JAI PRAKASH UNIVERSITY, CHAPRA

SYLLABUS

for

Bachelor of Science and Commerce

(Honours and Subsidiary)

TDC - I

JAI PRAKASH UNIVERSITY CHAPRA

REGULATIONS
FOR
THREE YEAR BACHELOR DEGREE COURSE
AND
COURSES OF STUDY
FOR
B.Sc. / B.Com.
(GENERAL AND HONOURS)
Part I EXAMINATIONS

JAI PRAKASH UNIVERSITY PUBLICATION

COURSES OF STUDY
for
B.A./B.Sc./B.Com (General/Honours) PART I Examination
COMPULSORY SUBJECTS

(Identical syllabi for both General & Honours Courses for all faculties)

अनिवार्य हिन्दी रचना

प्रथम पत्र

(हिन्दी–भाषा–भाषी विद्यार्थियों के लिए)

[बी०ए०, बी०एससी० एवं बी०कॉम० (प्रतिष्ठा तथा सामान्य) के लिए]

समय– तीन घंटे   पूर्णांक–100

अंक विभाजन

(क)	निर्धारित पाठ्य पुस्तक से पाँच वस्तुनिष्ठ प्रश्न	5×1 = 05
(खा)	निर्धारित पाठ्य पुस्तकों से दो परिचायत्मक प्रश्न	2×15 = 30
(ग)	पाठ्य पुस्तक 'पद्य–मंजरी' से एक अर्थ लेखन	1×5 =05
(घ)	प्रयोजनमुलक हिन्दी से एक सैद्धान्तिक प्रश्न	1×15 =15
(ड.)	व्यावहारिक हिन्दी रचना से दो प्रश्न :	
	(1) संक्षेपण अथवा पत्र लेखन	1×10 =10
	(2) मुहावरे अथवा लोकोक्तियाँ	5×1 =05
(च)	हिन्दी व्याकरण – संधि, समास, उपसर्ग, प्रत्यय, लिंग और कारक से तीन प्रश्न	3× 5 = 15
(छ)	निबन्ध – एक प्रश्न	1×15 =15
		100

निर्धारित पाठ्य पुस्तकें :–

(क)   पद्य मंजरी – सं० – डॉ० टी० निर्मला – राजकमल प्रकाशन

                डॉ० एस० मोहन   नई दिल्ली, पटना

केवल निम्नांकित अंश –

प्राचीन काव्य – समस्त (कबीर के दोहे, तुलसी के दोहे, सूर के पद, रहीम के दोहे, बिहारी लाल के दोहे), आधुनिक काव्य– हरिऔध–कर्मवीर गुप्त–एकता , प्रसाद–भारतवर्ष, निराला – जागो फिर एक बार, दिनकर – भीष्म, काशर – शय्या से उपदेश, नागार्जुन – पाषणी

(ख)   कथा मंजरी – सं० – डॉ० पुष्पपाल सिंह

केवल निम्नांकित अंश –

प्रसाद–विरामचिन्ह, प्रेमचन्द–मृतक–भोज, भगवतीचरण वर्मा– मुगलों ने

सल्तनत वर्ख दी, यशपाल–समय, फणीश्वरनाथ रेणु–सम्वदिया,
मोहन राकेश – क्लेम

(ग) प्रयोजनमूलक हिन्दी – आधार ग्रंथ –

1. प्रयोजनमूलक हिन्दी – विनोद गोदरे, वाणी प्रकाशन, नई दिल्ली

2. प्रयोजनमूलक हिन्दी – दंगल झाल्टे, वाणी प्रकाशन, नई दिल्ली

केवल निम्नांकित अंश –

1. प्रयोजनमूलक हिन्दी – अभिप्राय और व्यवहार क्षेत्र

2. राष्ट्रभाषा और राजभाषा

3. पत्र–लेखन : विशेषताएँ और प्रकार

4. टिप्पणी लेखन – सामान्य परिचय, विशेषताएँ।

सहायक ग्रन्थ –

1. प्रयोजनमूलक हिन्दी – डॉ0 माधव सोनटक्के

2. प्रयोजनमूलक हिन्दी – मानक हिन्दी   ओंकार नाथ वर्मा

3. हिन्दी निबन्ध – सं0 रामदरश मिश्र, रामस्वरूप शास्त्री

4. हिन्दी व्याकरण मीमांसा – काशीराम शर्मा

अनिवार्य हिन्दी रचना

प्रथम पत्र

(हिन्दीतर–भाषा–भाषियों के लिए)

[बी0ए0, बी0 एससी0 एवं बी0 कॉम0 (प्रतिष्ठा तथा सामान्य) के लिए]

समय– डेढ़ घंटे   पूर्णांक–50

अंक विभाजन –

(क) निर्धारित पाठ्य पुस्तकों से परिचयात्मक दो प्रश्न 2×10= 20

(ख) निबन्ध लेखन से एक प्रश्न   1×15 = 15

(ग) हिन्दी व्याकरण (संज्ञा, सर्वनाम, पर्यायवाची, विलोम
तथा लिंग निर्णय से दो प्रश्न   2×5 =10

(घ) वाक्य संशोधन (पाँच वाक्य)   5×1 =05
                                                        ────
                                                        50

निर्धारित पाठ्य पुस्तकें :–

(1) काव्य कलश – सं0– डॉ0 मंजू ज्योत्सना – राजकमल प्रकाशन
डॉ0 नागेश्वर सिंह, डॉ0 बालेन्दु शेखर तिवारी   नई दिल्ली, पटना

केवल निम्नांकित अंश –

विद्यापति – नन्दक नन्द कदम्ब तरु–तर / कथ सुख सार

कबीरदास – गुरूदेव अंग, सूरदास – पद संख्या – 1 और 2

तुलसीदास – पद संख्या – 22, 23, बिहारीलाल–दोहा संख्या– 1 से 10 तक

(2) गद्य बीथी–सं० सुशील कुमार महेश्वरी–राधाकृष्ण प्रकाशन समस्त पाठ

सहायक पुस्तकें –

1. आधुनिक हिन्दी व्याकरण और रचना – डॉ० वासुदेव नन्दन प्रसाद

2. व्यावहारिक हिन्दी भाषा–संरचना – डॉ० दिनेश सिंह, मोतीलाल बनारसीदास, पटना

भोजपुरी रचना

प्रथम पत्र(पहिला पत्र)

[बी०ए०, बी० एससी० एवं बी० कॉम० (प्रतिष्ठा तथा सामान्य) के लिए]

समय– डेढ़ घंटे   पूर्णांक–50

अंक विभाजन –

1. पाठ्य पुस्तक से परिचयात्मक प्रश्न – 1   1×15= 15

2. निबन्ध – 1   1×15 =15

3. व्याकरण – 4   4×5 =20
                                                    ⎯⎯⎯
                                                      50

निर्धारित पाठ्य पुस्तक आ पाठ –

1. भोजपुरी निबन्धावली – सं० डॉ० उषा वर्मा – सम्पूर्ण पाठ

2. प्राकृतिक, धार्मिक, राजनीतिक, सांस्कृतिक आ सामाजिक विषय पर आधारित तीन गो निबन्ध प्रश्न–पत्र में रही जौना में से एक गो पर निबन्ध लिखे के पड़ी।

3. व्याकरण :– संज्ञा, सर्वनाम, कारक, विशेषण, पर्यायवाची शब्द, विपरीतार्थक शब्द, व्याक्य शुद्धि।

निर्धारित सहायक ग्रन्थ –

1. भोजपुरी व्याकरण के रूप रेखा – विन्ध्याचल प्रसाद श्रीवास्तव

2. नाच न जाने अंगनवा टेढ़ – शारदानन्द प्रसाद

3. भोजपुरी शब्दानुशासन – डॉ० रसिक बिहारी ओझा 'निर्भिक'

4. आदर्श भोजपुरी व्याकरण – आचार्य श्रद्धानन्द अवधूत

मैथिली रचना

प्रथम पत्र

[बी०ए०, बी० एससी० एवं बी० कॉम० (प्रतिष्ठा तथा सामान्य) के लिए]

समय– डेढ़ घंटे   पूर्णांक–50

1. पाठ्यग्रंथ सँ परिचायक प्रश्न   12 अंक

2. पाठ्यग्रंथ सँ आशय   08 अंक

3. निबन्ध   20 अंक

4.   व्याकरण ओ रचना

   निर्धारित ग्रन्थ   10 अंक

1. चन्द्र बिन्दु – प्रो0 मायानन्द मिश्र, मैथिली अकादमी, पटना ।
2. शकुन्तला – दामोदर लाल दास, मैथिली अकादमी, पटना ।
   व्याकरण ओ रचना क लेल निर्धारित विषय : संज्ञा, सर्वनाम, विशेषण
   क्रिया, उपसर्ग, लोकोक्ति, विपरीतार्थक शब्द ।

URDU COMPOSITION
Paper I
[For B.A., B.Sc., B.Com. (General/Honours) courses]

Time - 1½ hours   Full Marks - 50

Distribution of marks

A   Summary and substance of Prescribed Text (15+15 = 30 marks)
B.   Grammer (Azdad Jins Mahawarat)   (10+10 = 20 marks)

Book Prescribed - Adabiyat *by* Dr. A. Wasy and Dr. Q. A. Hashmi

Prose portion to be read -

(i)   Sir Syed Ahmad Khan (ii) Shibli (iii) Waheb Ashrafi (iv) Premchand

BENGALI COMPOSITION
Paper I
[For B.A., B.Sc., B.Com. (General/Honours) courses]

Time - 1½ hours   Full Marks - 50

Distribution of marks

Critical Questions	10×2 = 20 marks
Explanations	5×2 = 10 marks
Unseen amplification Poetry piece	1×10= 10 marks
Essav	1×10= 10 marks

১। মধুকাব্য পাঠ : ডঃ চিত্তরঞ্জন লাহা সম্পাদিত
২। কমলাকান্তের দপ্তর : বঙ্কিমচন্দ্র
পাঠাংশ :- রত্নালোচন,, বিড়াল, অনুবাদন, ঢেঁকি ফুলের বিবাহ।

ENGLISH COMPOSITION
Paper I
[For B.A., B.Sc., B.Com. (General/Honours) courses]

Time - 1½ hours   **Full Marks - 50**

A **Rapid Reader** George Orwell's 'Animal Farm'   20 marks
B. **Translation**   15 marks
C.   **Grammer**   15 marks

Preposition	5 marks
Narration	5 marks
Correction	5 marks

Suggested Readings

1. English Grammer & Composition *by* **Prof. Guru Das Mukherjee**
2. English Grammer & Composition *by* **Thompson & Martinet**

COURSES OF STUDY
for
B.Sc. (General) PART I Examination
(See page no. 1 for compulsory subjects)
Optional Subjects for B.Sc.(General) Part I Examination

PHYSICS (GENERAL)
Paper I

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

Twelve questions to be set. Six to be answered (taking at least one from each group)

Group A
Relativity & Mechanics (Two questions to be set)

The Lorentz Transformations : Galilean Transformations, Newtonian relativity, Instances of their failure, Electromagnetism, Aberration of light, Michelson-Morley experiment, Einstein's basic postulates and geometric derivation of Lorentz Transformations; Length contraction, Simultaneity, Time dilation.

