coefficient of a metal by G.M. Counter.

Distribution of Marks :

(a) one exerices to be performed 40 marks
(b) Viva 5 marks
(c) Note Book 5 marks

Note : There shall be seperate practical examination of Group 'A' & 'B'

Help Book : University Practical Physics.

CHEMISTRY(Hons-) Paper-V

Physical Chemietry

Time : 3 hours **Full Marks-75**

Nine questions to be set. Five questions to be answered. Short answer type questions are recommended. There may be several parts in a question and different units may be mixed in Questions. While setting questions the entire Syllabus may be covered as lar as practicable.

1. Electrochemistry : Galvanic cells, thermodynarnics of G-alvaniecells, chemical cells with and without transference, liquid junction potential; Glass electrode for the measuremenl of pH, Storage batteries. Lead accumulator, Polarisation, Hydrogen and Oxygen ever voltage, Decomposition voltage in aqueou solution, Electrical double layer, corrosion of metals and its Prevention.

2. Wave Mechanics : Inadequacy of classical mechanics Wave quanta and motton,of vibrating string, basic concept of quantum mechahics, postulates, eigdn function and eigen value, physical properties of wave function, orthogonality and normalization of wave functions, Schrodinger Wave equation and it importance, Treatment of free particle and particle in one, two and three dimensional boxes, rigid rotator - expression for energy rotational quantum number and degeneracy of states.

Elementary idea ot H atom, radial and angular parts of wave functions R, 0 and φ, concept of quantum numbers and their significance, radial distributior functions, radial factors, R_{ni}-r, R^2nl-r and 4 $^2zR^2$nl- plots. Angular dependence of orbitals shape of s, p, anb d orbitals, concept of electronicspin.'

3. Spectroscopy : Component of molecular energy and their quantization,different parts of electromagnetic radiaiion and their characterisation, energy level spacings and relative population among levels, types of molecular spectra, band width, band intensity and position of spectral bands.

UV- visible spectra : Franck-Condon principle, selection rules, and ε max values, Qualitative description of , and n molecular orbitals, transitions in H_2, ethylene, butadiene, formaldehydes, , unsaturated carbonyl compounds. Red and blue shifts, calculation of λ max, Woodward rules.

Infrared spectra : Energy levels of simple harmonic oscillator, selection ruies, Hooke's law and force constant, qualitative relationship between force constant, bond length, bond angle, bond order, bond energy; and stretching frequency of molecules, vibrational spctra of H_2O, NO_2 and CO_2, concept of group frequency.

4. Magnetic Resonance Spectra : n.m.r. spectra, nuclear spir system, nuciear spin quantum number, nuclear spin anguiar momentum nuciear magnetic moment, nuciear magneton effect of magnetic field on system with nuclear spin, nuclearation and rescnance condition in a magnetic field n,m.r. Chemical shift, factor affecting chemical shift, shielding and deshielding mechanism, nuclear spin-spin coupling, coupling constant and contributing factors to it. first order rules.

e.s.r. Spectrea : Electronic spin system, electronic spin quantum number electron spin angular momentum, electron spin magnetic moment, Bohr magneton effect of magnetic field on electronic spn system, electron spin energy levels, magnetic quantum number for electronic spin state, separation between energy levels causes by the presence of magnetic field, condition for electron spin rsonance, selection rule, derivative curve, hyperfine coupling, hyperfine coupling constant, spectra of H_2, CH_3, Ch_2OH, N.O. C_6H_6.

5. Equilibrium thermodyanamics : Maxwell relations, thermodynamic equation of state, free energy change in chemical reaction and equilbrium constant, thermodynamic derivatio of law of mass action. Denuder's concept of chemical equilibria and reaction potential, pressure and temperature dependence of equilibrium constant, Van't Hoff equation, Nernst heat theorem, third law of thermodynamics and its experimental verification, entrophy and probability.

6. Theories of Rate Process : Derivation of Maxwell law of distribution of velocities of gaseous molecules, Avergae R.M.S. and most probable velocity, Collision theory of bimolecular reaction and its validity. Llindemann theory of unimolecular reaction. Hinselwood thoery, Transition state theory-thermodynamic treatment activation parameters viz volume of activation, Free energy of activation and Entrophy of activation.

Steady state approximation and rate law for thermal decomposition of Ozone, N_2O_5 and non-photo chemical combinations of

$H_2+Cl_2 \longrightarrow 2HCl$, $H_2+Br_2 \longrightarrow 2HBr$

7. Photochemistry : Primary and secondary photochemical processes, laws of photochemical, Jablonski diagram, radiative and non-radiative transitions, quantum efficiency and is variation.

Photochemical reactions : $H_2+Cl_2 \longrightarrow 2HCl$, $H_2+Br_2 \longrightarrow 2HBr$, decompostion of Hl, fluorescence and phosphorescence, photosensitization.

Help Book : University Guess Paper to Chemistry (Honours) Paper - V

CHEMISTRY(Hons-) Paper-VI

Inorganic Chemietry

Time : 3 hours **Full Marks-100**

Nine questions to be set. Five questions to be answered. Short answer type questions are recommended. There may be several parts in a question and different units may be mixed in questions. While setting questions the entire

Syllabus may be covered as far as possible.

1. Molecular orbital and valence Bond Methods : Principles of linear combination, critera of maximum overlapping for effective combination, Energy and probability plots of bonding and anti-bonding molecular orbitals in H_2+ energy versus internuclear separation in H_2 both for attractive and repulsive states, non-bonding MO and three centre bonding, valence bond wave functions of H_2 molecule, quantitative description of sp, sp^2 and sp^3 hybrid orbitals and inter orbital, comparison between V.B. and M.O Methods.

2. Magnetic Properties : Diamagnetic, paramagnetic, ferromagnetic and antiferromagnetic behaviour. Paramagnetic susceptibility and methods of its determination. Variation of magnetic susceptibility with temperature,m Curie and Neel temperature, Group Tem Symobls and Hund's rule, dependence of magnetic moment vlaue on L.S. and J quantum numbers, spin only magnetic moment, quenching of of orbital angular momentum, magnetic moment data in case of transition metal complexes.

3. Metal Ligand Bonding in Transition Metal Complexes : V.B. mode of M-L bonding and its limitation, crystal field model-d-orbital splitting in OH and T environments, crystal field splitting parameter (10Dq) and factors affecting it, Crystal field stablisation energy, magnetic properits and colour of complexes, variation of lonic radil of M^2+ ions in 2d series, themodynamic stability constants and factors affecting stability of complexes, chelate effect, entrophy effect.

4. Nuclear Chemistry : Nuclear stability and binding artifical radioactivity, position emission and - decay process, Nuclear fission, Liquid drop model, nuclear chain reation, moderator, nuclear fusion reactions, neutron activation analysis, isotoe dilution methods, isotope effect and isotope exchange reactions.

5. Electronic Spectra of Transition Metal Complexes : Thypes of electronic transition, selection rules for electronic tranistion, spectrochemical series, Free ion ground terms and Orgel diagram for d^1 to d^9 systems in octahedral and tetrahedral fields, visible spectra of $[T_1(H_2O_6)]^{3+}$ ions.

6. Hard and Soft acids and Bases : Classification of metals into A and B, acid-base behaviour of hard and soft acids and bases, classification, their acid-base strength,m hardness-softness, symbosis, theory of hardness and softness, electronegativity and hardness and softness.

7. Inorganic Polymers : Classification of polymers, chemistry of inorganic ring and chain compounds containing boron, nitrogen, phosphourus and sillcon atoms.

8. Methods of Analysis : (a) Complexometic titration using EDTA estimating of Mg^{2+} ion and Ca^{2+}. (b) Chromatographic technique : Principles of TLC and gas chromatography, determination of R_1 value. (c) Introductionof Colourimetry, coulometry and flame photometry.

Help Book : University Guess Paper to Chemistry (Hons.) Paper - VI

CHEMISTRY(Hons-) Paper-VII

Inorganic Chemietry

Time : 3 hours **Full Marks-100**

Nine questions to be set. Five questions to be answered. Short answer type questions are recommended. There may be several parts in a question and different units may be mixed in questions. While setting questions the entire Syllabus may be covered as far as possible.

1. Reaction Mechanism : Methods of determination of reaction meachanism (product analysis, intermediate, use of isotopes, Cross over experiment, stereo-chemical studies).

Mechanism of nucleophilic substitution reactions at saturated carbon atom SN^1, SN^2 and SN^i, Relative reactivities of alkyl halides, allyl, vinly and aryl haildes, α-and - Elimination reaction. E_1 and E_2 mechanism and their regio and stereo selectivites. Electrophilic additions to carbon-carbon multiple bonds, Regio and stereo selectivities, Nucleophlic additions to carbon-oxygen double bond.

