# FACULTY OF SCIENCES

## SYLLABUS

## FOR

# B.Sc. (Hons.) Physics
### (Semester I-II)
### Session: 2016-17

# KHALSA COLLEGE AMRITSAR
*(An Autonomous College)*

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# SYLLABUS FOR B.Sc. (HONS.) PHYSICS (2016-17)

## Semester I

## Semester II

## SYLLABUS FOR B.Sc. (HONS.) PHYSICS (2016-17)

## BHP 101 MECHANICS

**Time: 3 Hours**        **Total Marks:75**

**(Max. Marks: 60+Internal Assessment: 15)**

**Total Lectures: 60**        **Pass Marks: 35%**

**Instructions for the Paper Setters:**

There will be five sections. Section A will consist of Eight Short Answer Type questions covering the whole syllabus and is compulsory. Sections B, C, D and E will consist of two questions each. The candidates are required to attempt one from each Section. All questions carry equal marks.

### UNIT-I

**Co-ordinate system and Motion of a Particle:** Cartesian and Spherical polar co-ordinate systems; area, volume, displacement, velocity and acceleration in these systems. Solid angle, Symmetry principles and Laws of Conservation.

### UNIT-II

**Conservation of Momentum and Collisions:** Internal forces and momentum conservation. Centre of mass. Elastic collisions in laboratory and center of mass systems; velocities, angles, energies in these systems and their relationships. Conservation of angular momentum and examples-shape of the galaxy, angular momentum of solar system. Torques due to internal forces, angular momentum about center of mass. Cross-section elastic scattering and impact parameter, Rutherford scattering.

### UNIT-III

**Inverse-Square-Law Force:** Forces in nature (qualitative). Central forces, Potential energy and force between a point mass and spherical shell, a point mass and solid sphere, gravitational and electrostatic self energy. Two body problem and concept of reduced mass. Motion of a body under central force, equation of orbit in inverse-square force field. Kepler's laws and their derivation.

### UNIT-IV

**Dynamics of Rigid Bodies:** Equation of motion of a rigid body, rotational motion of a rigid body in general and that of plane lamina. Rotation of angular momentum vector about a fixed axis. Angular momentum and kinetic energy of a rigid body about principal axis, Euler's equations. Precession and elementary gyroscope, Spinning top.

**Reference Books:**

1. Mechanics-Berkeley Physics Course, Vol-I (second edition):C. Kittel, W. D. Knight, M. A. Ruderman, C. A.Helmholtz and R. J. Moyer-Tata Mc Graw Hill Publishing Company Ltd., New Delhi.
2. Fundamentals of Physics: D. Halliday, R. Resnick and J. Walker (sixth edition)-Wiley India Pvt. Ltd.

**BHP 102 ELECTRICITY AND MAGNETISM-I**

Time: 3 Hours                                                                          **Total Marks:75**
                                                        **(Max. Marks: 60+Internal Assessment: 15)**
**Total Lectures: 60**                                                      **Pass Marks: 35%**
**Instructions for the Paper Setters:**
There will be five sections. Section A will consist of Eight Short Answer Type questions covering the whole syllabus and is compulsory. Sections B, C, D and E will consist of two questions each. The candidates are required to attempt one from each Section. All questions carry equal marks.

## UNIT-I
**Calculus of Vectors :** Basic Ideas of Vector Calculus**,** Introduction to gradient, divergence & curl; their physical significance. Rules for vector derivatives, useful relations involving gradient, divergence & curl. Solenoidal and irrotational fields, Fundamental theorem for gradients, Gauss's and Stoke's theorems, Helmholtz and Green Theorems.

## UNIT-II
**Electrostatics:** Electric charge and its properties, Coulomb's law. Principle of superposition. The electric field due to a point charge and continuous charge distributions, Electric field due to finite and infinite lines of charges. Field due to electric dipole, Field lines, flux, Gauss's law and its applications. Curl of electric field. Relation between potential and electric field. Poisson's and Laplace's equations. Electric potential due to different charge distribution: Wire, Ring, Disc, Spherical Sheet, Sphere, dipole etc. The energy for a point and continuous charge distribution.