Relativistic dynamics : Variation of mass with velocity, Mass energy equivalence.

Group B
Mechanics of particles & continuous media
(Three questions to be set)

Generalised co-ordinates, Constraints (Holonomic, Non-holonomic). D'Alembert's principle and Lagrange's equations of motion, Hamilton's equation of motion and their simple applications.

Elastics constants for an isotropic solid, their inter-relation, torsion of a cylinder, bending of a beam.

Kinematics of moving fluids; equations of continuity, Euler's equation. Flow of incompressible and compressible fluids through a capillary tube.

Surface tension and surface energy, Molecular interpretation, pressure on a curved liquid surface.

Group C
Oscillations, Waves and Acoustics (Two questions to be set)

Free and damped oscillations in one dimension, critical damping, Forced oscillator with one degree of freedom, Resonance.

Fourier analysis; Fourier series and Fourier coeffecients; simple examples of rectangular, sawtooth wave and transverse vibration of strings.

The acoustics of halls, reverberation period, Sabine's formula.

Group D
Thermal Physics (Two questions to be set)

Maxwellian distribution of speeds in an ideal gas. Derivation of the distribution of speed and velocity and its experimental verification.

Real gas : vander waal's model; equation of state.

Mean free path, Transport of momentum (viscosity), Energy(thermal conduction) and matter (diffusion)

Group E
Thermodynamics (Three questions to be set)

The zeroth law; the first law, Carnot's theorem, the second law, Entropy as a thermodynamic variable; Principle of increase of entropy. Thermodynamic scale of temperature.

Thermodynamic relationship : Maxwell's equations and their applications.

Black body radiation : temperature radiation, Stefan - Boltzmann law, spectral distribution, Wien's displacement law, Rayleigh - Jeans law and the ultraviolet catastrophy. Planck's hypothesis, mean energy of an oscillator and Planck' law.

PHYSICS (GENERAL)
Practical

Time - 3 hours   **Full Marks -25**

(One experiment to be performed in examination) (Expt-15,viva-6,NB-4)

The course shall include the following experiments

1. Kater's pendulum, precise setting and analysis.
2. Study of flexure of a bar.
3. Study of torsion of a wire; dependence on radius, length, torque and material (static method}
4. Study of torsion of wire or fibre (dynamic method).
5. Studying the fall of solids through a liquid.
6. Searl's method for Y, η and σ from a single set.
7. Study of dependence of period of oscillations of a spring or rubber band on mass and spring constant.
8. Study of transverse wave speed on a string; dependence on density and tension (sonometer)

CHEMISTRY (GENERAL)
Paper I

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

There shall be three groups, Group A (Physical), Group B (Organic), Group C (Inorganic) each carrying 25 Marks. Each group shall contain four questions out of which two are to be answered. **Six** questions are to be answered in all.

Group A
Physical Chemistry

1. **Gaseous state, Kinetic theory of gases** - Postulates, Kinetic gas equation, Value of R in different units, Deductions of gas laws from kinetic gas equation, R.M.S. velocity, Average velocity and Kinetic Energy of gas molecules, vander Waal's equation of state and law of corresponding state.

2. **Chemical equilibrium** - Law of mass action and its kinetic derivation, equilibrium constant, relation between K_p, K_c & K_x, Le-Chatellier's principle.

3. **Dilute solution** - Collgative properties, osmosis and osmotic pressure, Lowering in V.P., elevation of boiling point of solutions, depression of freezing point of solutions, abnormal colligative properties of solutions.

4. **Thermochemistry** - Hess's Law, Born Haber Cycle.

5. **Thermodynamics** - Thermodynamic terms, Work, heat and energy, Thermodynamic and non thermodynamic properties, The first law of Thermodynamics, Enthaply, Heat capacities (C_p, C_v), Relation between C_p & C_v, Isothermal reversible and irrversible processes, Work done in isothermal and adiabatic processes.

Group B
Organic Chemistry

1. Shape and structure of Organic compounds, tetravalency of Carbon and sp, sp^2, sp^3 hybridisation.

2. Nomenclature of simple functional organic compounds.

3. Elementry idea of electron displacement effect (inductive and electromeric effect).

4. **Alcohols** - Classification and distinction between different types of monohydric alcohols and general methods of preparation and properties of Trihydric alcohol-Glycerol.

5. **Aldehydes and Ketones** - General methods of preparation and

properties.

6. **Carboxylic acids** - General methods of preparation and properties of monocarboxylic acid and their derivatives.

7. **Amines** - Aliphatic amines, classification, distinction and separtion.

Group C
Inorganic Chemistry

1. **Atomic structure**- The components of atom, results of Rutherford's α scattering experiment, Mosley's finding on the relationship of X-rays with atomic numbers, Bohr's model and introduction to spectral lines of hydrogen atom, Bohr-Sommerfeld's model, Pauli exclusion Principle, Hund's Rule, Aufbau's Principle.

2. **Periodicity** - Electronic lay out of the periodic table, periodicity of properties e.g., ionic, covalent and vander Waal's radii, Ionisation potential, electron effinity and electronegativity.

3. **Group 1**- Silver and Gold - occurrence, metallurgy, properties and important compounds ($AgNO_3$, $AgCl$, $H[AuCl_4]$), comparative study of the coinage metals.

4. **Group II** - Beryllium - occurrence, isolation, properties, uses and important compounds ($BeCl_2$) Basic beryllium acetate.

5. **Group III** - Boron-occurrence, preparation, properties and uses of compounds of Boron ($B\chi_3$, B_2H_6, Boric Acid). Chemistry of Borax bead test.

6. **Group IV** - Preparation, properties and uses of SiO_2, Silicic acid and silicagel

   Tin - occurrence, metallurgy, properties and uses. Important Sn(II) & Sn(IV) compounds ($SnCl_2$, $SnCl_4$).

   Lead - occurrence, metalluragy, properties and uses, white lead chrome yellow and red lead.

CHEMISTRY (GENERAL)
Practical

Time - 3 hours **Full Marks - 25**

1. Qualitative inorganic analysis of mixtures containing four radicals. 12 marks

   Basic radicals - Ag^{+1}, Pb^{+2}, Cu^{+2}, Sb^{+2}, AS^{+2}, Sn^{+4}, Fe^{+2}, Fe^{+3}, Al^{+3}, Cr^{+3}, Co^{+2}, Ni^{+2}, Zn^{+2}, Mn^{+2}, Ba^{+2}, Sr^{+2}, Mg^{+2}, NH^+_4,

   Acid Radicals - CO_3^{-2}, S^{-2}, SO_4^{-2}, NO_3^{-1}, NO_2^{-1}, halides

2. Volumetric analysis 8 marks

   Acidimetry and Alkalimetry

3. Viva and Note-Book 5 marks

MATHEMATICS (GENERAL)
Paper I
(Same for B.A. & B.Sc.)

Stress should be given on development of ideas and theories rather than on solving problems. Problems should be short and intelligent.

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

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

Group A
Set Theory (Two questions)

General form of De Morgan's laws, Cartesian product of sets, Equivalence relation induced by a partition of a set and fundamental theorem on equivalence relation. Composition and factorization of mapping. Set mapping, Countability of rational, real and algebraic number systems.

Group B
Abstract Algebra (Four questions)

Two questions from Binary operations and Two questions from Matrices.

Binary operations - Notions of group-Abelian group with examples, Uniqueness of Identity element in a group, Cancellation laws in a group, Definition of subgroup and cyclic group with example, Definition of rings, integral domains and field and their example.

Matrices -Operations of Matrix algebra, Kinds of Matrices, Transpose, Adjoint and inverse of the Matrix, Orthogonal matrices, Solution of consistent systems of Linear equations by Cramer's rule.

Group C
Real Analysis (Four questions)

One question from sequences of real numbers and three questions from convergent and divergent series.

Sequence of real numbers and their limits, Bounded sequence, Monotonic sequence, Cauchy's general principle of convergence.

Convergent and diconvergent series, Convergence of series of positive terms, Comparison tests, Cauchy's root test, D'Alembert's ratio test and Raabe's test, Alternating series and Leibnitz test, Absolutely

convergent series, Continuity and differentiability of real function of a single real variable and properties of continuous functions.

Group D
Trigonometry (Two questions)

De Moivre's theorem and its application to the expansion of $\sin x$, $\cos x$ and $\tan x$.

Trigonometric and Exponential function of complex argument, Hyperbolic functions and summation of sine, cosine series and $C + iS$ method, Gregory's series.

Books Recommended

1.	Set Theory	-	Das Gupta
2.	Set Theory	-	Laljee Prasad
3.	Set Theory	-	Satydeo Prasad
4.	Modern Algebra	-	Dr. K. K. Jha
5.	Modern Algebra	-	Laljee Prasad
6.	Modern Algebra	-	Das Gupta
7.	Real Analysis	-	Laljee Prasad
8.	Infinite Serie	-	Laljee Prasad
9.	Matrices	-	Laljee Prasad
10.	Matrices	-	Shanti Narayan
11.	Trigonometry	-	Laljee Prasad
12.	Trigonometry	-	Das Gupta

11
BOTANY (GENERAL)
Paper I
Algae, Fungi, Microbiology, Bryophyta, Pteridophyta, Gymnosperm

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

Ten questions to be set, five from each group. Candidates are required to answer five questions attempting at least two questions from each group.