2. Reagents use in organic synthesis : Diazomethane, Lithium aluminium hydride, Sodium borohydride, Diborance, N-bromo succinimide, Raney Nickel, Aluminium isoproxide, Periodic acide, Lead tetraacetate, Lithium dialkylcuparate and Osmium tetroxide, Discussion on specificity of the reagents and mechanism involved.

3. Organic Reactions and Molecular Rearrangements : (i) Mannich reaction, (ii) Michael addition reaction, (iii) Hofman exhaustive Methylation and elimination, (iv) Wagner - Meerwein rearrangemtn, (v) Wolf-rearrangement, (vi) Hofmann rearrangment, (vii) Beckmann rearrangment, (viii) Curtis rearrangment, (ix) Schmidt rearrangment, (x) Pinacol-Pinacolone rearrangment.

4. Polynuclear Hydrocarbons : Preparation, Properties and structure determination of napthalene, anthrancene and phenanthrene.

5. Heterocyclic Compounds : (a) **Five membered heterocylics :** Preparation, properties and aromatic character of pyrrole, furan and thiophene, (b) **Six membered heterocyclics :** Preparation, properrties and aromatic character of pyridine, (c) **Condesnsed heterocyclics :** Preparation and properties of quinoline and isoquinoline.

6. Dyes : Classification, correlation of colour with constitution, Chemistry of the following dyes, methyl crange, Congo-red, Malachite green, Crystal Violet, Phenolphathalein, Cluoresscein, Alizarin and Indigo.

7. Ureides : Purines, Isolation, structure and synthesis of Uric acid.

8. (a) Amino Acids and Proteins : (i) Classification structure and stereo chemistry of amino acids. Acid-base

behaviour, isoelectric point and electro-phoresis, preparation and reactions of α-amino acids. (ii) Peptide linkage, Basic idea about primary and secondary structure of proteins.

(b) Nucleic Acids : (i) Brief knowledge of purine and pyridine bases, (ii)D-Ribose and de-ribose, (iii) Constitution of nucleic acid and basic idea of double helix structure of DNA.

Help Book : University Guess Paper to Chemistry (Honours) Paper - VII

CHEMISTRY (Hons.) Paper - VIII (Practical)

Time : 6 Hours **Full Marks- 100**

The following exercises ae to be performed.

Physical (1 to 7)

1. To determine the specific reaction rate of hydrolysis of methyl acetate catalized by H^+ ion at room temperature.
2. To compare strength of HCL and H_2SO_4 by studying the kinetics of hydrolysis of ethyle acetate.
3. To determine the distribution coefficient of iodine between water & CCl_4.
4. To determine the surface tension of a liquid.
5. To determine the heat of neutralization of NaOh with HCl.
6. To determine enthalpy of neutralization of acetic acid using NaOH solution and determine enthalpy of ionization.
7. To determine the vascosity of a liquid.
8. Synthesis of organic compound : (a) Acetylation of salicylic acid, (ii) Benzoylation of aniline, (iii) Nitration of monobenzene to m-dinitrobenene. (iv) Selective reduction for m-dinitrobenzene to m-nitroaniline.

Distribution

One experiment from physical	60
One experiment from organic out of execise in item 8	20
Not Book	05
Viva-Voce	15

Help Book : University Practical Chemistry.

BOTANY (Hons.) Paper - V

(Plant Physiology and Biochmistry)

Time : 6 Hours **Full Marks- 100**

Ten questions to be set, four from Group A and four from Group B and two from Group C. Five questions to be answered, at leat one from each group.

Group-A

1. Osmoregulation, osmotic quantities and their relationship.
2. Modern Concept of absorption of water and ascent of sap.
3. Transpiration, mechanism of follar tranpiration, and modern concept of mechanism of stomatal-movement.
4. Mechanism of translocation of solutes.
5. Active and passive absorption of ions-role of carriers.

Group - B

1. **Photosynthesis :** Involvment of pigment system I and pirgment system II in light reaction, photophosphorylation, Valvin-Cycle and Hatch and Slack Cycle.
2. **Respiration :** Mecahnism of anaerobic, aerobic respiration ETS and oxidative phosphorylation.
3. (a) Amino-acid synthesis (b) Protein-synthesis in prokaryotes and eukaryotes.
4. Fat metabolism and B-oxidation.
5. Corrleate structure of following cell organelles with their roles (i) chloroplast (ii) mitochondria (iii) peroxisomes (iv) ribosomes.
6. **Enzymes :** Classification and mode of Action

Group- C

1. Growth-hormones : General account, structure and role of auxins, gibberellins and cytokinins.
2. Physiology of following-photoperiodism and vernalisation.
3. Movement : Nastic and tropic.

Help Book : University Guess Paper to Botany (Honours) Paper - V.

BOTANY (Hons.) Paper - VI

(Cytogentics and Molecular Biology)

Time : 3 Hours **Full Marks- 100**

Ten questions to be set, eight from group A and two from group B.
Five questions to be answered, four from group A and one from Group B

Group-A

1. Structure of prockayotic and eukaryotic cells.
2. Ultra structure of chromosome, Lampbhrush-chromosome, B-chromosome and polytene chromosome.

3. Microscopy- light, phase - contrast, electron, cell fractionation.
4. Cytoplasmic inhertance.
5. Linkage and crossing over.
6. Chromosomal aberrations.
7. Aneuploiidy and euploidy and role of polyploidy in evolution
8. Structruem replication and funtion of DNA and RNA
9. Modern concept of gene.
10. Mutation and its role in plant-hyprovement.
11. One cistron - one polypeptide hypothesis.
12. Genetic code.
13. (a) genetic-engineering, (b) Application of gene-transfer technology.
14. Principles and application of biotechnology.

Group - B

1. Conservation of germ-plasm.
2. Methods of plant-breeding and its application for wheat improvement in India.
3. Standard error, standard deviation and chi-square test.

Help Book : University Guess Paper to Botany (Honours) Paper-VI

BOTANY (Hons.) Paper - VII

(Ecology)

Time : 3 Hours **Full Marks- 100**

Ten questions to be set, five to be answered selecting at least two from each group.

Group-A

1. Scope, levels of organisation, branches and relationship of ecology with other sciences.
2. Autecology any synecology.
3. Concept and components of environment, environmental factors, climiatic edaphic, biotic and topographic factors.
4. General concept of population-ecology.
5. Ecosystem-Concept, structure and function, grassland ecosystem, pond ecosystem and forest ecosystem.
6. Community-dynamics, structure and methods of study.
7. Plant-succession-hydrarch and xerarch.

Group - B

1. Soil consercation and soil reclamation.
2. MAB, plant-indicator, social-forestry, wild-life management and bilogical-spectrum.
3. Renewable and non-renewable resources.
4. Pollution and its control-air and water pollutions.
5. Principle of distribution of plants.
6. Phytogeographical regions of India.

Help Book : University Guess paper to Botany (Honours) Paper - VII

BOTANY (Hons.) Paper - VIII

(Practical)

Time : 6 Hours **Full Marks- 100**

1. Experiments of osmosis, plasmolysis, imbibition, transpiration, photosynthesis, and respiration. 20
2. Detection of carbohydrates, proteins, lipids and alkaloids. 10
3. Study of chromosome at different stages of mitosis and meiosis by squash techniques. 15
4. Study of plant adaptations (xerophytes & hydrophytes) of study of plant community by quadrat method. 15
5. Physical and chemical properties of soil 10
6. Comment upon 5 spots 10
7. Viva-Coce 10
8. Practical records 10

Help Book : University Practical Botany.

ZOOLOGY (Hons.) Paper - V

Time : 3 Hours **Full Marks- 100**

In all ten questions are to be set distributed in four Group out of which Group-A shall be compulsory consisting of objective type question (1x20 marks) with alternative short answer (5x4 marks) requiring question and both shall span over the whole syllabus in the paper. Three question are to be set from each Group-B. Group C and Group D. Studnets are required to answer five questions in all including the compulsory one and at least one from each Group - B Group - C and Group- D

Group-A

1. Objective type questions (1x20) with alternative short answer requiring question (5x4)

Group-B

Biochemistry :

1. Structure and classification of protein, carbohydrate and fats.
2. Structure and classification of Amino acids.
3. Matabolism of Carbodhydrate - Glycolysis and Krebs cycle.
4. Beta Oxidation of fatty acids.
5. Vitamins- Definition, Types and Functions.

Group - C

Physiology (Mammals)

1. Physiology of digestion.
2. Physiology of respiration (Ventilation of Lungs and transport of gases)
3. Physiology of excretion and Osmoregulation.
4. Physiology of blood coagulation.
5. Physiology of testicular and ovarian cycles.