## UNIT-III
**Electric Currents and Fields of Moving Charges** Conductors in the electrostatic field, Capacitors, Current and current density, drift velocity, expression for current density vector, Potential due to a point charge, group of charges, wire, dipole, line charge, ring, disc, spherical shell, sphere and dipole. Equation of continuity. Ohm's Law and expression for electrical conductivity, limitations of Ohm's law, Drude Lorentz Theory of electrical conductivity**,** Multipoles and multipole moments. Equipotential surface method of electrical images. Electric field in different frames of references, Transformation of Electric Field from one inertial Frame to another, Relation between electric force in two inertial frames, Interaction between moving charges, Electric field due to moving charges, electric force in two internal frames, Interaction between moving charges.

## UNIT-IV
**Electric Fields in Matter :** Dielectrics, Non Polar and Polar Molecules, Polarisation of Dielectric, Polarization Vector P, Atomic polarizability, Dielectric Constant, Capacity of a Capacitor, Electric Susceptibility, Free and Bound Charges, Gauss's Law in Dielectric, Displacement Vector, Energy stored in Capacitor having Dielectric Medium, Energy Density of a Dielectric Medium

**Reference Books:**
1. Introduction to Electrodynamics -D.J. Griffiths, Pearson Prentice Hall, New Delhi.
2. Electricity & Magnetism-T.S. Bhatia and Gurpreet Singh, Vishal Publications.
3. Berkeley Physics Course Vol. II (Electricity & Magnetism)- E.M.Purcell, Mc Graw hill, New York.
4. Fundamental of Physics -D. Halliday, R. Resnick and J. Walker (6th edition)-John Wiley, India Pvt. Ltd.

## BHP 103-MATHEMATICS – I

**Time: 3 Hours** **Total Marks:50**
**(Max. Marks: 40+Internal Assessment: 10)**
**Total Lectures: 60** **Pass Marks: 35%**

**Instructions for the Paper Setters:**
There will be four sections. Each section carry ten marks. Student has to attempt two questions from each section. Each question carries five marks. Each section should consist of four questions in all.
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### UNIT-I
**Functions and Derivatives:** Limits, continuity and derivative of function. Differentiation of standard functions, Successive differentiation. Geometrical significance of derivative. Maxima and Minima of a function of single variable. Partial differentiation. Chain rule of differentiation.

### UNIT-II
**Differential Calculus:** Statement of Rolle's theorem and Mean value theorem, Taylor's and Maclaurins theorems and their applications to formal expansion of functions. Tangents and normals. Asymptotes and graphs of simple curves in Cartesian co-ordinates.

### UNIT-III
**Integral Calculus:** Integration as inverse of differentiation. Indefinite integrals of standard forms.Method of substitution. Integration using partial fractions. Integration by parts. Reduction formulae. Definite integrals. Definite integral as limit of a sum and geometrical interpretation as an area. Formal double and triple integrals and their uses in the determination of C. G. and Moments of inertia.

### UNIT-IV
**Differential Equations:** Definition & formation of differential equations. Linear differential equation of first order and first degree. Linear homogenous and inhomogeneous differential equation of second order. Linear differential equations with constant coefficients.

**Text and Reference Books:**
1. Differential Calculus: Shanti Narayan, New Delhi, Shyam Lal, 1983.
2. Integral Calculus: Shanti Narayan, Delhi, S. Chand, 1968.
3. Mathematical Hand Book: M. Vygodsky, Mir, Mascow, 1975.
4. Higher Engineering Mathematics: B.S. Grewal, Delhi, Khanna, 1995.

## BHP 104-CHEMITRY – I

**Time: 3 Hours**      **Total Marks:50**
**(Max. Marks: 40+Internal Assessment: 10)**
**Total Lectures: 60**      **Pass Marks: 35%**

### Instructions for the Paper Setters:
There will be five sections. Section A will consist of Eight Short Answer Type questions covering the whole syllabus and is compulsory. Sections B, C, D and E will consist of two questions each. The candidates are required to attempt one from each Section. All questions carry equal marks.