Group A

Algae — Structure, reproduction and the history of the following members : *Volvox, Oedogonium, Ectocarpus, Batrachospermum, Anabaena.*

Fungi — Structure, reproduction and the history of the following members : *Synchytrium, Phytopthora, Peziza, Erysiphe, Ustilago, Puccinia.*

Microbilogy — A brief knowledge of ultra structure and economic importance of Bacteria and Virus.

Group B

Bryophyta — Life history of *Marchantia, Anthoceros* and *Sphagnum.*
Pteridophyta — Life history of *Lycopodium, Equisetum* and *Marsilea.*
Gymnosperm — Life history of *Cycas* and *Pinus.*

BOTANY (GENERAL)
Practical

Time - 3 hours **Full Marks - 25**

1. Morphology and structural details of
   Algae - One, Fungi - One, Bryophyta - One
   Temporary slide preparation   9 marks

2. Morphology, structure of the material and its permanent double stained slide preparation (either from pteridophyta or from Gymnosperm)   6 marks

3. Identification and comment on the following five spots :
   Algae-One, Fungi-One, Bryophyta-One, Pteridophyta/ Gymnosperm - One, Embryology - One   5 marks

4. Practical Records   5 marks

ZOOLOGY (GENERAL)
Paper I

Time - 3 hours

Full Marks - 75

Ten questions to be set. Students will be required to answer any five questions, at least two from each group.

Group A
Non-Chordata

Bionomics : General characters and classification (upto orders) of the following phyla :

Porifera, Coelenterata, Platyhelminthes, Aschelminthes, Annelida, Mollusca, Echinodermata and Hemichordata

Detailed study of the structure and life history of the following types :

1. Protozoa   -   *Paramecium*
2. Porifera   -   *Sycon*
3. Cnidaria   -   *Obelia*
4. Platyhelminthes   -   *Fasciola*
5. Aschelminthes   -   *Ascaris lumbricoides*
6. Annelida   -   *Pheretima posthuma*
7. Arthropoda   -   *Palaemon*
8. Mollusca   -   *Pila*
9. Echinodermata   -   *Asterias*
10. Hemichordata   -   Salient features of *Balanoglossus* and its affinities

Group B
Cell-Biology, Genetics and Evolution

1. Gametogenesis, Fertilization & Parthenogenesis
2. Cell-Biology and Genetics : Ultra-structure and functions of the following cell organelles :-
   Plasma membrane, Endoplasmic reticulum, Mitochondria, Golgi bodies, Ribosomes, Chromosomes, Lysosome
3. Structure and functions of DNA
4. Gene Mutation
5. Linkage and crossing-over

Evolution

1. Lamarckism and Neo-Lamarckism
2. Darwin's theory of Natural Selection and Neo-Darwinism
3. Isolating mechanism and its role in evolution.

ZOOLOGY (GENERAL)
Practical

Time - 3 hours   **Full Marks - 25**

1. Dissection   1×7=7 marks

   Pheretima - Reproductive system, Nervous system and Alimentary canal

   Palaemon - Alimentary canal, Nervous system.

   Pila - Alimentary canal and Nervous system

2. Permanent stained preparation of the following: 1×4=4 marks

   Septal nephridia, Ovary, Setae of *Pheretima*, Statocyst of Prawn, Radula and Osphradium of *Pila*.

3. **Spotting**   1×6=6 marks

   A. Museum Specimens   2

   B. Slides   3

   C. Evolution   1

4. **Cytology**   4 marks

   Squash preparation to show the stages of Mitosis (onion root tips) and Meiosis (Grashopper testes)

   or

   Giant Chromosomes of *Chironomus* larvae.

5. **Practical Records**   4 marks

COURSES OF STUDY
for
B.Sc. (Honours) Part I Examination
PHYSICS (HONOURS)
Paper I
(Mechanics and General Physics)

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

Twelve questions to be set. Six to be answered (taking not more than two from each group)

Group A
Vector and Relativity (Four questions to be set)

Scalar and Vector Fields : Gradient, Divergence and Curl; Line, Surface and Volume integrals. Theorems of Gauss, Stoke and Green Theorems.

The Lorentz Transformations: Galilean Transformation, Newtonian relativity. Instances of their failure; Electromagnetism, Aberration of light, Michelson - Morley Experiment. Einstein's basic postulates and geometric derivation of Lorentz Transformations; Length contraction, Simultaneity, Time dilation. Einstein's velocity addition rule, Doppler effect in light.

Group B
Mechanics of Particles & Continuous Media
(Four questions to be set)

Intertial frame of reference and non-inertial frame, Coriolis and centrifugal forces and their simple application.

Motion under a central force; conservation of angular momentum, Kepler's laws, Geostationery Satellite.

Elastic constants for an isotropic solid, their inter-relation, Torsion of a cylinder, Bending of beam, Flat spiral spring.

Kinematics of moving fluids; Equation of continuity, Euler's equation, Bernoulli's theorem.

Viscous fluids; Streamline and turbulent flow, Flows of incompressible and compressible fluids through a capillary tube, Reynold's Number, Stokes' Law.

Surface tension and surface energy; molecular interpretation, Pressure on a curved liquid surface.

Group C

Oscillations, Waves and Acoustics

(Four questions to be set)

Free and damped oscillations in one dimension, critical damping, Q of an oscillator, Forced oscillator with one degree of freedom, Resonance.

Waves in continuous media, Speed of longitudinal waves in a fluid, Energy density and energy transmission in waves, Concept of group velocity and phase velocity.

Fourier analysis; Fourier series and Fourier coeffecients; Simple examples of rectangular, Saw-tooth wave and transverse vibration of strings.

Transducer and their characteristics, Recording and reproduction of sound, Measurement of frequency, velocity, Wave form and intensity. The accoustics of halls, Reverberation period, Sabine's formula.

Books Recommended :

1. **R. P. Feynman, R. B. Leighton and M. Sands; "The Feynman Lectures on Physics" Vol. I**(B. I. Publications, Bombay-Delhi-Calcutta-Madras)

2. **S. P. Puri "Vibrations and Waves"** (Tata MacGraw-Hill)

3. **D. P. Khandelwal; "Oscillations and Waves"** (Himalaya Publishing House, Bombay)

4. **R. K. Ghosh; "Theory of Mathematics of waves and vibrations"** (McMilan, 1975)

5. **Newman and Searle; "General Properties of Matter"**

6. **Takwale and Puranic; "Classical Mechanis"**

7. **Landau & Lifshitz; "Theoratical Physics - Part I"**

8. **H. J. Pain; "Waves and oscillations"**

PHYSICS (HONOURS)

Paper II

(HEAT AND THERMODYNAMICS)

Time - 3 hours   Full Marks - 75

Twelve questions to be set. Six to be answered (taking at least

two from each group)

Group A
Kinetic Theory (Six questions to be set)

Maxwellian distribution of speeds in an ideal gas. Derivation of the distribution of speed and velocity and its experimental verification. Equipartition of energy; Specific heats of gases.

Real gas : vander Waal's model, Equation of state, Nature of vander Waal's forces, Critical constants.

Transport phenomena: Mean free path, Transport of momentum (viscosity), Energy(thermal conduction) and matter (diffusion)

Group B
Thermodynamics (Six questions to be set)

The Laws of Thermodynamics : The zeroth law; the first law, Carnot's theorem, the second law, Entropy as a thermodynamic variable; Principle of increase of entropy. Thermodynamic scale of temperature; its identity with perfect gas scale, Imossibility of attaining the absolute zero (third law).

Thermodynamic relationship : Maxwell's equations and their applications.

Thermodynamic potentials : Relation to thermodynamic variables; equilibrium in thermodynamic systems, Simple applications.

Joule - Thomson and adiabatic cooling : Joule - Thomson expansion; constants of $U+PV$, cooling in J - T expansion, Adiabatic expansion of an ideal gas, Principles of regenerative and cascade cooling, liquefaction of gases.

Low temperatures : Production and measurement of very low temperatures.

Black body radiation : temperature radiation, Stefan - Boltzmann law, spectral distribution, Wien's displacement law, Rayleigh - Jeans law and the ultraviolet catastrophy. Planck's hypothesis, mean energy of an oscillator and Planck' law.

Books Recommended :

1. M. W. Zemansky; "Heat and Thermodynamics" (McGraw-Hill)
2. Saha & Srivastava; "A treatise on Heat"

3. J. B. Rajam; "Heat and Thermodynamisc"

PHYSICS (HONOURS)
Practical

Time - 6 hours   **Full Marks -50**

(One experiment to be performed in examination)

(Expt.- 30, viva-12, NB- 8)

The course shall include the following experiments

1. Kater's pendulum, Precise setting and analysis.
2. Study of laws of parallel and perpendicular axes for estimation of moment of interia.
3. Study of flexure of a bar.
4. Study of torsion of a wire; dependence on radius, length, torque and material (static method}
5. Study of torsion of wire or fibre; dynamic method.
6. Study of flow of liquids through capillaries; laminar and tubulent flow stages, Capillaries in series.
7. Studying the fall of solids through a liquid.
8. Study of airflow through a capillary; U-tube with long capillary fitted on one arm, mercury level difference pushing air.
9. Searl's method for Y, η and σ from a single set.
10. Thermal conduction in poor conductor : temperature distribution using thermocouples in cases of linear geometry (sheets or slabs), cylindrical geometry, spherical geometry. Study of thermionic emmision from metals.
11. Study of harmonic oscillation and its relaxation; rigid pendulum or torsional oscillations.
12. Oscillations of a bifilar suspension.
13. Study of dependence of period of oscillations of a spring or rubber band on mass and spring constant.
14. Study of transverse wave speed on a string; dependence on density and tension (sonometer)
15. Study of wave velocity in a gas; Kundt's tube.
16. Melde's experiment.

CHEMISTRY (HONOURS)

Paper I /

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

Ten questions to be set. Five questions to be answered selecting two from group A (Physical Chemistry) and three from group B (Inorganic Chemistry). Short answer type questions are recommended. There may be several parts in a question.