Group - D

Cndocrinolgy (Mammals) :

1. Hisology of the various endocrine glands - Pitutiary, Thyroid, , adrenal, Islets of Langerhans and Goands.
2. Chemical nature and physiological actions of the hormones of the following endocrines.
   (a) Pituitary - Adenohypophysis and Neurohypophysis.
   (b) Thyroid.
   (c) adrenal - cortex and medulla
   (d) Islets lf Langerhans
   (e) Gonads - Ovary and Testis.

   Help Book : University Guess paper to Zoology (Honours) Paper - V.

ZOOLOGY (Hons.) Paper - VI

Time : 3 Hours **Full Marks- 100**

In all ten questions are to be set distributed in four Group out of which Group-A shall be compulsory consisting of objective type question (1x20 marks) with alternative short answer (5x4 marks) requiring question and both shall span over the whole syllabus in the paper. Three question are to be set from each Group-B. Group C and Group D. Studnets are required to answer five questions in all including the compulsory one and at least one from each Group - B Group - C and Group- D

Group-A

1. Objective type questions (1x20) with alternative short answer requiring question (5x4)

Group-B

Cell Bilogy

1. Ultra structure and functions of the following cell organelles :-
   Plasmamembrance, Endoplasmic reticulum, Mitochondria, Golgi Complex, Ribosomes, Chromosomes, Lysosomes, Nucleous.
2. gametogenesis - Spermatogenesis and oogenesis.
3. Parthenogensis.

Group- C

Genetics

1. Linkage and Crossing over.
2. Structure and Replication of DNA, transcription and tranlation.
3. Chromosomal aberrations - genetic and oytological manifestation and significance.
4. Gene mutation and molecular mechanism of its origin.
5. Extra-nuclear genetic system.

Group - D

Economic Zoology

1. Lac Culture
2. Sericulture
3. Apiculture
4. Pisciculture
5. Elementary idea of the common pests of paddy, wheat, sugarcane and their control.
6. Vectors of Kalazar, Malaria and filaria-their biolody, mode of infection, prevention and control.

   Help Book : University Guess Paper to Zoology (Honours) paper - VI.

ZOOLOGY (Hons.) Paper - VII

(Evolution, Zoogeography, Palaeozoology and Histology)

Time : 3 Hours **Full Marks- 100**

In all ten questions are to be set distributed in four Group out of which Group-A shall be compulsory consisting of objective type question (1x20 marks) with alternative short answer (5x4 marks) requiring question and both shall span over the whole syllabus in the paper. Three question are to be set from each Group-B. Group C and Group D. Studnets are required to answer five questions in all including the compulsory one and at least one from each Group - B Group - C and Group- D

Group-A

1. Objective type questions (1x20) with alternative short answer requiring question (5x4)

Group-B

Evolution

1. Sources of heriditory variations and their role in evolution.
2. Principles of evolution : Lamarckism, Neo Lamarksim, Darwinism and Neo Darwinism.
3. Isolating mechanisms and their role in evolution.
4. Hardy-weinberg Law and genetic equilbrium.
5. Fossil history of Horse and Man.

Group - C

Zoogeography and Palaeozoology

1. Zoogeoraphical realms of the world - their bounaries and climatic peculiarties.
2. Charactristic and peculiar fauna of Oriental, Ethiontial, Ethiopian and Australian regions.
3. Characteristics of Island faunas.
4. Theories and principles pertaining to animal distribution.
5. Different geological eras of the world, their duratin and climatic conditions.
6. Faunistic pecullarities of palaeozoic, meaozoic and Cenozoic earas.
7. Fossils, their mode of formation and age determination.

Group - D

Histology (Mammal) : Integumanet, Epithelia, connective and sketetal tissues, Stomach, Intestine, Liver, Spleen and Kidney.

Help Book : University Guess paper to Zoology (Honours) Paper - VII

ZOOLOGY (Hons.) Paper - VIII

(Practical)

Time : 6 Hours **Full Marks- 100**

(Biochemistry, Physiology and Endocrinology)

Biochemistry **20**

1. Benedict's test for sugar
2. Molish's test
3. Iodine test for starch and glycogen
4. Ninhydrin reaction forglycline/Tyosine/tryptophan

Physiology : Experiments to be performed in Frog/Bird/Mammal
(four experiments each of 7 marks) 7x4=28

1. Enumeration of Total R.B.C.
2. Estimation of haemoglobin (gm/100 ml)
3. Determination of E.S.R. of Blood.
4. Determination of BT, CT
5. Determination of O_2 uptake by terrrestrial animal
6. Simple heat-beat recording and muscle vurve determination by drum method. Dissection and display of any four following Endocrine glands in a mammal :
   Gonad, Thyroid, Adrenal, Pancreas, Pituitary and Pineal gland. 16
   Identification and commenting upon the histological slides (four in number of the following)
   Pituitary, Adrenal, Ovary,Testis, Islet of Langerhans, Thymus, Thyroid, Parathyroid and Vaginal smear
   Viva-Coce 10
   Practical records 10

Help Book : University Practical Zoology.

MATHEMATICS (Hons.) Paper - V

Time : 3 Hours **Full Marks- 100**

Stress should be given on development of ideas and theories rather than on solving leangthy problems. As such, sixty percent of the questions should be from theory portion and forty percent from the problem portion.

Twelve questions to be set. Six to be answered selecting at least one from each group.

Group-A

Fnctions of two variables, limit, double limit, repeated limits, Moore-Osgood theorem, Continuty of a function of two variable, Differentiability of a function of two variables, Sufficient conditions for the differentiability, Young's and Shwarz's theorems of the equality of f_{xy} and f_{yx}.

Implict function, Implict funtion theorem, inverse function theorem.

Taylor's theorem for a function of two variables, Maxima and Minima of a function of two variables, Lagrange's method of undetermined multipliers. (Four Questions)

Group - B

Definition of Riemann integral of a bounded funtion, Bound definition and limit definition, their equivalence, Riemann integrability of a continuous function and monotonic funtions. Rieman integrability of functions with finite number of discontinuties. Fundamental theorem of integral calculus, Mean value theorem Definition of Riemann - Stielijes integral a bounded functions and its simple properties. (Three Questions)

Improper integrals and their convergence, Comparision tests, Dirichlet's test, Beta and Gamma functions and their properties and relationship, Differentiation under integral sign. (One Question)

Group - C

Definition of uniform convergence of sequences and series of funtions, Cauchy's principle for unifrom convergence of a sequence of untions, Pointwise convergence, Uniform continuity, Dini's theorem term by term differentiation theorem, term by term interation theorem, Welerstrasses M-test, Abel's test, Dirichlet's test. (Four question)

Help Book : University Guess Paper to Matematics (Honours) Paper - V

MATHEMATICS (Hons.) Paper - VI

Time : 3 Hours **Full Marks- 100**

Stress should be given on development of ideas and theories rather than on solving leangthy problems. As such, sixty percent of the questions should be from theory portion and forty percent from the problem portion.

Twelve questions to be set. Six to be answered selecting at least one from each group.

Group-A

Group Theory : Centre, Normalizer, Conjugacy, class equation, cauchy's and Sylow's theormes, Automorphisms, inner automorphism, Direct product of two groups. (Four questions)

Group-B

Rings : Division ring, plynomial ring, Imbeding of a ring without unity in a ring with unity, imbeding of a ring and integral doman in a field, characteristic of a field quotients, polynomial over commutative rings, prime and maximal ideals in commutative rings. (Four questions)

Group-C

Linear Albegra : Vector spaces, sub-spaces, bases and dimensions, linear transformations and their algebra, Matrices and linear tranformations, rank and nulity of a linear transformation

Dual spaces, transpose of a linear tranformation, direct sum of subspaces, charactristic values, characteristic vectors, Cayley-Hamilton theorem. (Four questions)

Help Book : Univeristy Guess Paper to Mathematics (Honours) Paper- VI.

MATHEMATICS (Hons.) Paper - VII

Time : 3 Hours **Full Marks- 100**

Stress should be given on development of ideas and theories rather than on solving leangthy problems. As such, sixty percent of the questions should be from theory portion and forty percent from the problem portion.

Twelve questions to be set. Six to be answered selecting at least one from each group.

Group-A

Statics : Moment of inertia, definitions and standard results, moments ellipsoid, parallel and perpendicular axes theorems, principle axes of inettia, its existence at a point, determinatio of principle axes of inertia, equimomental systems. (Four questions)

Dynamics : Angular momentum and kinetic energy of a rigid body rotating about a fixed point, kinetic energy of a rigid body in general motion. Principles of linear momentum, angular momentum and energy of a rigid body. D'Alembert's principle, general equation of motion of a rigid body, Motion about afixed axis, compond pendulum. (Four questions)

Group-B

Attraction and Potential : Attraction and potential of rods, circular discs, speherical sheells, sphere (Laplace's and poission's equation) Theorems on equipotential surface (Two questions)

Hydrostatics : Pressure at a point, equlibrium of fluids under given system of forces, central of presures, equilibrium of floating bodies.