### UNIT-I
**Stereochemistry:** Molecular chirality, enantiomers/symmetry in achiaral structures, chiral centres in chiral molecules, properties of chiral molecules-optical activity, absolute and relative configuration, the Cahn-Ingold Perlog R-S notional system physical properties of enantiomers. Stereochemistry of chemical reactions that produce chiral centres, chemical reactions that produce stereoisomers, Resolution of enantiomers, chiral centres other than carbon.

### UNIT-II
**Chemistry alkanes and alkenes:** Conformations of alkanes and cycloalkanes: conformational analysis of ethane, butane, cyclohexane, monosubstituted and disubstituted cyclohexane, conformation of small, medium and large ring cycloalkanes and of polycyclic ring systems.Stereochemistry of alkenes, naming stereo isometric alkenes by the E-Z system, mechanism of hydrogenation of alkenes, stereochemistry of hydrogenation of cycloalkenes, Dehydration of alcohols and regioselectivity of these reactions. Acid catalysed dehydration of alcohols with complete mechanistic discussion, Mechanism of dehydrohalogenation of alkylhalides (E mechanism), stereoselective and antielimination in E reactions, the E Mechanism, electrophilic addition of hydrogen halides to alkenes its regioselectivity explained on the basis of mechanism, free radical addition of hydrogen bromide to alkenes, acid catalysed hydration of alkene with mechanism stereochemistry of halogen addition to alkenes and its mechanistic explanation. Hypohalous acid addition to alkenes, epoxidation of alkenes.

**Alkynes:**Acidity of acetylene and terminal alkenes, metal ammonia reduction of alkyne, addition of hydrogen halides and water to alkynes, with detailed discussion of mechanism of these reactions, the diels Alder reaction, orbital symmetry and the diels Adler reaction.

### UNIT-III
**Nucleophilic substitution and addition reaction:**
**(a)**Functional group transformation by nucleophilic substituion, the biomoleculear(SN), mechanism of nucleophilic substitution, stereochemistry of SN reactions, how SN reactions occur, steric effect in SN reactions, nucleophiles and nucleophilicity, the unimolecular (SN) mechanism of nucleophilic substitution, carbocation stability and the rate of substitution, by the SN mechanism stereochemistry of SN reactions, carbocation real arrangements in SN reactions, solvent effects, substitution and elimination as competing reactions. The SN -SN.

(b) Principles of nucleophillic addition to carbonyl groups : Hydration acetal formation, cyanohydrin formation ; reactions with primary and secondary amines, Whittig reaction,

steroselective addition to carbonyl groups mechanism of halogenation, acid and base catalysed cholization, haloform reaction, aldol condensation, conjugate nucleophillic addition to unsaturated carbonyl compounds

## UNIT-IV

**Spectroscopy:** Principles of molecular spectroscopy, electromagnetic radiation, quantized energy states, NMR(H) Spectroscopy, nuclear shielding and Chemical shift measurements chemical shift and molecular structure, interpreting proton NMR spectra, spin- spin splitting in NMR spectroscopy, patterns of spin-spin splitting, proton NMR spectra of alcohols, NMR and conformations carbons- 13 nuclear magnetic resonance, the sensitivity problem, interpretation of spectra. Infrared spectroscopy, ultraviolet–visible (UV-VIS) spectroscopy and mass spectrometry.

**Text and Reference Books:**
1. R.T. Morison and R.N. Boyd, Organic Chemistry.

2. I.L. Finar, Organic Chemistry, Vol. I IV ed.

3. Advanced Organic Chemistry, Reactions Mechanisms and Structure by J. March.

4. Schaum's Outlines Series Theory and Problems of Organic Chemistry by Herbert Meislick and Jacob Sharefkin

5. Problems and their solution in Organic chemistry by I.L. Finar, Modern Organic Chemistry by J.D. Robbert and M.C. Caserio.