Group A
PHYSICAL CHEMISTRY

The syllabus consists of following units :-   **Marks - 25**

UNIT - I   10 Hrs

GASEOUS STATE

Kinetic molecular theory of gases, Kinetic gas equation, Deduction of gas laws, Equipartition of energy, vander Waal's equation of state, Critical constants and vander Waal's constants, Boyles temperature, Principle of corresponding states, R.M.S. velocity, Average and most probable speeds, Collision number, Mean free path and collision diameter.

UNIT - II   6 Hrs

LIQUID STATE

Molar Volume, Vapour Pressure

Trouton's rule, Surface Tension

Viscosity and their measurements, Parachore, Rheachore and chemical constitution.

Kopp's law, Liquid crystals, Nematic, Cholestric and sonectic liquid crystals, Inter molecular forces.

UNIT - III   8 Hrs

SOLID STATE

Types of solids, Space lattices, Unit cell, Law of rational indices, Miller Indices, Radius ratio, Co-ordination number, Octahedral and tetrahedral voids.

X-ray diffraction

Bragg's equation, Structure of $NaCl$, $CsCl$, Zinc blende, Wurtzite Fluorite and antifluorite structures.

UNIT - IV

ELECTROCHEMISTRY

Conduction, Electrolytic Conduction

Specific, Equivalent and molar conductances

Cell constant, Effect of dilution on conduction, Ionic mobility, Kohlrausch's law.

Transport number and its determination

Conductometric-titration and applications.

Group B

INORGANIC CHEMISTRY

The syllabus consists of following units :-   **Marks - 50**

UNIT - I   5 Hrs

PERIODIC PROPERTIES

Atomic and Ionic radii, Covalent and vander Waal's radii, EA, EN and their trends in P.T. and application in explaining and predicting the chemical behaviours.

UNIT - II   20 Hrs

CHEMICAL BONDING

a)   **Covalent bond** - V.B. Theory and its limitations, Directional Characteristics of covalent bond. Hybridisation and shape of Inorganic Molecules and Ions, VSEPR Theory with special reference to bond length, Bond angle vs electronegativity, M.O. Theory, Homonuclear and Heteronuclear diatomic molecules(CO and NO), Bond strength, Bond energy, Dipole moment, Percentage Ionic Character in HX Molecules, Geometry of polyatomic molecules.

b)   **Ionic Solids** :- Lattice Energy

Born Haber cycle, Solvation energy, Solubility of Ionic Solids, polarising power and polarisation of ions, Fajan's rule.

Weak Interactions, H-bonding

UNIT - III   6 Hrs

s-BLOCK ELEMENTS

Comparative Study :- Diagonal relationship, Hydrides, Solvation and complexing tendencies. An introduction to alkyl and aryl organometallics.

Extractions of Li and Be.

UNIT - IV
15 Hrs

P-BLOCK ELEMENTS

Comparative Study

Diagonal relationship

Elements of group 13 to 17.

Elementary Idea of Hydrides.

Oxides and Halides.

Hydrides of Boron, Diborane and higher Boranes.

Borazines, Fullerenes, Sillicates, Tetra

Sulphur tetranitride, Properties of halogens.

Interhalogens and polyhalides, Extraction of B and Sn.

UNIT - VI
6 Hrs

CHEMISTRY NOBLE GASES

Isolation and seperation of Inert gases, Chemical properties of noble gases.

Chemistry of Xenon, Structure and bonding in Xe-compounds, Clathrate compounds.

CHEMISTRY (HONOURS)

Paper II

Time - 3 hours
Full Marks - 75

Ten questions to be set. Five questions to be answered selecting two from group A (Physical Chemistry) and three from group B (Organic Chemistry). Short answer type questions are recommended. There may be several parts in a question.

Group A

PHYSICAL CHEMISTRY

The syllabus consists of following units :-
Marks - 25

UNIT - I
12 Hrs.

CHEMICAL THERMODYNAMICS

First law of Thermodynamics, Internal energy, Enthalpy, Cp and Cv and relation between them for ideal gas.

Joule-Thomson coefficient for ideal and real gases, Inversion temperature, Calculation of W, dU and dH for expansion of ideal gases under isothermal and adiabatic conditons for reversible and irreversible processes.

Relation between ΔH and ΔU, Variation of ΔH and ΔU with temp. (Kirchhoff's equation).

UNIT - II   8 Hrs

DILUTE SOLUTIONS

Types of solutions, Solution of gases in liquids, Henery's law, Raoult's law, Vapour pressure, Ideal and non Ideal solutions and their characteristics, Vapour pressure and composition of liquid phase, Azeotropic mixture, Principle of steam and Fractional distillations.

UNIT - III   6 Hrs.

COLLOIDEAL STATE

Definition, Classification, Preparation and purification of Colloids, Kinetic, Optical and electrical properties of sols, Stability of colloids, protective action, Hardy-Schulze law, Gold number, Emulsions, Micelles, Gels, Thixotrophy.

UNIT - IV   4 Hrs.

PHASE EQUILIBRIA

Gibb's phase rule, Phase, Component and degree of freedom, Phase equilibria of one component systems - water and sulphur, Triple point.

Group B
ORGANIC CHEMISTRY

The syllabus consists of following units :-   Marks - 50

UNIT - I   10 Hrs.

STRUCTURE AND BONDING

Atomic orbitals, Hybridisation, Orbital representation of hydrocarbons, Hydrogen Bonding, Inductive, Steric, Electromeric and Hyperconjugation effect and their effects on properties of compounds, Nomenclature of polyfunctional complex organic compounds.

UNIT - II   10 Hrs.

ORGANIC REACTION MECHANISM

Homolytic and hetrolytic bond cleavages, Nucleophiles and electrophiles, Reaction Intermediates Carbocations, Carbanions, Free radicals, Nitrenes, Carbenes and arynes, their generation, Structure and reactivity, General considerations of energy profile diagrams-Transition state.

UNIT - III

10 Hrs.

STEREO CHEMISTRY

Confirmation of Ethane, Propane and n-butane, Newman projection formulae, Confirmation of Cyclohexane and its monosubstituted derivatives, Axial and equitorial bonds.

UNIT - IV

10 Hrs.

ALCOHOLS AND ORGANO-S-COMPOUNDS

Distinction among 1°, 2° and 3° alcohols, preparation and properties of ethyle glycol, Glycerol, Allyl alcohol, Thiols and thioethers.

UNIT - V

10 Hrs.

Organometallic compounds, Introduction, Nomenclature, Grignard reagent-Preparation, Structure and application in organic synthesis

UNIT - VI

10 Hrs.

ORGANIC COMPOUNDS OF NITROGEN

Classification, Structure and reactivity, Preparation and properties of aliphathic amines, Separation and Identification of 1°, 2° and 3° amines Preparation, Properties and estimation of urea.

CHEMISTRY (HONOURS)
PRACTICAL

Time - 6 hours Full Marks - 50

1. Qualitative Inorganic analysis of mixtures containing four radicals and one Interfering radicals **20 marks**

BASIC RADICALS - Ag^+, Pb^{+2}, Cu^{+2}, Cd^{+2}, Sb^{+2}, As^{+2}, Sn^{+2}, Fe^{+2}, Fe^{+3}, Al^{+2}, Ni^{+2}, Co^{+2}, Mn^{+2}, Ba^{+2}, Sr^{+2}, Mg^{+2}, NH_4^+

ACID RADICALS - Co_3^{-2}, So_4^{-2}, No_3^{-1}, No_2^{-1}, S^{-2}, So_3^{-2}, Halide and phosphate.

2. **Qualitative Organic Analysis** **20 marks**
(i) Detection of Elements (X, N, & S)
(ii) Detection of functional groups
 ph-OH, -COOH, C=O, A_r- NH_2, A_r -NO_2, -$CONH_2$.
3. Note Book **05 marks**
4. Viva-voce **05 marks**

MATHEMATICS (HONOURS)
Paper I

Stress should be given on development of ideas and theories rather than on solving problems. Problems should be short and illustrative to the theories.

Papers I and II for Part I (Honours) written examination will be of 100 marks each.

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

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

Group A
MATRICES (Three questions)

Symmetric, Skew-symmetric, Hermitian and skew-Hermitian matrices, Elementary operations 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, Eigenvalues, Eigenvectors and the characteristic, equation of matrix, Cayley-Hamilton theorem and its uses in finding inverse of a matrix, Application of matrices to a system of linear (both homogeneous and non-homogeneous) equations, Theorems on consistency of a system of linear equations.

Group B
THEORY OF EQUATION (Two questions)

Relation between the roots and coefficients of general polynomial equation in one variable, Transformation of equations, Descarte's rule of signs, Solution of cubic equations (Cardon method), Biquadratic equations.

Group C
SET THEORY AND ALGEBRA (Three questions)

Mapping, Equivalence relations and partitions, Congruence modulo n, Definition of a group with examples and simple properties, Subgroups, Generation of groups, Cyclic groups, Coset decomposition, Lagrange's theorem and its consequences, Fermat's and Euler's theormes, Homomorphism and Isomorphism, Normal subgroups,

Quotient groups, The fundamental theorem of homomorphism, Permutation groups, Even and odd permutations, The alternating groups, Cayley's theorem, Introduction to rings, Subrings, Integral domains and fields, Characteristic of a ring.

Group D
TRIGONOMETRY (Two questions)

De Moivre's theorem and its application, Direct and inverse circular and hyperbolic functions, Logarithm of a complex quantity, Expansion of trigonometrical functions, Gregory's series, Summation of series.

Group E
LINEAR PROGRAMMING (Two questions)

The Linear programming problems, problem formulation, Linear programming in matrix notation, Some basic properties of convex sets, Graphical solution of LPP, Theory and application of the simplex method of solution of a LPP.