Group-C

Differential euations : Second order equations with variable coefficeints, methods of variation of parameters.

Total differential equation in three independent variables, Simultaneous differential equations, Lagrange's linear partial differential equations, standard froms, Charpit's method, Monge's method.

Help Book : Univeristy Guess Paper to Mathematics (Honours) Paper- VII.

MATHEMATICS (Hons.) Paper - VIII

(Spherical Astronomy)

Time : 3 Hours **Full Marks- 100**

Stress should be given on development of ideas and theories rather than on solving leangthy problems. As such, sixty percent of the questions should be from theory portion and forty percent from the problem portion.
Twelve questions to be set. Any six to be answered.

Courses : Spherical triangle, fundamental formulae sine, Cosine, Shine-Cosine, Cotangent, Napier's and D'Albert's angles, right angle triangle and Napier's rule.

Celetial sphere, Differnt systme of coordinates, Rising and setting of stars, Twillight, Transit instruments, errors and their corrections, Kepler's laws of motion, anomalies and their relations. Kepler's laws of motion, anomalies and their relation. Kepler's equation, Refraction, Simpon's Bradlay's and Casssinls forfulae, effect to refraction on the postion of a body. Annual Aberration, effects of aberratin on (i) latitude and longitude (ii) on right ascenttion and declination, Parallax, effects of pareallax on (i) lattitude and longitiud

Help Book : Univeristy Guess Paper to Mathematics (Honours) Paper- VII.

MATHEMATICS (Hons.) Paper - VIII

(Numerical Aalysis)

Time : 3 Hours **Full Marks- 100**

Stress should be given on development of ideas and theories rather than on solving leangthy problems. As such, sixty percent of the questions should be from theory portion and forty percent from the problem portion.
Twelve questions to be set. Any six to be answered.

Courses : Finite, Central and Divided difference, interpolation, Inverse interpolation, Numerical differentiation, Numerical integration, Trapezidal, Simpson's 1/2rd and 3/8th rules, Weddle's rule, Gausse's quadrature formula of integration, Greogry's formaula and the Duler-Machaurin's formula.

Solution of diffreential equation of the first order, general equations, Linear differential equations with constant coefficients, Solution of ordinary differential equaation- one step methods : Euler's modified, Picard's Runge-Kutta's methods, method of starting the soulution and continuing the solution, Adam's, Adam's Bashforth-Milive.

Simultaneous linear equations : Gausss elimination, Gausa Seidel, Jordan's and Relaxation methods (simple problems).

Finding roots of polynomial equations, Regular False bisection, Newton-Raphson method for several variables, interative method and its generalisation, Chebychev's Bigre-Vieta, Lin Boristow's, Graffel's root squaring method and their convergence.

Significance figure and errors of computation, Nomograms.

MATHEMATICS (Hons.) Paper - VIII

(Probability Theory)

Time : 3 Hours **Full Marks- 100**

Stress should be given on development of ideas and theories rather than on solving leangthy problems. As such, sixty percent of the questions should be from theory portion and forty percent from the problem portion.
Twelve questions to be set. Any six to be answered.

Courses : Probability spaces, Finite probability space, conditional probability, Bay's theorem, Random variables, Mathematical expectations and moments, Joint distributions, Independent random varibles, convergence of sa sequance of random virables, convergence in distributions, convergence in probability, almost sure convergence, convergence in quadriatic mean, Halley Bery theorem, complexed valued random variables, characteristic funtions, Inversion theorem, continuity theorem, Distribution of X and S Kolmogorov's inequality, weak and strong law of large number.

MATHEMATICS (Hons.) Paper - VIII

(Theory of Number)

Time : 3 Hours **Full Marks- 100**

Stress should be given on development of ideas and theories rather than on solving leangthy problems. As such, sixty percent of the questions should be from theory portion and forty percent from the problem portion.
Twelve questions to be set. Any six to be answered.

Courses : The BasicRepresentation Theorem. Linear Diophantine euations, Fundamental theorem of Arithmetic, Fermat's little theorem, Silson's theorem.

Basic properties of congruences, Residue system, Duler's theorem, Chinese Remainder theorem, Multiplicative arithmetic funtions, the function u(n) d and their simple properties, Boblus inverson formula, Primitive roots, Modulation.

Elementary properties of (x), Legendre's formula for the highest power of a prime number that divides n, Statement of prime number theorem, Euler's criterion for quadratic residue, the Legendre symbol, the quadratic reciprocity law and application.

Sums of two and four squares, Fermat's conjecture, Graphical representation of partitions, Euler's partion theorem.

PHYSICS (General)

(Theory of Number)

Time : 3 Hours **Full Marks- 100**

12 questions to be set 6 to be answered. 1 from Group A. 2 from Group B and 3 from Group C

Group- A

Quantum Mechanics (2 questions)

Need for quantum mechanics, Dual nature of matter and radiation Debrogell's relation. Uncertainty principle, Postulates of quantum mecahanics. Schrodinger wave equation and its application to the problelms-(i) particle in a box (ii) particles in one dimensional square well. (iii) transmission across a potential barrier, (iv) Linear harmonic oscillator.

Group- B

Solid State Physics (4 questions)

Crystal structure : Bravais lattice. Miller indices, simple crystal structure of NaCl and CaCl, Crystal among logic metallic, covalent and Vander walls binding Vanderwalls a London interaction and Modelund constant.

Free electron thory of metals. Heat capacity of electron, Electricl conductivity of metals. Band theory of solids, Block's theorem and distrinction between metal semiconoductor and insulator, intrinsic and extrinsic semiconductors. Transistor and p-n junctions rectifier.

Electrical polarisation and displacement in materials. Local electric field of an atom, dielectric constant and polarisation. Langevin-Debye equations.

Thermonics : Richandson's equation and its experimental verification, Child Langmuir equation, Schottky's Effect.

Semiconductor Devices : P-n junction and Zener diodes. BJT and FET transitor. Opto-electrical devices, photodevices. LDR, photovoltic cell, photo transistor.

Circuit theory : coupled LCR cireuits, superposition theorem. Thevenin, Nortan and Reciprocity theorems, Maximum power transfer theorem. one part and low part newworks (only parameter. T and Pi equivalence two part network.Ladder network and constant filter (low, high and band pass), Attenuator.

Solid state Electroric circuits : Equivalent circuit of BJR and FET. Half wave and F ll wave rectifiers powers supplier with special reference of smoothing circuit and voltage stabilization by a cold cathode valve and Zener dioce. A.F. amplifiers (R.C) Feedback amplifiers, push-Futl power amplifier. Simple circuits for oscillatior R.C. Oscillatro Astable Multivibrator. Solid State amplitude modulator. Auverage & envelope deduction, radio receivers. Superhetrod one recievers. Simple idea of transmiters (with block diagrams) CRO and its application.

PRACTICAL

Time : 6 hours **Full marks : 25**

The course shall include the.following experiments.

1. Use of oscilloscope to measure (i) voltage (ii) current, (iii) frequency.
2. Determination of child-Lahgmuir law.
3. Characteristic of triod valve.
4. Characteristic of BJT transistor.
5. Characteristic of FET transistor.
6. P-N junction characteristic.
7. Frequency response of R-C coupled amplifier.
8. LCR resonance circuirs (i) series (ii) Parallel

(9) Determination of self and mutual inductances.

CHEMISTRY(Generat)

Time : 3 hours **Full marks : 25**

Nine question to be set and five of them to be answered selecting maximum of two questions from any group A, B and C.

Group : A [Physical] (Three questions)

1. **Maxwell Law of Distribution of velocities :** Distribution of molecular velocities, Maxewell law of velocities. its derivation, concept of most probable velocity, dependence of velocity, distribution on T and m and distribution curves, collision number, collision diameter, mean free path, frequency of collision, visosity of gases, distribution

of energy, degree of freedom of motions, equipartition principle.

2. **Thermodynamics :** Clasusius inequality, free energy and work functions, dependence of free energy of P and T, Maxwell relation, thermodynamic equation of state, Clausis claypeyron equation and its application in cololigative properties, thermodynamics of cell reactions, reactions isotherm and isochore, thermodynamic derivation of law of mass action.
3. **Waves, Quanta and Schrodinger Wave Equation :** Photo electric, black body rediation and quantum theory, wave particle duality of light and electron, de-Broglie relation and its experimental verification by Davission and Gemer experiment, postulates of quantum mechanics and consequences, normalization and orthogonality of wave funtions,. Schrondinger wave equation and its significance, its application in particle in a box system concept of quantum number, quantization of energy, zero point energy and idea of modes and Ψ^2 plots in particle in a box-system.
4. **Chemical Kinetics :** Collision theory of reaction rates and its limitations, Lindemam theory of unimolecular reaction, steady state hypothesis and decomposition of ozone and N_2O_5 thermal combination of complex reactions betweenb H_2 and Cl_2 and H_2 and Br_2. Kinetics of adsorption and disorption heterogeneous catalysis and Langmuir theory of adsorption to determine the rate of catalyzed reactions.