6. Organic Chemistry by D.J. Cram and G.S. Hammond.

7. J.E. Banks, Naming Organic Compounds – Programmed Introduction to Organic Chemistry.

8. E.L. Eliel, Stereochemistry of carbon compounds.

9. W. Camp, Organic Spectroscopy.

10. F.A. Carey, Organic Chemistry.

**BHP 105-COMMUNICATIVE ENGLISH – I**

Time: 3 Hours                                                                          **Total Marks:50**
**(Max. Marks: 40+Internal Assessment: 10)**
**Pass Marks: 35%**
**B.A. (Hons. School) Punjabi B.Sc. (Hons. School) Physics, Chemistry**

**Course Contents:**

**1.  Reading and Comprehension Skills:**

Students will be required to read and comprehend the essays in Unit 1 and 2 of the book *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition. They will be required to answer the questions given after each essay.

**2.  Developing Vocabulary and using it in the Right Context:**

The students will be required to master "Word List" and "Correct Usage of Commonly Used Words and Phrases" from the Chapter "Vocabulary" in the book *The Written Word.*

**3.  Writing Skills**

Students will be required to learn "Report Writing" and "Letter Writing" as in the book *The Written Word.*

Students will be required to write long essays based on the prescribed text book *Making Connections: A Strategic Approach to Academic Reading.*

**Suggested Paper Pattern:**

1.  Letter Writing with internal choice as  prescribed in *The Written Word* (8marks)
2.  Short answer type questions from Unit 1,2 of *Making Connections: A Strategic Approach to Academic Reading* (12 marks)
3.  "Word List" and "Correct Usage of Commonly Used Words and Phrases" from the Chapter "Vocabulary" with internal choice the book *The Written Word.* (8 marks)
4.  Essay type question from Unit 1 and 2 of *Making Connections: A Strategic Approach to Academic Reading* 1 out of 2 (6marks)
5.  Report Writing from *The Written Word* (6marks)

## BHP 106 ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ) – I

**Time: 3 Hours**                                                  **Total Marks:50**

**(Max. Marks: 40+Internal Assessment: 10)**

**Pass Marks: 35%**

# B.A. (Hons. – English), B.Sc. (Hons. – Physics, Chemistry), B.Sc. Agri./Bio Tech./IT/FD/ Food Sc./ Food Sc. & QC/BCA, BJMC

## SEMESTER-I

ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਸਾਹਿਤ ਦੇ ਰੰਗ** (ਸੰਪਾ. ਡਾ. ਮਹਿਲ ਸਿੰਘ), ਭਾਗ ਪਹਿਲਾ (ਕਵਿਤਾ ਅਤੇ ਕਹਾਣੀ), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

2. ਪੈਰ੍ਹਾ ਰਚਨਾ

3. ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ।

4. (ੳ) **ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ** : ਉਚਾਰਨ ਅੰਗ, ਉਚਾਰਨ ਸਥਾਨ ਤੇ ਵਿਧੀਆਂ, ਸਵਰ, ਵਿਅੰਜਨ, ਸੁਰ।

(ਅ) **ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ** : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ-ਭਾਸ਼ਾ ਦਾ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ-ਚਿੰਨ੍ਹ।

5. **ਮਾਤ ਭਾਸ਼ਾ ਦਾ ਅਧਿਆਪਨ**

(ੳ) ਪਹਿਲੀ ਭਾਸ਼ਾ ਦੇ ਤੌਰ ਉੱਤੇ

(ਅ) ਦੂਜੀ ਭਾਸ਼ਾ ਦੇ ਤੌਰ ਉੱਤੇ

## ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਕਿਸੇ ਕਵਿਤਾ ਦਾ ਸਾਰ ਜਾਂ ਉਸਦਾ ਵਿਸ਼ਾ ਵਸਤੂ (ਦੋ ਵਿਚੋਂ ਇੱਕ) **8 ਅੰਕ**

2. ਕਿਸੇ ਕਹਾਣੀ ਦਾ ਸਾਰ, ਉਸਦਾ ਵਿਸ਼ਾ ਵਸਤੂ, ਕਹਾਣੀ ਕਲਾ ਜਾਂ ਪਾਤਰ ਉਸਾਰੀ (ਦੋ ਵਿਚੋਂ ਇੱਕ) **8 ਅੰਕ**