References :-

1. I. N. Heistein — Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975
2. K. B. Dutta — Matrix and Linear Algebra, Prentice Hall of India Pvt Ltd., New Delhi, 2000.
3. Chandrika Prasad — Text Book on Algebra & Theory of Equation, Pothishala Pvt. Ltd., Allahabad
4. Burnside and Panton — Theory of Equation
5. M.L. Khanna — Theory of Equation
6. Shanti Narayan — Matrix, S. Chand & Company
7. S.L. Loney — Plane Trigonometry Part II, Mcmillan & Co., London
8. R.S. Verma and K.S. Shukla — Text Book on Trigonometry, Pothishala Pvt. Ltd., Allahabad
9. Laljee Prasad — Linear Programming
10. P.B. Bhattacharya, S.K. Jami & S.R. Nagpaul — First course in Linear Algebra, Willey Eastern, New Delhi, 1983

MATHEMATICS (HONOURS)
Paper II

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

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

Group A
DIFFERENTIAL CALCULUS (Three questions)

$\varepsilon-\delta$ definition of a limit of a function, Basic properties of limits, Continuous functions and classification of discountinuities, Differentiability, Successive differentiation, Leibnitz theorem, Maclaurin and Taylor series expansions, Asymptotes, Curvature.

Group B
INTEGRAL CALCULUS (Two questions)

Integration of irrational algebric functions and transcendental functions, Reduction formulae, Difinite integrals, Quadrature, Rectification, Volumes, and Surface area of solids of revolution.

Group C
ORDINARY DIFFERENTIAL EQUATIONS (Three questions)

Degree and order of a differential equation, Equation 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.

Group D
Analytical Geometry of Two Dimensions (Two questions)

General Equation of second degree, Tracing of Conics, Confocal Conics Polar equation of Conics.

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Group E
Analytical Geometry of Three Dimensions (Two questions)

Plane, The straight line and the plane, Sphere, Cone, Cylinder, Central Conicoids, Paraboloids, Plane section of Conicoids, Geometry lines, Confocal Conicoids, Reduction of second degree equation.

References :-

1. Gorakh Prasad — Differential Calculus, Pothishala Pvt. Ltd., Allahabad
2. Gorakh Prasad — Integral Calculus, Pothishala Pvt. Ltd., Allahabad
3. Laljee Prasad — Differential Calculus
4. Laljee Prasad — Integral Calculus
5. Dasgupta — Differential Calculus
6. Dasgupta — Integral Calculus
7. J. T. Bell — Elementary Treatise on coordinate geomaetry of there dimensions, Macmillan India Ltd.,1994
8. D. A. Murray — Introduction course in differential equation, Orient Longmann (India), 1967
9. E. A. Codington — An introduction to ordinary differential equation, Prentice Hall of India, 1961
10. P.K. Jain & Khalil Ahmed — Analytical Geometry of two Dimensions, Wiley Eastern Ltd.
11. P.K. Jain & Khalil Ahmed — Analytical Geometry of three Dimensions, Wiley Eastern Ltd.

BOTANY (HONOURS)

There shall be two theory and one practical paper in the 1st and 2nd year examination carrying 75 marks in each theory and 50 marks in each practical paper. In the 3rd year there shall be three theory and one practical paper carrying 100 marks each. Students of all the three parts are required to participate in botanical excursions organized by the department to enrich the laboratory and their knowledge.

Paper I

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

Ten questions to be set. Five questions to be answered (taking not more than two from any group). Question No. 1 will be of objective type and compulsory.

Group A

1. **Algae :**
   (i) General characters, occurrence and distribution, origin and evolution.
   (ii) Classification, ultrastructure of algal cell and economic importance.
   (iii) Thallus organization and evolutionary tendencies.
   (iv) Comparative account of morphology, anatomy and reproduction in *Volvox, Oedogonium, Coleochaete, Vaucheria, Ectocarpus, Sargassum, Polysiphonia* and *Rivularia*.

2. **Fungi :**
   (i) General characters, occurrence and distribution, origin and evolution.
   (ii) Classification, Ecological and economic importance.
   (iii) Important features and life history of : *Pythium, Phytophthora, Saccharomyces, Eurotium, Puccinia, Colletotrichum*.

Group B

3. **Bryophytes :**
   (i) General characters, occurrence and distribution, origin and evolution.
   (ii) Classification, Ecological and economic importance.
   (iii) Evolution of sporophyte and gametophyte
   (iv) Comparative account of morphology anatomy, reproduction and broad relationship of : *Marchantia, Pellia, Anthoceros* and

Polytrichum.

4. **Pteridophytes :**

    (i) Salient features and classification, origin and evolution.

    (ii) Stelar evolution, Telome theory, Heterospory and Seed habit.

    (iii) Evolutionary significance of Psilophyta, Lycopsida, Shenopsida and Pteropsida.

    (iv) Comparative account of morphology, anatomy, reproduction and broad relationships of *Rhynia, Psilotum, Lycopodium Selaginella, Equisetum, Marsilea and Ophioglossum.*

BOTANY (HONOURS)
Paper II

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

Ten questions to be set. (Four questions from Group A and Five from Group B). Two questions to be answered from each group. Question No. 1 will be of objective type and compulsory.

Group A

1. **The cell & cell division :**

    (i) Cell Theory and Cell Structure.

    (ii) Comparative account of prokaryotic and eukaryotic cell.

    (iii) Mitosis and Meiosis, mechanisms of cell cycle control, Apoptosis.

2. **Nucleus, Ribosomes, Mitochondria & Chloroplast :**

    (i) Ultrastructure of nucleus, nuclear envelope, nuclear pore complex, nuclear matrix, nucleoplasm, D.N.A. & nucleosome model.

    (ii) Ribosome structure and their functional significance.

    (iii) Structure of Mitochondria, variation in size, shape & number and its function.

    (iv) Types of plastids, structure and function of chloroplast.

3. (i) Structure and function of Golgi complex, endoplasmic reticulum and lysosomes.

    (ii) Structure and function of peroxisomes, glyoxysomes and Cytoskeleton.

    (iii) Ultrastructure, chemical constituents and functions of cell wall.

    (iv) Models of cell membranes organization, and role of membrane proteins, lipids, carbohydrates, ion channels & pumps in cellular transport and signalling.

4. (i) Principles of light and electron microscopy, phase contrast and fluorescence microscopy.

    (ii) Principles of various chromatography techniques - paper chromatography, TLC, GLC and HPLC.

Group B

5. (i) Classification and nomenclature of enzymes, physico-chemical properties.

    (ii) Kinetics of enzymes action; Michaelis & Mantene Constant and factors affecting enzyme activity, ie. temperature, pH, allosteric modification and feedback regulation.

6. Nucleic acids : D.N.A., R.N.A. and their types. Double helical structure of D.N.A, Replication of D.N.A., Transcription of R.N.A.

7. Amino acid and Protein metabolism : Structural characteristics and classification of amino acids, protein and non-protein amino acids; amino acid biosynthesis; transamination; peptide bond and polypeptide chain; primary, secondary, teritary and quarternary structure of proteins; Protein biosynthesis & its regulation; post-translational modification of proteins targeting protein degradation

8. Carbohydrate : Classification, structure of some representative examples of monosaccharides, disaccharides, polysacchharides, stereoisomers, enantiomers and epimers, biosynthesis and degradation of sucrose and starch.

9. Lipid : Saturated and unsaturated fatty acids, fatty acid bio-synthesis; oxidations of fatty acids; storage and mobilization of fatty acids and lipids.

Practical

Time - 6 hours   **Full Marks - 50**

a. Algae, Fungi, Bryophyta, Pteridophyta, Gymnosperm and Angiosperm   6×4=24

b. Detection of Carbohydrate, Proteins, Lipids & Alkaloids   - 05

c. Study of Mitosis and Meiosis   - 05

d. Spotting   6×1 = 06

e. Class records & field work   - 05

f. Viva-voce   - 05

                                          Total   50

ZOOLOGY (HONOURS)
Paper I

Time - 3 hours

Full Marks - 75

Ten questions are to be set. Question number 1 will be compulsory and objective (numbering fifteen, each of one mark) covering the whole syllabus. Students will be required to answer any five questions in all, including question number one.

Group A

1. Salient features and outline classification, upto orders of major non-chordate phyla.

   Type study — Structure & biology of animals

2. Protozoa — Leishmania donovani, Paramecium
   - Locomotion in Protozoa
   - Osmoregulation in Protozoa
   - Reproduction in Protozoa

3. Origin and evolution of Metazoa

4. Porifera — Sycon : Structure & life cycle
   - Skeleton in Sponges
   - Canal system

5. Coelenterata — Obelia : Structure & life cycle, comparison with Aurelia
   - Metagenesis
   - Coral.& Coral-reefs

6. Ctenophora — Structure & affinities with special reference to Hormiphora

7. Helminthes — Structure & life cycle of
   - Taenia soliun, Fasciola hepatica, Ascaris lumbricoides, Wuchereria bancrofti
   - Parasitic adaptation

Group B

1. Annelida — Alimentary Canal in annelida
   - Excretory system in annelida

2. Onychophora — Structure & affinities of Peripatus

3. Arthropoda — Larval forms of Crustaceans
   - Appendages of Prawn
   - Life cycle of Sacculina

4. Mollusca - Foot in Mollusca
- Respiration in Mollusca
- Torsion in Gastropoda
- Pearl formation & structure of shell.
6. Echinodermata - Water vascular system in Sea-star
- Larval forms of Echinoderms

ZOOLOGY (HONOURS)
Paper II

Time - 3 hours   Full Marks - 75

Ten questions are to be set. Question number 1 will be compulsory and objective (numbering fifteen, each of one mark) covering the whole syllabus. Students will be required to answer any five questions in all, including question number one.