Group - B [Inorganic] (Three questions)

5. **Coordination Compounds :** Valence bond theory and its failure in cases of metal-ligand bonding, d-orbital splitting and crystal field model, 10 Dq and factors affecting it. C.F.S.E. and spectro-chemical series, stereochemistry and value of magnetic moment, classification of ligands-as σ donor, and donors, donor and -acceptor, donor and acceptor and Sandwitch bonding ligands, thermodynamic stability.
6. **Hrd and Soft Acids and Bases :** Classification of metals as class A and B, Hard and soft acids and bases, theory of HSAB, symboisis, orle of electronegativity and d^n configurations.
7. **Non Aqueous solvents :** Reactions in aueous medium, criteria of solvent power of compounds, non-aqueous solvents such as liquid NH_3, liquid SO_2 their autoionisation, metathetic, precipitation, complex formation and acid base properties of compounds.
8. **Second and third transition series metals :** Comparative study of d-block elements with those of 4d and 5d metals, principles of extraction, acid-base properties of compunds, possibility of oxidation state, oxidizing and reducing behaviour of ions, formation of their halides, carbonyls and organometallic compounds, catalytic action of such metals, analytical text of ions.

Group : B [Organic] (Three questions)

9. **Stereochmistry and Reaction Mechanism :** Conformal analysis of ethane and n-Butane, conformations of cyclohexane, Newman projection and Sawhorse formulae, Fischer and flying-wedge formulae, Difference between configuration and conformation, Machanism of nucleophilic substitution reactions. -elimination reaction (E^1 and E^2), addition reactions to C=C bond C=O bond, Free radical substitution and addition reactions.
10. **Amino Acids :** Classification, synthesis of α -aminoacids, reaction, Zwitterlion phenogmena, aziactone formation, Discussion on amino acids as binding block of proteins.
11. **Polyncuclear Hydrocarobons and Heterocyclic Compounds :** Isolation structure determination of naphthalene, anthracence, phenanathrene-their properties, pyrrole, pyridine - their strcutrue synthesis and properties.
12. **Dyes :** Classification, colour and constitution, Azodyes, Trinenylmethane dyes.

PRACTICAL

Time : 6 hours **Full Marks : 75**

1. (a) Determination of molecular weight by Victor-Meyer method.
   (b) Measurment of surface tension of liquid by stalagamometer.
   (c) Determination of partition coefficient of benzoic acid between water and benzene.
2. (a) Gravimetric determination of Cl^-, SO_4^{2-}, Ba^{2+} and Cu^{2+}
   (b) Molecular weight determination of organic acid by H_1PtCl_6 10
3. Record and Viva-Voce 05

BOTANY (Generat)

Time : 6 hours **Full marks : 75**

The examinatin to set four question from Group A and three question sach from Group B and C out of which candidate are required to answer two from each group.

Group : A [Cytogenetics and Molecular Biology]

1. Structure of the cell and cell organeliers.
2. Structure of Chromosome (Physical and Chemical)
3. Mendelian laws of inheritance and its modification.
4. Physical basis of heredity.
5. Structure, replication and function of DNA and RNA.

6. Linkage and Crossing over and Mutation.

Group : B [Environment Biology]

1. Plant communities and ecosystem.
2. Succession (Hydrosere and Xerosere)
3. Factors affecting vegetation.

Group : C [Economic Botany]

1. (a) Oil seeds-Mustard, Sunflower, Linseed, Sesamum, Ground nut.
   (b) Pulses-Gram, Pigeon pea, Green gram (mug), Lentil (massor), Pea.
   (c) Cereals-Rice, Wheat, Barley, Maize, Ragi.
   (d) Fruits-Litchi, Mango, Banana, Guava, Makhana,
   (e) Timber-Teak, Sal, Sisham, Jamun, Mahoganl.
2. Important medicineal plants in Bihar.
3. Techniques of plant-Breeding.

PRACTICAL

Time : 6 hours **Full Marks - 25**

1. Ecological adaptation in Hydrophytes, Xerophytes, Mesophytes Parasites and Epiphytes.
2. Study of PH of different types of soil with the help of pH meter.
3. Study of different stages of mitosis and meiosis.
4. Comment upon the spots (5)
5. Practical record and Viva.

ZOOLOGY (General)

Time : 3 hours **Full marks : 75**

Five questions are to be sert from each of the two group. Students shall have to answer five questions attempting not more than three from each group.

Group : A [Ecology]

1. Concept of Bisophere.
2. Definition, Structure and functions of a typcial ecosystem.
3. Major Ecosystems of the world and their features.
4. ond ecosystem and Forest ecosystem.
5. Physical and Biotic factors.
6. Biogeochemical cycle of Oxygen, Nitrogena nd Carbon.
7. Energy flow in Ecosystem.

Animal Behaviour :

1. Scope of Ethology : Innate and Learned Behaviour.
2. Parental care in Fishes and Amphibians.
3. Social Behaviour in insect.
4. Migratory behaviour in birds.

Group : B [Paleozoology & Zoogeography] "

1. Different geological eras of the world, their climate conditions an funa.
2. Zoogergraphical realms of the world and their boundaries.
3. Biogeographical distribution of animals in Oriental. Ethiopian and Australian regions.
4. Fossils and their mode of formation.

Economic Zoology :

1. Semiculture, Lac culture and piscivulture.
2. Prelinimay ideas of common pess of paddy and wheat their control.
3. Factors of Kalazar, Malaria, Filaria their prevention and control.

PRACTICAL

Time : 3 hours **Full Mark - 25**

(Ecology, Animal Behaviour, Paleoozoology, Zoogeography and Economic Zoology)

1. Quantitative estimation of dissolved O in water with the help of winker's volumetric method.
2. Determinatin of P of different water amples.
3. Moistrue content of soil, identification & comment on the organisms present in water soil samples.
4. Identification and comment on the specimens (spotting) on
   (i) Paleozoology-fossils (ii) Economic Zoology-skill yam, larva, pupa,, adult of silk work, lac stricks, lac insect, Fishing gears, Museum specimens showing parental care, Mouth parts of male and female culex, anopheles, Sand fly and their different development stage.
5. Practical record

MATHEMATICS (General)

Time : 3 hours **Full marks : 100**

Fourteen questions to be set seven to be answerd, selecting at least one from each groups..

Group : A

Vectors analysis : Triple product of vectors, Differentiation of vector functions differentiation of a product of two vectors, Gradient, Divergence, curl in Cartesian coordinates. (Two Questions)

Group : B

Statics : Reduction of a system of coplanar cforces, Equation of the line of action of the resultant of a system of coploanar focre, condition of equilibrium of a system of coplanar forces, Principle of virtual work and its converse.

Dynamics : Rectilinear motion, simple Harmonic motion, Elastic strings and Hook's law, motion in a plane, radial and transverse velocity and acceleration, tangential and normal velocity and acceleration. (Two questions)

Group : C

Differential Equation : Formation and solution of differential equations, equation of the first order, seperation of variables, homogeneous forms, exact differential equation, equations of the first order but of higher degiees, clakaut's complementary functions and particular integrals, orthogonal tranjectories.

Linear Programming : Convex sets and their properties, Linear programming problems-graphical solutions, theory of simplex methods and its simple application, Assignment and transportation problems. (Three questions)

B.Com. Honours, Part- III

Accounts Group (Group-A)

COST ACCOUNTING (Hons.) Paper-V

Time : 3 hours **Full marks : 100**

1. **Cost Accounting :** Meaning, Objects, Scope of Cost Accounting and its relation with Financial Accounting-Methods/Systems of Cost Accounting-Elements of cost and its classification-Meterial Cost-Purchase Storage and Pricing of Materials-Labour Cost-Comutation of Labour Cost Meaning, Classification and allocation of overheads.
2. **Methods of Costing**
   Units Costing : Preparation of Cost sheet, Statement of cost and Profit-Production Account, Estimates, Tenders/ Quotations.
   Process Costing : Treatment of wastates, By Products, allocation of joint expences and inter-process profit. Job order or contract costing Preparation of contract account, Treatment of Profits and loss on incomplete contract.
   Operating Costing : Transport costing, power house costing, Hotel Costing.
   Relation between Cost and Financial Account Preparation of Reconcillation statements.
   Help Book : University Guess Paper to Cost Accounting (Honours) Paper - V.