3. ਪੈਰ੍ਹਾ ਰਚਨਾ : ਤਿੰਨ ਵਿਸ਼ਿਆਂ ਵਿਚੋਂ ਕਿਸੇ ਇੱਕ ਉੱਤੇ ਪੈਰ੍ਹਾ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇ। **4 ਅੰਕ**

4. ਪੈਰ੍ਹਾ ਦੇ ਕੇ ਉਸ ਬਾਰੇ ਚਾਰ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ **4 ਅੰਕ**

5. ਨੰਬਰ 5 ਉੱਤੇ ਦਿੱਤੀ ਵਿਆਕਰਣ ਦੇ ਆਧਾਰ 'ਤੇ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ **8 ਅੰਕ**

6. ਨੰਬਰ 6 ਵਿਚ ਮਾਤ ਭਾਸ਼ਾ ਦੇ ਪਹਿਲੀ ਭਾਸ਼ਾ ਅਤੇ ਦੂਜੀ ਭਾਸ਼ਾ ਵਜੋਂ ਅਧਿਆਪਨ, ਮਹੱਤਵ ਅਤੇ ਸਮੱਸਿਆਵਾਂ ਬਾਰੇ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ ਦੋ ਦਾ ਉੱਤਰ ਦੇਣਾ ਹੋਵੇਗਾ।

(4×2)=8 ਅੰਕ

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 10 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਇਨ੍ਹਾਂ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 40+10 = 50 ਹਨ।

## BHP 107 ਮੁੱਢਲੀ ਪੰਜਾਬੀ– I (In Lieu of Compulsory Punjabi)

**Time: 3 Hours**

**Total Marks:50**
**(Max. Marks: 40+Internal Assessment: 10)**
**Pass Marks: 35%**

**B. A., B.A. (SS), B. A. (Hons. – English), B. Com. (Hons. & R), B. Sc. Agri./Bio-Tech./Comp. Sc./Eco./FD/Food Sc./Food Sc. & QC/IT/Med./NMed./B. Sc. Hons. – Ch./Phy./B. Int. & Mob.Tech./B. of Mult./BBA/BCA/BJMC**

## SEMESTER-I
(In Lieu of Compulsory Punjabi)

1. ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ

ੳ) ਨਾਮਕਰਣ ਤੇ ਸੰਖੇਪ ਜਾਣ ਪਛਾਣ : ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ, ਅੱਖਰ ਕ੍ਰਮ, ਸਵਰ ਵਾਹਕ (ੳ ਅ ੲ), ਲਗਾਂ ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ।

ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ 15 ਅੰਕ

2. **ਗੁਰਮੁਖੀ, ਆਰਥੋਗ੍ਰਾਫੀ ਅਤੇ ਉਚਾਰਨ** : ਸਵਰ, ਵਿਅੰਜਨ : ਮੁੱਢਲੀ ਜਾਣ-ਪਛਾਣ ਅਤੇ ਉਚਾਰਣ, ਮੁਹਾਰਨੀ, ਲਗਾਂ ਮਾਤਰਾਂ ਦੀ ਪਛਾਣ । 10 ਅੰਕ

3. **ਪੰਜਾਬੀ ਸ਼ਬਦ ਜੋੜ** : ਮੁਕਤਾ (ਦੋ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਤਿੰਨ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ), ਸਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਬਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਔਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲੈਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਲਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲਾਵਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਹੋੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਕਨੌੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਲਗਾਂਖਰ (ਟਿੱਪੀ, ਬਿੰਦੀ, ਅੱਧਕ) ਵਾਲੇ ਸ਼ਬਦ, ਸ਼ੁੱਧ-ਅਸ਼ੁੱਧ।

15 ਅੰਕ

## ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੈ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਪੰਜ-ਪੰਜ ਅੰਕ ਹਨ। (5+5+5) 15 ਅੰਕ

2. ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਨੰਬਰ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। 10 ਅੰਕ

3. ਭਾਗ ਤੀਸਰਾ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿਨ੍ਹਾਂ ਦੇ ਪੰਜ-ਪੰਜ ਅੰਕ ਹਨ। 15 ਅੰਕ