Group A

1. Cell Theory
2. Concept of Prokaryotic & Eukaryotic cells
3. Isolation and growth of cells; cell cycle
4. Cell membrane - Structure & function
   - Types of junction & cell adhesion
5. Transport across cell membrane - Active transport, Passive tranport and Bulk transport
6. Structure & biogenesis of Endoplasmic reticulum and its varied types
7. Ultrastructure, function & biogenesis of Mitochondria. Electron Transport chain & Oxidative Phosphorylation
8. Ultrastructure of Lysosomes and its types, Lysosomal deficiency diseases
9. Ultrastructure of Golgi bodies & Process of Cell secretion
10. Ultrastructure of Ribosomes and function
11. Ultrastructure of Nucleus, Chromosome and their types

Group B
Molecular organization of Cell
1. Structure & Classification of Amino Acids, Protein, Carbohydrate & Lipids
2. Enzymes
3. Structure and types of Nucleic acids- DNA & RNA
4. Nucleotides-ATP

5. Glycolysis, Krebs Cycle, -Oxidation of Fatty acids

Cellular Techniques

6. Microscopy, Types of Optical & Electron Microscopes
7. Cell prochionation, Ultracentrifugation
8. Chromatography
9. Electrophoresis
10. Autoradiography

Biometry

1. Mean, Median and Mode
2. Standard Deviation and Standard Error

ZOOLOGY (HONOURS)
Practical

Time - 6 hours **Full Marks -50**

(Expt.- 30, viva-12, NB- 8)

1. **Dissection** 1×10= 10 marks
   a. *Pheretima* and **Leech** - Alimentary canal, reproductive, excretory and nervous system
   b. *Palaemon* - Alimentary canal, Nervous system
   c. *Unio* and *Pila* - Nervous system and Pallial complex of *Pila*

2. **Permanent stained Preparation of the following** 1×5= 5 marks
   Paramecium, Gemmules, Spicules, *Obelia* colony, Nephridia and ovary of *Phertima*, Statocyst of Prawn, Radula of *Pila*, Gill lamina of *Unio*, Glochidium larva, Larvae of Crustacea

3. **Identification and comment** 7×2 = 14 marks
   a. Museum Specimens 2
   b. Slides (invertebrates) 4
   c. Specimens relating to animal behaviour or Parental care - 1

4. **Cytology** 6 marks
   a. Squash preparation to show the stages of Mitosis (onion root tips) and Meiosis (Grasshopper testes)
   b. Giant Chromosomes of Chironomous larvae
   c. Paper chromatography

5. **Biometry** 1×5 = 5 marks
   Calculation of arithmatic mean and standard deviation of the samples provided

6. **Records and field work** 5 marks
7. **Viva-voce** 5 marks

COURSES OF STUDY
for
B.Sc. (Subsidiary) Part I Examination

PHYSICS (SUBSIDIARY)
Paper I

Time - 3 hours   Full Marks - 75

Twelve questions to be set. Six to be answered (taking at least one from each group)

Group A
Relativity & Mechanics (Two questions to be set)

The Lorentz Transformations : Galilean Transformations, Newtonian relativity, Instances of their failure, Electromagnetism, Aberration of light, Michelson-Morley experiment, Einstein's basic postulates and geometric derivation of Lorentz Transformations; Length contraction, Simultaneity, Time dilation.

Relativistic dynamics : Variation of mass with velocity, Mass energy equivalence.

Group B
Mechanics of particles & continuous media
(Three questions to be set)

Generalised co-ordinates, Constraints (Holonomic, Non-holonomic). D'Alembert's principle and Lagrange's equations of motion, Hamilton's equation of motion and their simple applications.

Elastics constants for an isotropic solid, their inter-relation, torsion of a cylinder, bending of a beam.

Kinematics of moving fluids; equations of continuity, Euler's equation. Flow of incompressible and compressible fluids through a capillary tube.

Surface tension and surface energy, Molecular interpretation, pressure on a curved liquid surface.

Group C
Oscillations, Waves and Acoustics (Two questions to be set)

Free and damped oscillations in one dimension, critical damping, Forced oscillator with one degree of freedom, Resonance.

Fourier analysis; Fourier series and Fourier coeffecients; simple examples of rectangular, sawtooth wave and transverse vibration of strings.

The acoustics of halls, reverberation period, Sabine's formula.

Group D
Thermal Physics (Two questions to be set)

Maxwellian distribution of speeds in an ideal gas. Derivation of the distribution of speed and velocity and its experimental verification.

Real gas : vander waal's model; equation of state.

Mean free path, Transport of momentum (viscosity), Energy(thermal conduction) and matter (diffusion)

Group E
Thermodynamics (Three questions to be set)

The zeroth law; the first law, Carnot's theorem, the second law, Entropy as a thermodynamic variable; Principle of increase of entropy. Thermodynamic scale of temperature.

Thermodynamic relationship : Maxwell's equations and their applications.

Black body radiation : temperature radiation, Stefan - Boltzmann law, spectral distribution, Wien's displacement law, Rayleigh - Jeans law and the ultraviolet catastrophy. Planck's hypothesis, mean energy of an oscillator and Planck' law.

PHYSICS (Subsidiary)
Practical

Time - 3 hours   Full Marks -25

(One experiment to be performed in examination) (Expt-15,viva-6,NB-4)

The course shall include the following experiments

1. Kater's pendulum, precise setting and analysis.
2. Study of flexure of a bar.
3. Study of torsion of a wire; dependence on radius, length, torque and material (static method}
4. Study of torsion of wire or fibre (dynamic method).
5. Studying the fall of solids through a liquid.
6. Searl's method for Y, η and σ from a single set.
7. Study of dependence of period of oscillations of a spring or rubber band on mass and spring constant.
8. Study of transverse wave speed on a string; dependence on density and tension (sonometer)

CHEMISTRY (Subsidiary)
Paper I

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

There shall be three groups, Group A (Physical), Group B (Organic), Group C (Inorganic) each carrying 25 Marks. Each group shall contain four questions out of which two are to be answered. **Six** questions are to be answered in all.

Group A
Physical Chemistry

1. **Gaseous state** - Kinetic theory of gases-Postulates, Kinetic gas equation, Value of R in different units, Deductions of gas laws from kinetic gas equation, R.M.S. velocity, Average velocity and Kinetic Energy of gas molecules, vander Waal's equation of state and law of corresponding state.

2. **Chemical equilibrium** - Law of mass action and its kinetic derivation equilibrium constant, relation between Kp, Kc & Kx, Le-Chatelier's principle.

3. **Dilute solution** - Collgative properties, osmosis and osmotic pressure, Lowering in V.P., elevation of boiling point of solutions, depression of freezing point of solutions, abnormal colligative properties of solution.

4. **Thermochemistry** - Hess's Law, Born Haber Cycle.

5. **Thermodynamics** - Thermodynamic terms, work, heat and energy, Thermodynamic and non thermodynamic properties. The first law of Thermodynamics. Enthaply, heat capacities (Cp,Cv). Relation between Cp & Cv, Isothermal reversible and irrversible processes, work done in isothermal and adiabatic processes.

Group B
Organic Chemistry

1. Shape and structure of Organic compounds, tetravalency of Carbon and sp, sp^2, sp^3 hybridisation.

2. Nomenclature of simple functional organic compounds.

3. Elementry idea of electron displacement effect (inductive and electromeric effect).

4. Aldehydes and Ketones - General methods of preparation and properties.

5. Carboxylic acids - General methods of preparation and properties of monocarboxylic acid and their derivatives.

6. Isomerism-Elementary idea of geometrical and optical isomerism.

Group C
Inorganic Chemistry

1. **Atomic structure**- The components of atom, results of Rutherford's scattering experiment, Mosley's finding on the relationship of X-rays with atomic numbers, Bohr's model and introduction to spectral lines of hydrogen atom, Bohr-Sommerfeld's model, Pauli's exclusion Principle, Hund's Rule, Aufbau's Principle.

2. **Periodicity** - Electronic lay out of the periodic table, periodicity of properties e.g., ionic, covalent and vander Waal's radii, Ionisation potential, electron effinity and electronegativity.

3. **A.** General properties of Ag, Be, B, Si, Pb, Cr, Mn, Co, Ni and inert gases.

   B. Principle of extraction of Ag, Sn, Pb, Cr, Mn, Co and Ni.

4. Preparation, Properties and uses of the following compounds - $AgNo_3$, AgX(Silver halides), Borax, Boric acid, Silicon, SiO_2, Silicagel, $Sncl_2$, White lead, Chrome-Yellow, Red lead, Hydrazine, Hydroxyl amine, Hydrazoic acid, $KMnO_4$, $Ni(CO)_4$, $Na_2S_2O_3$.

CHEMISTRY (SUBSIDIARY)
Practical

Time - 3 hours   **Full Marks - 25**

1. Qualitative inorganic analysis of mixtures containing four radicals.

                                                              12 marks

   Basic radicals - Ag^{+1}, Pb^{+2}, Cu^{+2}, Bi^{+3}, Cd^{+2}, Sb^{+2}, AS^{+2}, Sn^{+4}, Fe^{+3}, Al^{+3}, Cr^{+3}, Co^{+2}, Ni^{+2}, Zn^{+2}, Mn^{+2}, Ba^{+2}, Sr^{+2}, Mg^{+2}, NH^+_4,

   Acid Radicals - CO_3^{-2}, S^{-2}, SO_4^{-2}, NO_3^{-1}, NO_2^{-1}, halides

2. Organic preparation - Preparations of organic compounds by using following reactions   8 marks

   A. Nitration of Nitrobenzene

   B. Oxidation of benzaldehyde

   C. Acetylaton of p-toluidine and anilne

   D. Hydrolysis of Ester, Ethyl Benzonate and Methyl Salicylate

3. Viva and Note-Book   5 marks

MATHEMATICS (SUBSIDIARY)

Paper I

Time - 3 hours   Full Marks - 100

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

Group A
Set Theory (Two questions)

Notions of sets and their algebra, Cartesian product, Notion of relation and mapping and their classification, Equivalence relation and partition of sets, Partially ordered and totally ordered set.

Abstract Algebra (Two questions)

Binary operations, Notions of groups, sub groups, Cyclic group and permutation group, Elementary concept of ring, Integral Domain and field with examples.

Group B
Matrices (Two questions)

Matrices and its algebra, Kinds of Matrices (Symmentry, Skew Symmetry, Hermitian, Skew-Hermitian, Orthogonal, Unitary Matrices), Transpose, Adjoint and inverse Matrices, Rank of a Matrix and solution of Linear equation.

Linear Programming (Two questions)

The Linear programming problem, Problem formulation, Linear programming in matrix notation, Convex set and their elementary properties, Graphical solution of L.P.P.

Group C
Trigonometry (Two questions)

Gregory's DeMoivre's theorem and its application, Complex argument, Gregory's series and Hyperbolic function.

Group D
Real Analysis (Two questions)

Definition of Sequence, Theorems on limits of sequences, Bounded and monotonic sequences, Cauchy's convergence criterion, Convergence and divergence of series, Comparison Test, Cauch's root test, D'Alembert's ratio test, Alternating series, Leibnitz's Test, Continuity and differentiability of real function of a single variable and their properties.