MANAGEMENT ACCOUNTING (Hons.) Paper-VI

Time : 3 hours **Full marks : 100**

1. **Management Accounting :** Meaning and nature, Management Accounting as distinguished from financial Accounting and Cost Accounting. Scope and limitations of Management Accounting.
2. **Financial Statements :** Concept, nature and limitations of financial statement.
3. Methods and technique used in analysing finaicial statement; comparative finaicial and operating statement common size statment - Trent percentage or trends Analysis.
4. Financial Rations.
5. Statement of change in financial position, Fund Flow and Cash Flow Statement Meaning and Distinction their preparation.
6. Elementary idea of Variance Analysis and Break-Even Analysis.
   Help Book : University Guess Paper to Cost Accounting (Honours) Paper - VI.

TAXATION LAW & ACCOUNTING (Hons.) Paper-VII

Time : 3 hours **Full marks : 100**

1. Income tax Act, 1961-Definitions, concept of income, residence and tax liability, income exempted from tax.
2. Comutation of income under the heads : (a) Salaries (b) House Property (c) Bussiness and profession (d) Capital gains and (e) other sources.
   Help Book : University Guess Paper to Cost Accounting (Honours) Paper - VII.

BUSSINESS STATISTICS AND ELEMENTARY MATHEMATICS (Hons.) Paper-VIII

Time : 3 hours **Full marks : 100**

MATHEMATICS

1. Elementary idea of A.P., G.P., and H.P.
   (a) **Arithmetical Progression :** The nth term, properties of A.P., The Sum of the first n terms of an A.p. Arithmetic Mean, The Sum of the First n natural number.
   (b) **Geometrical Progression :** The nth germ of G.P. Geometric Mean, The x Sum of n terms a series of G.P. The Sum of an Arithmetic Geomatric Series.
   (c) **Harmonic Progression :** Harmonic mean, Relation between A.M., G.M., and H.M.
2. **Rermutation and Combination :** Factorial Notation, Important Lema, to find the number of Permutation of n different things takesn rat a time, three therom, to find the number of Combinations of n dissimlar things taken rat a time. Circular permutation.
3. **Binomial Theorem :** Difinition, to find the expansion of (a+b) n, when n is positive integer, properties of Binomial expansion.
4. Airthmetic-Declimilisation, Contacted method of Multiplication and Division, Ratio and proportion, Percentage,

Discount, Commission and brokerage,m Profit and loss, Simple and Compound Interest.

STATISTICS

1. **Statistics :** Its meaning, nature, scope, limitation and importance in bussiness and economics.
2. **Collection of Data :** Definition of the unit of investigation. Census and sample ssurvey, Direct and indirect personal investigation, investigation on the basis of existing documents, errors in collection of statistics, Preparation of questionnaires and schedules.
3. **Sample Survey :** Population, Sampling units and sampling variances, concept of purposive and probability sampling, simple random sampling stratified random sampling, systematic sampling, two stage sampling and cluster sampling.
4. **Graphic Representation of Data :** Histograms, bar charts and pie charts, frequency polygon, frequency vurve, ogives of less than ane more types.
5. **Measures of Central Tendency :** Arthmetic mean, geometric mean, harmonic mean, weighted average, median mode, quartiles, deciles and percentiles, their relative importance and limitation.
6. **Measures of Disperison :**Range, Mean deviation, quartile deviation, standard deviation.

Help Book : University Guess Paper to Business Statistics and Elementary Mathematics (Honours) Paper - VIII.

Corporate Administration (Group - B)

SECRETARIAL PRACTICE (Hons.) Paper-V

Time : 3 hours **Full marks : 100**

Role of Secretary in a Company, Duties of Secretary, Contractual, Statutory, Secretarial Practics relaing to promotion and incorporation of companies registered under the Companies Act, 1956.

Procedure for preparation of Momorandom, Articles and prospects.

Share certificate, share warrants-Format, issue of share certificate and duplicate share certificates-Maintenance of statutory books, records and registers, register and index of members, registers and index of debenture holders register of directiors, managers, register of charges and mortgages, register of contracts disclosing interest of Director's.

Transfer and transmission of Shares.

Annual Returns.

Preparation ol certain resolutions and agreements with the Flegistrar.

Routine corresspondence with Sharehoders arrangement with postal authorities for despatch of notices. Annual reports, dividend warrants, etc, notices from shareholds & compliance with stock exchange requirements.

CORPORATION FINANCE (Hons.) Paper - VI

Tine:3 hours **Full marks : 100**

Meaning, importance and scope of Corporation Finance. Corporate Securitles-Ownership Securities. Prefences share and Equity sharers, Creditorship Securities. Debentutres and Bonds, their kind and significance.

Corporate Poromotion-Meaning, types and stages of corporate promotion.

Corporate promotion in lndia.

Capitalisation-Over Capitalisation, under-capitalisation, Designing Capital structure-trading on equity requistes of financial plan; working capital-meaning and singnificance.

Marketing of Corporate Securities-Methods-Functions of Stock Exchanges, Underwriting of securities in india.

Profit Management- lnternal Financing-Dividerd Policy-kinds of Dividend payments.

Bussiness expansion, Bussiness failure, re-organisation of bussimegs and financial consideration.

Sources of Finance for companies-Financial institutions in India-their working.

Corporte Taxation and Accounting (Hons.) Paper-VII

Time : 3 hours **FulI marks- 100**

1. Corporate Income Tax in India- Income tax and tax liabilities of compaines, classification of companies and tax incidence under the Income Tax Act.
2. Concept of Tax Planning -Method of Tax Planning; tax planning and Financial management in companies. Tax Considerations in devdence policy and bonus, Share issues; taxation of inter-corporate dividends and transfer. Companies (profits) Surchage Tax Act 1964 : :,
3. Corporate Tax Management in India : Deduction of Tax at sources-advance payment of Tax, Filling of returns etc.

BUSSINESS STATISTICS & ELEMENTARY MAHEMATICS (Hons.) Paper- VIII

Time:3 hours **Full marks - 100**

(Syllabus of this paper is the same as of paper VlIl forAccounts Honours Gorup)

Bussiness Environment (Group - C)

PERSONNEL MANAGEMENT AND INDUSTRIAL RELATION (Hons.) PAPET-V

Time:3 hours **Full marks - 100**

Trade Unisn Movemerit with special reference to India : aims, objects, functions and weakness of Trade Unions.

Labour Management-recruitment, training, promotion, induction, retrecbment of industrial workers.

lndustrial disputes-causes and effects- methods of prevention and settlement of Industrial Disputes and machinary in lndia-Labour Welfare and Social Security measures, Methods of wage payment.

Functions and Organisation of Personal Deparlment : Changing role of personal function in modern times.

RURAL ENVIRONMENT & CO-OPERATION (Hons.) Paper - VI

Time :3 hours **Full marks - 100**

Rural Econorny in lndia : Problems of agricultures, Small Seale and village lndustries, their problems, Rural indebtedness, problems and solution. Village Panchayats and their role in rural development, various programmes of rural development.

Co-operative Movement-History, Principles and Characteristics.

Managements of Co-operative Societies-both credit and non-credit cooperative societies, Working of Co-operative Banks, Land Development Banks, Role of R.B.land NABARD in rural development.

TAXATION LAW &ACCOUNTS (Hons.) Paper-VII

Time : 3 hours **Full marks - 100**

The course for this paper shall be the same as of Paper Vll of Part III of Accounts (Honours) Group

BUSSINESS STATISTICS AND ELEMENTARY MATHEMATICS (Hons.) Paper - VIII

Time : 3 hours **Full marks - 100**

The Course of this paper shall be the same as of paper VIII of Part III of accounts (Honours) Group.

Bussiness Finance (Group - D)

MONEY MARKET (Hons.) Paper-V

Time : 3 hours **Full marks - 100**

Meaning Significance and organisation of Money Market. Features of Indian Money Market. Money Market Organrsation in U.S.A.,England and Japan.

Organisatron of Indian Money Market, Defects of Money Market in india.

Constituents of Indian Money Market.

Functioning of Commercial Banks. Co-operative Banks as constituents of Money Market.

Bill Market in India- Working of Indian Bill Market.

CAPITAL MARKET (Hons.) Paper - VI

Time:3 hours **Full marks - 100**

Meaning, Significance and scope of capital market. A brief history of development ot capital market in U.S.A., Engiand and Japan.

Organisation and instituions of Capital Market in India, Devetopment Banking its role in economic development in India.

Functions and working of specialised financial institution viz. I.F.C., l.C.I.C.L., U.T.l., L.l.C., I.D.B.I. etc.

Agencies of international capital market viz. I.D.A.,I.B.R.D., I.M.F., A.D.B.I., F.C.I. etc.

STOCK EXCHANGES (Hons.) Paper-VII

Time : 3 hours **Full marks - 100**

Meaning, importance and functions of stock exchange, their role in incustrial finance in the Country. A brief history of development of stock Exchangs in U.S.A, England and Jipan.

Stock exchanges in India- Their organisation and working . A brief study of the working of stock exchanges in India. Regulations of stock Exchanges is India.

Stock Exchanges Transclion : Provisions of securities, contracts (Regulation) Act.1956.