## SYLLABUS FOR B.Sc. (HONS.) PHYSICS (2016-17)

### BHP 108 PHYSICS LAB-I
**General Guidelines for Practical Examination**
**Periods 8 Periods/week**
**Time: 3 Hours**                                    **Total Marks:50**
**(Max. Marks: 40+Internal Assessment: 10)**
**Pass Marks: 35%**

I. The distribution of marks is as follows:
i) One experiment **20 Marks**
ii) Brief Theory **5 Marks**
iii) Viva–Voce **10Marks**
iv) Record (Practical file) **5 Marks**
II. There will be one sessions of 3 hours duration. The paper will have one session and will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.
III. Number of candidates in a group for practical examination should not exceed 12.
IV. In a single group no experiment be allotted to more than three examinee in any group.
1. To measure the time periods of oscillation for the objects of various geometrical shapes but of same mass.
2. To study rotational motion using a flywheel and hence show that toque is proportional to angular acceleration.
3. To find the moment of inertia of an irregular body about an axis through its centre of gravity with a torsion pendulum.
4. To determine the moment of inertia of a flywheel.
5. To determine the Young's modulus by bending of beams.
6. Determination of Poisson's ratio for rubber.
7. To verify laws of conservation of (a) linear momentum, (b) kinetic energy in elastic collisions using one dimensional collisions of hanging spheres. (c) Also determine energy transfer and coefficient of restitution.
8. To determine modulus of rigidity of copper wire by Maxwell needle experiment.
9. To determine low resistance with Carey-Foster's Bridge with and without calibration.
10. To determine the resistance and specific resistance of a copper wire with the help of Kelvins double bridge.
11. To find the unknown capacitance of a capacitor by flashing and quenching of a neon lamp.
12. Measurement of capacitance, determination of permittivity of a medium air and relative permittivity by de–Sauty's bridge.
13. To study the flow of water through a capillary tube as a function of pressure head using two tubes of same length but different radii.
14. To study the flow of water through a capillary tube as a function of pressure head using two tubes of different length but of same radii.
15. To study the variation in resistance of filament of a bulb with temperature.
**Reference Books:**
1. Practical Physics Vol. I, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications.
2. Practical Physics, C.L. Arora, S. Chand & Co.

**BHP 109 CHEMISTRY LAB-I**
**General Guidelines for Practical Examination**
**6 Periods/week**
**Time: 3 Hours**                                                      **Total Marks:50**
                                            **(Max. Marks: 40+Internal Assessment: 10)**
                                                                    **Pass Marks: 35%**


I. The distribution of marks is as follows:

The preliminary examination of physical and chemical characteristics (physical state, colour, odor and ignition tests), elemental analysis (nitrogen, sulphur, chlorine, bromine, iodine), solubility tests including acid-base reactions, classification tests involving functional reactivity other than acid-base test, preparation of derivatives for given pure organic compounds.

The following categories of compounds should be analyzed.

-phenols, carboxylic acids

-carbonyl compounds - ketones, aldehydes

-carbohydrates

-aromatic amines

-aromatic hydrocarbons



**Suggested Book:**
Practical Organic Chemistry by F.G. Mann and B.C. Saunders

## BHP 201 ELECTRICITY & MAGNETISM-II

**Time: 3 Hours**                                                **Total Marks:75**
                                      **(Max. Marks: 60+Internal Assessment: 15)**
**Total Lectures: 60**                                          **Pass Marks: 35%**
**Instructions for the Paper Setters:**
There will be five sections. Section A will consist of Eight Short Answer Type questions covering the whole syllabus and is compulsory. Sections B, C, D and E will consist of two questions each. The candidates are required to attempt one from each Section. All questions carry equal marks.