Books Recommended

1.	Matrix & Linear Algebra	-	**K. B. Dutta,** Prentice Hall of India Pvt. Ltd., New Delhi 2000
2.	Matrices	-	**Shanti Narayan**
3.	Linear Programming	-	**Laljee Prasad**
4.	Higher Trigonometry	-	**Das Gupta**
5.	Higher Trigonometry	-	**Laljee Prasad**
6.	Degree Level Set Theory	-	**Prof. K. K. Jha**
7.	Set Theory	-	**Laljee Prasad**
8.	Set Theory	-	**Das Gupta**
9.	Abstract Algebra	-	**Prof. K. K. Jha**
10.	Real Analysis	-	**Das Gupta**
11.	Infinite Series	-	**Laljee Prasad**

BOTANY (Subsidiary)
Paper I

Algae, Fungi, Bacteria, Virus, Bryophyta, Pteridophyta, Gymnosperm, Embryology and Economic Botany

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

Ten questions to be set, six from Group A and four from Group B. Five to be answered, selecting three from group A and two from group B.

Group A

1. Algae   - Morphology, structure, reproduction and life history of the following genera : *Volvox, Oedogonium, Ectocarpus, Batrachospermum, Anabaena.*

2. Fungi   - Morphology, structure, reproduction and life history of the following genera : *Synchytrium, Phytophthora, Peziza, Erysiphe, Puccinia, Ustilago*

3. Microbiology - A brief knowledge of Microbiology, Ultra structure and economic importance of Bacteria and Virus.

4. Bryophyta   - Morphology, structure, reproduction (important characteristics), life history and classification of *Marchantia, Anthoceros* and *Sphagnum.*

5. Pteridophyta - Morphology, structure, reproduction (important characteristics), life history and classification of *Lycopodium, Equisetum* and *Marsilea.*

6. Gymnosperm- Morphology, structure, reproduction (important characteristics), life history and classification of *Cycas* and *Pinus.*

Group B

1. Embryology - A. Micro and Megasporogenesis
                      B. Micro and Megagametogenesis
                      C. Endosperm
                      D. Embryo

2. Economic Botany - Systematic position and morphological nature

of the parts and the economic importance of the following :-
Wheat, Rice, Gram, Pea, Tea, Mustard, Mango, Shisham, Vashak, Carrot.

BOTANY (SUBSIDIARY)
Practical

Time - 3 hours   **Full Marks - 25**

1. Morphology and structural details of following forms prescribed in the syllabus

   Algae - One

   Fungi-One

   Bryophyta - One

   Temporary slide preparation   3×3= 9 marks

2. Morphology and structural details of the forms of Pteridophyta or Gymnosperm prescribed in the course and its permanent stained microscopic slide preparation   4 marks

3. Identification and comment upon the following five spots : Algae-One, Fungi-One, Bryophyta-One, Pteridophyta/Gymn-osperm-One, Embryology-One   5 marks

4. **Practical Records**   5 marks

ZOOLOGY (Subsidiary)

Paper I

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

Twelve questions are to be set. Students will be required to answer any five questions, at least **two** from each group.

Group A
Non-Chordata

Bionomics : General characters and classification (upto orders) of the following phyla :-

Porifera, Coelenterata, Platyhelminthes, Aschelminthes, Annelida, Mollusca, Echinodermata and Hemichordata

Detailed study of the strucure and life history of the following types

1.	Protozoa	-	Paramecium
2.	Porifera	-	Sycon
3.	Cnidaria	-	Obelia
4.	Platyhelminthes	-	Fasciola
5.	Aschelminthes	-	Ascaris lumbricoides
6.	Annelida	-	Pheretima posthuma
7.	Arthropoda	-	Palaemon
8.	Mollusca	-	Pila
9.	Echinodermata	-	Asterias
10.	Hemichordata	-	Salient features of Balanoglossus and its affinities

Group B
Cell-Biology, Genetics and Evolution

1. Gametogenesis, Fertilization & Parthenogenesis
2. Cell-Biology and Genetics : Ultra-structure and functions of the following cell organelles :-
   Plasma membrane, Endoplasmic reticulum, Mitochondria, Golgi bodies, Ribosomes, Chromosomes, Lysosome.
3. Structure and functions of DNA.
4. Gene Mutation.
5. Linkage and crossing-over.

Evolution

1. Lamarckism and Neo-Lamarckism.
2. Darwin's theory of natural selection and Neo-darwinism.
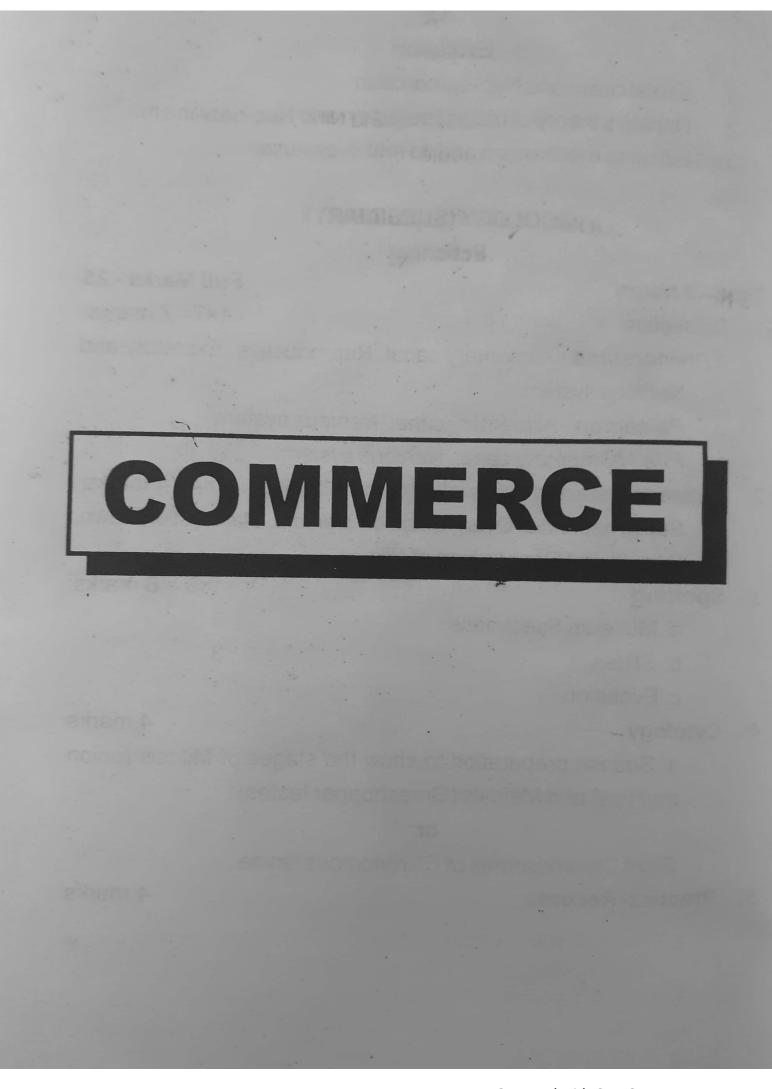3. Isolating mechanism and its role in evolution.

ZOOLOGY (SUBSIDIARY)
Practical

Time - 3 hours   Full Marks - 25

1. Dissection   1×7= 7 marks
   a. **Pheretima** - Alimentary canal, Reproductive, Excretory and Nervous system
   b. **Palaemon** - Alimentary canal, Nervous system
   c. **Pila** - Alimentary canal, Nervous system
2. Permanent stained Preparation of the following   1×4= 4 marks
   Septal nephridia, Ovary, Setae of *Phertima*, Statocyst of Prawn, Radula and Osphradium of *Pila*
3. **Spotting**   1×6 = 6 marks
   a. Museum Specimens   2
   b. Slides   3
   c. Evolution   1
4. **Cytology**   4 marks
   a. Squash preparation to show the stages of Mitosis (onion root tips) and Meiosis (Grasshopper testes)

   or

   Giant Chromosomes of *Chironomous* larvae
5. **Practical Records**   4 marks

COMMERCE

COURSES OF STUDY
for
Commerce subjects/group of subjects
for B.Com (General) Part I Examination

Time - 3 hours   Full Marks - 100

Paper I
FINANCIAL AND CORPORATE ACCOUNTING

i.   Introduction - Meaning and scope of accounting, Accounting Cycle, Objectives of Accounting, Branches of Accounting, Principles of Accounting.

ii. Special Accounting Areas - Branch Accounts(except foreign branch), Royality Accounts, Hire Purchase and Instalment Purchase System.

iii. Partnership Accounts - Basics, Dissolution of Partnership Firms, Accounting entries, Insolvency of Partner(s) including Garner vs Murray Case decisions.

iv. Basics of Corporate Accounting- Issue of Shares and Debentures, Forfeiture and Re-Issue of forfeited shares, Final Accounts of company.

v.   Core issues of Corporate Accounting - Amalgamation as per AS-14 and Reconstruction.
     Consolidated Balance Sheet of Holding Company, Accounting for winding up of a company (Voluntary only).

Suggested Reading :

1. Gupta R.L.and Radhaswami - Financial Accounting,Sultan Chand & Sons, New Delhi.

2. Agrawala A. N. - Higher Science of Accounting, Kitab Mahal, Allahabad.

3. Maheswari S. N. - Advanced Accounting, Sultan Chand & Sons.

4. Uchh Vitiya Avam Kampany Lekhankan, Agrawal and Agrawal, Ramesh Book Depot.

5. Shukla S.M. - Advanced Accounting, Sahitya Bhawan, Agra.

6. Shukla M.C. - Advanced Accounts. S. Chand & Co.,New Delhi

Paper II
PRINCIPLES OF BUSINESS MANAGEMENT

i.   Introduction - Concept, Nature, Process and Significance of Management, An Overview of Functional Areas of Management, Levels of Management.

ii. Planning - Concept, Process and Types of Planning, Planning and decision-making.

iii. Organising - Concept, Nature, Process and Significance, Forms of Organization Structure.

iv. Motivating and Leading - Concept of Motivation and Leadership.

v. Communication - Concept, Types, Effectiveness and Barriers.