Forward Contract Act. 1958.

Control of Capital lssue Act. 1956.

BUSSINESS STATISTICS AND ELEMENTARY MATHEMATICS (Hons.) Paper-Vll

The course for this paper shall he same as of paper VIII part III pf Accounts (Honours) Group.

(General Course)

BUSINESS STATISTICS AND BUSINESS MATHEMATICS (Paper-VII)

Time :3 hours **Full rnarks - 100**

The Course for this paper shall be the same as of paper VIII of Account Honours except item No. 3 of Mathematics portion.

Paper VIII & IX Any one of the following groups

Consisting two papers of 100 marks each.

Group - A

ADVANCES ACCOUNTS (paper - VIII)

Time : 3 hours **Full Marks -100**

1. Accounting of Non-trading Concerns
2. Accounts of Banking Companies.
3. Cost Account : Elements of cost, Preparation of cost sheet and statement of Cost. Process and Contract Costing.
4. **Tax Accounting :** Determination of residential sratus and tax liability under income Tax Act 1961. Computation of income under the head salary and House properties-Income Tax Authorities and their functions.

AUDITING (Paper-IX)

Time : 3 hours **Full Marks -100**

lntroduction : Origin, definition, objects, importance, classes of Audit conduct of Audit. Audit working papers, routine checking, test checking internal check and internal audit, internal control. Fundamentals of an effective system of internal cheek. Internal check as regards purchase, sales, cash, receipt, payments and wages.

Vouching : Definition, Importance, Vouching receipts and payments, vouching capital expenditure.

Valuation and Verification : Valuation and verification of fixed, floating and intangible assets, Land and Building, plant and Machinery, stock, Investments. Book debts, Goodwill verification.

Auditor : His qualities and qualification; appointment, statutory rights, duties and status of Auditors with reference to selected case; case laws, Liabitity of Auditor.

Gompany Audit : The Audit of Share Capital and transfer of Shares, Depriciation and reserves, General considerations, Legal Position, Revenue and Capital resourees, Reserve Furd, and othrer Funds. Capitalisation of reserve; secrat reserve, Dividends and Divisible profit, Legal and Commercial Concepts, Capital profit and the question of their availability for dividends, Interim dividends.

Labour (Group-B)

PERSONNEL MANAGEMENT (Paper-VIII)

Time : 3 hours **Full marks - 100**

1. **Nature of Personnel Administration:** Definition of Personnel Administration-Role of Personnel Administration, Function of the Personnel Department-Personnel Policies.
2. **Procurement :** Job Analysie and Man Power Planning, Recruitment and Hiring-Tests and Interviews-Executive talent procurment.
3. **Development :** Training Procedures, Executive Development Prograrmmes promotion Policies-Performance apprisal.
4. **Corpenstion :** Job Evaluation-Incentive schemes-Group Incentives-Merit rating-Modes of wage payment.
5. **Integration :** Nature of human needs-Theories of Motivation Grievance procedur-Communication process-Baniers of communication and their elimination.
6. **Maintenance :** Accidents and their prevention-Health pogrammes- Employee Benefit Schemes-Personnel Research.

INDUSTRIAL RELATION (Paper-IX)

Time : 3 hours **Full marks : 100**

1. Meaning & scope of Industrial Relations.
2. Psychology of Human Behaviour, Work Environment. Fatigue, Accidents.
3. Labour in an industriat society-Labour Problems, sources of tension, Position and status of Labour Force.
4. Industiral conflict-causes of Industrial Disputes, Existing machinery for the prevention and settelment of Industrial disputes in India, Industrial harmoy, faetors promoting industrial peace, Employee participation in management.
5. Role of Trad Unions in maintaing industrial peace Result Status and role of Trade Unions in protecting the interest of labour.
6. Collective Barganing-Objectives methods and recent development.

Public Interprises (Group-C)

PRINCIPLES OF PUBLIC ENTERPRISES (Paper-VIII)

Time : 3 hours **Full marks : 100**

Concept of Public sector- its place in the capitalistic and socialistic system Growth of public sector over a period of time.

Role of Public Enterprise - Prime mover-Resource generaior-Resource allocate-Tool for regional development and a pace-setter for multi-faceted objects-Social objectives of public enterpises. Nationalisation vs. Regulated Private Enterprise-State initiative in the rehabilitation of sick and fragile industrial units and the formation of strategic and national industries-concept of joint sector.

Financing of Pubtic Enterprises : Equity and loan from the government- Internal resources-capital market for raising funds-Loans from public financial institutions. Government grants and subs dies-public deposits-Foreign investments inclusive of foreign private investments.

PUBLIC ENTERPRISES IN INDIA (Paper - IX)

Time : 3 hours **Full marks : 100**

The origin and growth of Public Enterprises in India, Social responsibilities of Public Enterprises. Organiselional patiern of Pubtic Enterprises, Managerial structure of Public Enterprises, Autonsmy and delegation of, Authority, in Public Enterprises : control of Public Enterprises-perliamentary and state legislature, Jurisdiction & control, Parliamenary committee of public undertakirfos. Audit of Public Enterprises in India, personnel Management & Labour relitions in Pubic Enterprises in India Performance apprisal of publie Enterprises in India. Price Policy & Financing of public Enterprises, in lndia. A detailed study of the following:

(a) Bharat Heavy Electricals Ltd.
(b) Steel Authority of India Ltd.
(c) Coal India Limited
(d) Hindustan Fertitiser Corporatian ot India Ltd.
(e) Indian Oil Corporation Ltd.
(f) Bihar State Electricity Board.

Company Law & Administration (Group - D)

COMPANY LAW IN INDIA (Paper-VIII)

Time : 3 hours **Full marks : 100**

1 . History of Company law in lndia.
2. Kinds of Companies.
3 Company LawAdministration in India.
4. Promotion of a company-promoters-Incorporation-commencement of Buniness.Memorandum of Association & Articles of Association.
5. Prospectus. ' ,
7. Borrowing Powers.
8. Management of Companies.
9. Accounts, Audit and Investigations.
10. Winding up.

COMPANY ADMINISTRATION (Paper-IX)

Time : 3 hours **Full marks- 100**

Company profit and finance, pattern of liability and assets; sources and uses of funds, Loans and lnvestments, Capital issues-Oividends.

Companies incorporated outside but working in lndia.

The Department of Company Law Administration - The Advisory Commission.

Industrial (Developments and Regulation) Act 1951 ; Control of Capital lssues-Taxation of Carporate income.

Organisation and Structure of Companies-Rights, Duties and Liabilities of different functionaries.

Finance Department : Organisational Structure and Functions Financial Need-Methods and Sources of raising finance-administration of profit distribution of dividend.

Production Department : Organisational Structure and functions-Plant location-Plant Layout Design-furchasing, Storing and Meterial Handling Inventory Control-Production Control.

Marketing and sales Department : Organisational Structure and Functions-Market and Marketing Research, Market Survey, Choice of Channels of Distribution sale Promotions.

Personnel Department : Organisational Structure and Functions. Recruitment-Training-Promotisn- Dismissal

Business Environment (Group-E)

ECONOMIC PLANNING (Paper - VIII)

Time : 3 hours **Full marks - 100**

(a) Definition of Econoric Planning, Reaction against unplanned economy, Different types of planning.
(b) Working of Planned Economy : Rational determination of price and national allocation of reources. Problems of incentives, efficiency and consumers' freedom under planning.
(c) General Frame Work of the Plan-the drawing up of the plan and planning techniques. Planning machinary and administration.
(d) Management of Public & Private Sectors-Regulation and control of Private Sector-Administration of Public Seelor-Nature, woking and scope of Public Enterprises.
(e) Critical study of India's economic growth under the Five Year Plans.

INDUSTRIAL GROWTH & DEVELOPMENT (Paper-IX)

Time : 3 hours **Full marks : 100**

(a) Theories of lndustriaf Growth-balanced growth approach, balanced-unbalanced growth, take off into selt sustained growth critical minimum effort approach, theories of big-push employment approach and surplus labour.
(b) Sources of industrial finance-shares, equity, bonus and right shares, debentures and deterred credit term loans, internal generation, public deposits, stock exchanges, fresh issues, participation of foreign capitai-controllor of capital issues, memorandum and articles of association under writers.
(c) Problems of investment criteria and capital intensity.
(d) Problems of capital formation.
(e) All India Financial Institutions-Industiai Development Bank of India-Industrial Finance Corporation of India-State Financeing Corporation-Credit guarantee Schem-Deposit Insurance Corporation; Role of banks in financing for new investments.
(i) Raising of Public Deposits-Apprasial of Industrial Profits-Appraisal of Industrial, managerial and technical personnels and organisation to the public-implementation and operation of projects-ensturing of proper management.
(j) technical Side of Industry-capacity of plant and machinary-infrastructure, building and layout planning-foreign colaboration-consultancy services.
(k) Financial Viability Cost of production, Calculation of profitability-cost flow statements-protected profit-break even analysis.
(l) International aspect of industrialisation in underdeveloped countries.