### UNIT-I
**MAGNETIC EFFECTS OF ELECTRIC CURRENTS :** Magnetic Effect of Electric Current, Direction of Field Lines due to current Flowing in a straight Conductor , Magnetic Field Density, Magnitude of Magnetic Flux, Magnetic and Lorentz Forces, Biot-Savart's Law, Magnetic Field Due to along Straight Conductor, Magnetic Field Intensity at point on the axis of a current loop. Variation of Field along the axis of the coil, Magnetic Field intensity inside a long Solenoid, Ampere's Circuital Law: Line Integral of Magnetic Field, Applications of Ampere's Circuital Law, Solenoid Nature of Vector Field, Properties of the Magnetic Field, Vector Potential and its expression, Surface Current Density, Changes in Magnetic Field at a current Sheet, Hall Effect, Comparison of Electrostatic Field and Magnetic Field, Transformation Equation For Electric and Magnetic Fields.

### UNIT-II
**MAGNETIC PROPERTIES OF MATTER :** Some Important Terms associated with Magnetic Materials, Torque on current Loop, Magnetic Dipole in a Magnetic Field , Potential Energy of Magnetic Dipole, Force on Magnetic Dipole In Non-Uniform Magnetic Field, Magnetic Dipole Moment of an Atom, Expression of orbital Magnetic dipole moment of Electron, Electron Spin Magnetic Moment , Free and Bound Currents, Uniformly and. Non-Uniformly Magnetised Matter , Diamagnetism , Langevin's theory of diamagnetic behaviour, Paramagnetism and Langevin's Theory of Paramagnetic Susceptibility, Ferromagnetism, Domain theory of Magnetism, Analysis of magnetisation Curves : Hystersis Curve, Energy Loss Due to Hystersis and its Importance

### UNIT-III
**ELECTROMAGNETIC INDUCTION :** Electromagnetic Induction, Faraday's Induction Experiments, Faraday's Laws of Electromagnetic Induction (Integral And Differential Forms), Lenz's law, Self Induction, Expression for Self Induction : Neumann's Formula, . Self Inductance of a Solenoid and a Torodial, Energy Stored in an Inductor, Mutual Induction, Expression for Coefficient of Mutual Induction and Reciprocity theorem, Mutual Inductance of two Solenoids, Inductive Coupling of Electrical Circuits, Modification of Ampere's Law and the Displacement Current, Maxwell's Equation of Electromagnetism, Series and Parallel LCR Circuits, Average Power Associated With LCR Circuit

### UNIT-IV
**PLANE ELECTROMAGNETIC WAVES:**
Plane waves in lossless media, transverse electromagnetic waves, polarisation of plane waves, plane waves in conducting media, Low-loss dielectric, good conductor, group velocity. Flow of electromagnetic power and the poynting vector. Instantaneous and average power density. Normal and oblique incidence at a plane conducting boundary, Perpendicular and parallel polarisation, normal incidence at a plane dielectric boundary and at multiple dielectric interfaces, wave impedance of total field, impedance transformation with multiple dielectrics, oblique incidence at a plane dielectric boundary, total reflection, perpendicular and parallel polarisation.

**Text and Reference Books:**

**SYLLABUS FOR B.Sc. (HONS.) PHYSICS (2016-17)**

1. Electricity & Magnetism-T.S. Bhatia and Gurpreet Singh, Vishal Publishing Co.
2. Waves and Vibrations, T.S. Bhatia, Vishal Publishing Co.
3. Field & wave Electromagnetics by David & Cheng, Addison Wesley Publishing co.
4. Introduction to Electrodynamics by David J. Griffiths, Prentice Hall of India.

## BHP 202 WAVES & OSCILLATIONS

**Time: 3 Hours**                                                    **Total Marks:75**

**(Max. Marks: 60+Internal Assessment: 15)**

**Total Lectures: 60**                                          **Pass Marks: 35%**

**Instructions for the Paper Setters:**

There will be five sections. Section A will consist of Eight Short Answer Type questions covering the whole syllabus and is compulsory. Sections B, C, D and E will consist of two questions each. The candidates are required to attempt one from each Section. All questions carry equal marks.