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Suggested Readings :

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2. Wrihrich and Koontz - Essentials of Management, Tata McGraw Hill, New Delhi.

3. Stoner and Freeman - Management, Prentice Hall, New Delhi.

4. Tripathy and Reddy - Principles of Management, Tata McGraw Hill, New Delhi.

5. Gupta C.B. - Management Theory and Practice, S. Chand and Co, New Delhi.

6. Saxena S. P. - Vyavsay Prashashan Avam Prabandh, Sahitaya Bhawan, Agra.

Paper III
BUSINESS ECONOMICS

i. Introduction - Nature and scope of Business Economics, Business Economics and Traditional Economics, Business Economists.

ii. Demand - Concept of Demand, Law of Demand, Price Elasticity of Demand, Demand Forecasting.

iii. Production Function - Law of variable proportions, Nature of Production Function, Iso Product Curve.

iv. Market Structure - Perfect Competition, Monopoly, Price-Output Determination Under Perfect Competition and Monopoly, Time Element in Price Determination.

v. Factor Pricing - Theories of Wage, Rent, Interest and Profit, Concept and Measurement of National Income.

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3. Jhingor M. L. - Advanced Economic Theory

4. Mishra & Puri - Business Economics, HPH, Bombay

5. Singh S. P. - Arthashastra Ke Shidhant.

COURSES OF STUDY
for
for B.Com (Honours) Part I Examination
(A) ACCOUNTING AND FINANCE GROUP

Time - 3 hours   Full Marks - 100

Paper I
FINANCIAL AND CORPORATE ACCOUNTING

i.   Introduction - Meaning and scope of accounting, Accounting Cycle, Objectives of Accounting, Branches of Accounting, Principles of Accounting.

ii. Special Accounting Areas - Branch Accounts(except foreign branch), Royality Accounts, Hire Purchase and Instalment Purchase System.

iii. Partnership Accounts - Basics, Dissolution of Partnership Firms, Accounting entries, Insolvency of Partner(s) including Garner vs Murray Case decisions.

iv. Basics of Corporate Accounting- Issue of Shares and Debentures, Forfeiture and Re-Issue of forfeited shares, Final Accounts of company.

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3. Maheswari S. N. - Advanced Accounting, Sultan Chand & Sons.
4. Uchh Vitiya Avam Kampany Lekhankan, Agrawal and Agrawal, Ramesh Book Depot.
5. Shukla S.M. - Advanced Accounting, Sahitya Bhawan, Agra.
6. Shukla M.C. - Advanced Accounts. S. Chand & Co.,New Delhi

Paper II
AUDITING

i. Introduction - Definition, Objectives and Importance of Auditing, Classes of Audit, Audit and Accounting, Auditor, Qualities of an Auditor.

ii. Audit Programme - Audit Note Book, Internal Check, Internal

Audit, Internal Control, Vouching, Verification of Assets and Liabilities.

iii. Company Audit - Appointment, Remuneration, Duties, Liabilities and Rights of Company Auditor, Audit of Final Accounts of a Company, Divisible Profits, Audit of Share Capital.

iv. Audit and Investigation - Audit Report, Types of Audit Report, Concept and Objectives of Investigation, Audit vs Investigation.

v. Allied Issues - Revenue and Capital Expenditure, Different types of Reserves, Depreciation and Audit.

Suggested Reading :-

1. Gupta, Kamal - Auding , Tata McGraw Hill, New Delhi
2. Tondon, B. N. - Principles of Auditing, Sultan Chand and Sons, New Delhi.
3. Pangre Dinkar - Principles and Practices of Auditing, Sultan Chand and Sons, New Delhi.
4. Sharma T. R. - Ankeshan, Sahitya Bhawan, Agra.
5. Prasad Manmohan - Ankeshan ke Sidhant, Mitlal Banarsi Das, Patna.

B.Com (Honours)
(B) MARKETING GROUP

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

Paper I
FINANCIAL AND CORPORATE ACCOUNTING

i. Introduction - Meaning and scope of accounting, Accounting Cycle, Objectives of Accounting, Branches of Accounting, Principles of Accounting.

ii. Special Accounting Areas - Branch Accounts(except foreign branch), Royality Accounts, Hire Purchase and Instalment Purchase System.

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5. Shukla S.M. - Advanced Accounting, Sahitya Bhawan, Agra
6. Shukla M.C. - Advanced Accounts. S. Chand & Co.,New Delhi

Paper II
PRINCIPLES OF MARKETING

i. Introduction - Nature and scope of Marketing, Traditional and Modern Concepts of Marketing, Selling vs Marketing, Marketing Environment, Marketing Mix.

ii. Product - Concept of Product, Consumer and Industrial Goods, Product Life Cycle, Development of New Product, Packaging.

iii. Promotion - Methods of promotion, Optimum Promotion mix, Advertisment, Publicity, Sales Promotion and Personal selling.

iv. Price - Importance of Price in Marketing mix, Pricing Policy consideration, Factors affecting price of a product/service.

v. Distribution - Concept, Role and Types of Distribution Channels, Supply chain and Logistics.

Suggested Reading :

1. Kotler Philip - Marketing Management, Prentice Hall, New Delhi
2. Stanton W. J., Etzel and Walken - Fundamentals of Marketing, McGraw Hill, New Delhi.
3. Nanlakha R. I. - Vipnan ke Shionyat, Ramesh Book Depot.
4. Agrawla, Kolhari - Vipanan Prabandh, Sahitya Bhawan, Agra
5. Jha & Singh - Marketing Management : Indian Perspective, H & H, Bombay.

B.Com (Honours)
(C) INTERNATIONAL BUSINESS GROUP

Time - 3 hours   Full Marks - 100

Paper I
FINANCIAL AND CORPORATE ACCOUNTING

i. Introduction - Meaning and scope of accounting. Accounting Cycle, Objectives of Accounting, Branches of Accounting, Principles of Accounting.

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Paper II
INTERNATIONAL BUSINESS ENVIRONMENT

i. Introduction - Nature, Importance and scope of Environment Analysis, Economic, Geographical, Socio-Cultural, Commercial and Political Environment.

ii. International Business - Theories of International Trade, Gains from International Trade, Balance of Payment Analysis.

iii. MultiNational Corporation - Concept, Nature, Role, Types and Operations of MNCs.

iv. Instituions - WTO, IBRD, IMF, UNCTAD

v. Current Trends - Current issues in International Trade, Trade in Services.

Suggested Reading :

1. Daniel and Radebough - International Business Environments and Operations, Addison Werley Pub co.
2. Bhalla V. K. - International Business, Anmol Publication, New Delhi
3. Parver Asheghran, Bahaman Ebrahim - International Business, Harper Collins, London
4. Cherunilam, Francis - International Business Environment, HPH, Bombay
5. Michel V. P.-Globlization and Stategic Management, HPH, Bombay

COURSES OF STUDY
for
B.Com Subsidiary subjects
Part I Examination

Subsidiary Papers for All Three Groups of Honours Subjects will be same

Time - 3 hours   Full Marks - 100

Paper I
PRINCIPLES OF BUSINESS MANAGEMENT

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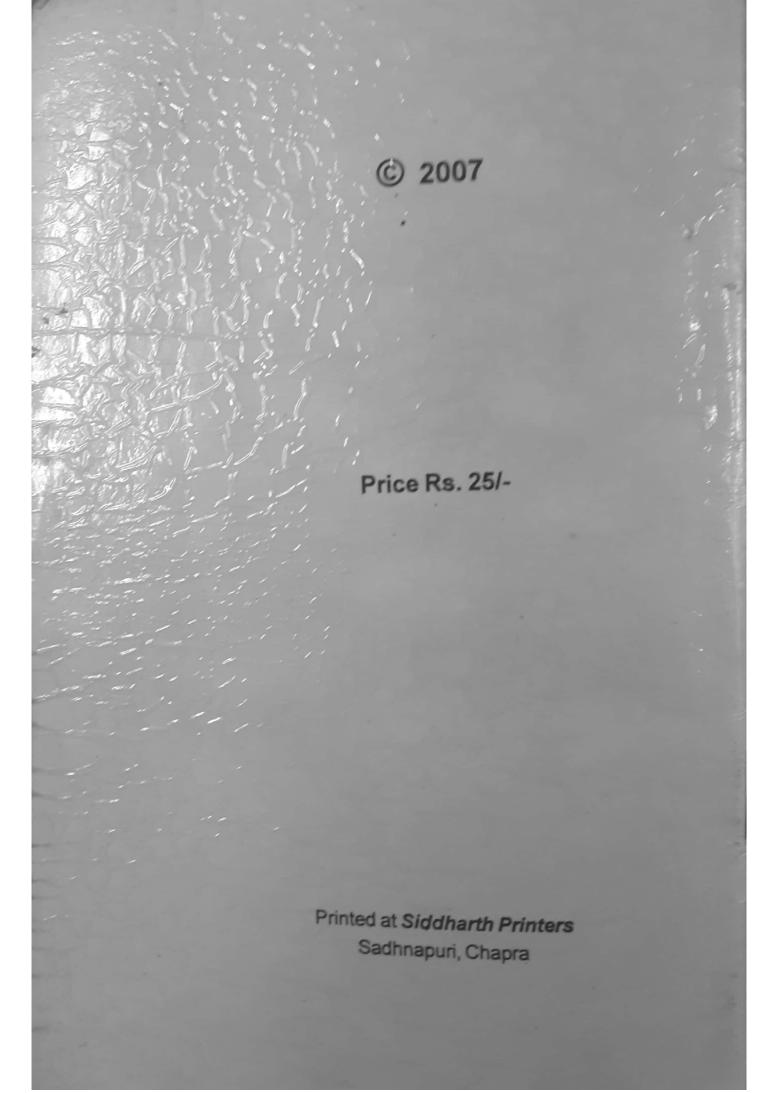6. Saxena S. P. - Vyavsay Prashashan Avam Prabandh, Sahitaya Bhawan, Agra.

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3. Jhingor M. L. - Advanced Economic Theory

4. Mishra & Puri - Business Economics, HPH, Bombay

5. Singh S. P. - Arthashastra Ke Shidhyant.

Price Rs. 25/-