Business Mathematics & Statistics (Group-F)

BUSINESS MATHEMATICS (Paper-VIII)

Time : 3 hours **Full marks : 100**

1. Theory of Sets.
2. Elementary Functions.
3. Calculas.
4. Differentiation.
5. Integration.
6. Algebra-Number system, Quadratic Equation, Exponential and logarithmic series.
7. Vectors, Metrices and Determinants.
8. Liner programming, PERT and CPM.
9. Exchange Aritmatic and Annuity.
10. Co-ordinates : Staight lines and Pairs of Straight lines.

BUSINESS STATISTICS (Paper-IX)

Time : 3 hours **Full marks : 100**

1. Statistical Quality Control.
2. Input-Output Analysis.
3. Standared Errors of Mean.
4. Standard of Proportion.
5. Test of Singnificance.
6. Measures of Variation, Moments and Kurtosis.
7. Correlation Analysis.
8. Regression Analysis.
9. Association of Atributes.
10. Index Numbers.

11. time Series.
12. Interpolation and Extrapolation.
13. Vital Statistics
14. Interpretation of Data.

Trade (Group - G)

INTERNATIONAL TRADE (Paper - VIII)

Time : 3 hours **Full Marks : 100**

1. Theories of International Trade.
2. Capital Movements between National-Need and circumstances for capital movements-Short term and long term capital movements.
3. Domestic and Foreign Investments-Role of IBRD in the international capital movment-Role of Central Bank in regulation Capital movements.
4. International Liquidity-Problems of external liquidity, problems of external disequilibrium Compensating official financing-settlement in conditions of equilibirium and disequilibrium-the process of adjustment-Virious plans for improving the international liquidity -SDR-International Dollar Standard and Gold Standard.
5. International Financial institutions and their role in international monetary cooperation-IRBD, IMF, ADB, IFC, IDA.
6. European Monetary Co-operation-EPU, EMA & EEC.
7. Sterling Area-Euro dollar and petro dollar.

FOREIGN EXCHANGE (Paper-IX)

Time : 3 hours **Full marks : 100**

1. Impotance of Foreign Exchange in national and international economics.
2. International Remittances - Balance of Payments-Disequilibrium of balance of payments.
3. Foreg\ign Exchange Rates - Theories of Foreign Exchang-Exchange rate determination.
4. Exchange Rates under Gold Standard - Exchange rates under inconvertible paper currency system & the I.M.F. system of exchange rate.
5. Fixed - Vs - Flexible Exchange Rates - Factors influencing exchang rates fluctuations.

Banking (Group - H)

BANKING PRICIPLES (Paper - VIII)

Time : 3 hours **Full marks : 100**

A. **Elements of Banking :** Origin & Growth of Banks. Types & functions of Banks. Unit and Branch banking systems; relationship between Banker and Customer. Opening & operation of bank Accounts. Special account holde of a bank. The bankers'clearing house.

B. **Bankers Funds and Advances :** Sources of Bankers Funds. Empolyment of funds by Bankers. Analysis of bank balance sheet. Bankers advances and types of securities, their relative merits & demerits

C. **Negotiable Instruments :** (i) cheques, difinition & forms, crossing and endorsements, presentation and collection of cheques, payment of cheques, dishonour of cheques, termination of bankes authority to pay cheques (ii) Bill of Exchange : Its kinds, acceptance and endorsement, discounting of bills, dishonour of bills, noting and protesting, discharge of a bill.

D. **Legislation & Control of Banking in lndia :** A briel history of banking legislation in India. Indian Banking Regulation Act, 1949, some of the important provisions. Recent developments in Indian banking system. Reserve Bank of India Act & Control of R.B.I. over banks and the banking system

BANKING IN INDIA (Papr-IX)

Time :3 hours **Full marks -100**

(a) **Money-Market :** Definition, characteristics and importance Indian money market, its constituents and defects, recent trends, London money market, its constituehts and recent trends.

(b) **Indian banking :** Evolution of banking, Different types of banking institutions, Indigenous Banking; Joint Stock Banks, Exchange Banks, State Bank of India, Reserve Bank of India.

(c) **Special Institution of Fural Credits :** (1) Co-operative Banks, (2) Land Development Banks, (3) Rural Banks.

(d) **Financing of Industries by Banks :** Sources of Industrial Finance, Specialised Financial Institutions, Industrial Finance Corporation of India. State Finance Corporation of India. State Finance Coroporation, National Industrial Development Corporation, Industrial Credit and Investment Corporation, Industrial Development Bank of India.

(e) **Foreign Banking :** A Study of the banking system of U.K and U.S.A.

Insurance (Group - I)

INSURANCE PRINCIPLES (Paper - VIII)

Time : 3 hours **Full marks : 100**

General Principles and Kind :

a. Life Assurance - Principles and practice of life assurance, assurance contracts; their nature and characterisitics; Parties to the contract and their rights and duties. Conditions and terms of Policy and effect of non-compliance thereof, Assignment, colaims and surrenders, Re-assurance. The prospectus-its general construction and uses.

b. Practice in connection with collection of premiums, revivals, loans, surrenders, claims, bonuses and annuity payments.

c. **Motrality Trade :** The general nature, characteristics and use of the principal tables including an elementary knowledge of the method of their construction.

d. Premium Rates : Life Assurence Fund, Nationalisation lf Life Insurance in India.

e. **Fire Insurance :** The Function of fire insurance. The basif principles of fire insurance conttracts. Fire policy, conditions and their meaning, Parties to contract, Assigngment of Policy, Subrogation, contribution and their meaing, Parties to contract. Assignment of Policy. Subrogation, contribution, average, clamims, proximate cause, onus of proof, abandoment and re-instatement, Average clause and loss appoortionment, Re-insurance,m Fire Prevention.

f. **Marine Insurance :** General principles, Insurable interest and value disclosure. The contract of marine insurance and its conditions, premium, double insurnace, assignment of policy, warranties, the voyage, loss and abandonment, partial losses and particular charge, Salvage total losses and measures of indemnity. Subrogation, General average, Lloyd's organization.

g. An elementary knowledge of accident and motor insurance.

INSURANCE IN INDIA (Paper - IX)

Time : 3 hours **Full marks : 100**

Sources and history of Insurance laws in India.

Present Insurance law in India : Indian Insurance Act. 1938, Life Insurance Corporation Act. 1956. General Insurance Corporation Act. 1972. Insurance Administration.

(a) **The problems of Insurance Administration :** Scope and Importance, System of Administration, Internal and external Administration.

(b) Internal office Administration, Office Systems, Office Organisation, Office Management, Officers and Staff, Equipment and Mechanisations.

(c) **External Side of Field Administration :** Branc and Agency Orgtanisation, Agency Department Appointment. Agency Contract, Agency Costs.

(d) **Departmental Administration :** Administration of Life. Marine and Accounts Departments.

Rural Economics and Co-oreration (Group - J)

RURAL ECONOMICS (Paper - VIII)

Time : 3 hours **Full marks : 100**

Charactristics of rural economy of India, Changing pattern of rural econmy, Occupational Pattern in rural India. Land resource and its Utilisation, Problems of Indian Agriculture-a detailed study : Size of holdings; Subdivision and fragmentation. Land Reform Studey; Size of holding : Subdivision and fragmentation. Land Reforms, productivity of Indian agriculture, reclamation and Conservation of Land Irrigation problem, River Valley projects, Crop Inusrance, Green Revolution, Problems of Marketing, Warehousing and Finance; State Trading in Foodgrains. Marketable Surplus.

Organisation of Agriculture; Individual Collective, Co-operative and State farming.

Agricultural price establishment.

Agricultural labour and its problems : Under employment and Unemployment, Agriculture wages.

Cottage and Agro-Industries : Scope, problem and progress.

Inter-relationship between the Rural and Urban sectors; Social and economic consequences for rural areas of growing urbanization.

Modernising the Rural Economy, Rural Economic Institutions, Panchayats and their functions and working relation to rural economy. Community Development Project. Five Year Plans and the development of the rural economy.

CO-OPERATION IN IDNIA (Paper - IX)

Time : 3 hours **Full marks : 100**

Principle and Philosophy of Cooperation and their reformulation; Cooperation and economic development, Cooperation and Social Change, Organisation and Management of Cooperatives. Salient features of Cooperative Movment in U.K., Germany, Dennark, Israel and India.

Cooperation Movement in India, Cooperative Credit, Consumer Cooperatives, Industrial Cooperatives. Housing Cooperative institutional set up, types, Progress, achievement and problems. Rural Credit Survey Committee, R.B.I. and Cooperative Movement in India. Role of the State, Cooperative Education.