### UNIT-I

**Simple and Damped Oscillations**: Simple Harmonic Motion, Equation of SHM, Superposition of two perpendicular SHM, Polarization, Lissajous figures–superposition of many SHM's, complex number notation and use of exponential series. Damped motion of mechanical and electrical oscillator, heavy damping, critical damping. Energy dissipation and energy of damped oscillator, amplitude decay, logarithmic decrement, relaxation time, Q value, comparison between Free and Damped oscillations

### UNIT-II

**Forced Oscillations:** Differential equation of forced mechanical oscillator**,** Transient and steady state behaviour of a forced oscillator, Variation of displacement and velocity with frequency of driving force, frequency dependence of phase angle between force and (a) displacement, (b) velocity, Power supplied to oscillator by driving force and its variation with driving force frequency, Resonance absorption and Q-value as a measure of power absorption bandwidth, Q-value as amplification factor, Forced electrical oscillator, Variation of current with frequency, Variation of power supplied with frequency of applied voltage, Q factor as amplification factor.

### UNIT-III

**Coupled Oscillations**: Stiffness coupled oscillators, In phase and Out phase modes, normal co-ordinates and normal modes of vibration, solutions for differential equations for normal modes and exchange of energy, inductance coupling of electrical oscillators, loose, intermediate and strong coupling, energy exchange between two electrically coupled oscillators..

### UNIT-IV

**Wave Motion:** Types of wave motion**,** The wave equation, transverse waves on a string, the string as a forced oscillator, characteristic impedance of a string, reflection and transmission of transverse waves on a string at a boundary, Energy of a progressive wave, impedance matching, standing waves on a string of fixed length, Energy of a vibrating string, normal modes and eigen frequencies. Energy in a normal mode of oscillation,wave groups, group velocity, dispersive and non dispersive media, Longitudnal waves.

**Reference Books:**

1. Waves and Vibrations, T.S. Bhatia, Vishal Publishing Co.
2. The Physics of Vibrations and Waves- H.J. Pain, John Wiley, Chichester, 1999
3. Vibrations and Waves in Physics- I.G. Main-Cambridge University, Cambridge, 1993.

## BHP-203 MATHEMATICS – II

**Time: 3 Hours** **Total Marks:50**
**(Max. Marks: 40+Internal Assessment: 10)**
**Total Lectures: 60** **Pass Marks: 35%**

**Instructions for the Paper Setters:**
There will be five sections. Section A will consist of Eight Short Answer Type questions covering the whole syllabus and is compulsory. Sections B, C, D and E will consist of two questions each. The candidates are required to attempt one from each Section. All questions carry equal marks.

### UNIT-1
**Second order Differential Equations:** Linear differential equations with variable coefficients. Series Solution of Bessel, Legendre, Hermite, Laguerre and Hypergeometric differential equations by Frobenius method. Recurrence relations and orthogonality properties.

### UNIT-1I
**Partial Differential Equations:** Definition and formation of first and second order partial Differential equations, Laplace, Wave and diffusion equation in one and two dimensions, Solutions of these equations by separation of variables.

### UNIT-1II
**Laplace Transforms:** Definition, elementary Laplace transforms, transforms of derivatives, integration of transforms, Laplace transform of periodic functions, solution of differential equations with constant coefficients using Laplace transforms.

### UNIT-1V
**Fourier series and Transforms:** Periodic functions, Drichlet's conditions, Fourier coefficients, Sine and Cosine series, half range expansions, exponential series, differentiation and integration of Fourier transform, Fourier Sine and Cosine transforms, Inversion formulae, Fourier transforms of derivatives.

**Reference Books:**
1. I. N. Sneddon, *Elements of Partial Differential Equations,* Dover, 2006.
(Scope in Chapters **2-6** )
2. A. Pinkus and S. Zafrany, *Fourier Series and Integral Transforms*, Cambridge University Press, 1997. (Scope in **Chapter 4.**)
3. Applied Mathematics for Engineers and Physicists Pipes & Harvill, London, McGraw Hill,1970.
4. Mathematics of Physics and Modern Engineering: Sokolnikoff & Recheffer
5. Mathematical Methods for Physicists: George Arfken, New York, Academic Press, 1970.

**BHP 204-CHEMITRY – I**

Time: 3 Hours                                     Total Marks:50
                              (Max. Marks: 40+Internal Assessment: 10)
Total Lectures: 60                               Pass Marks: 35%

**Instructions for the Paper Setters:**
There will be five sections. Section A will consist of Eight Short Answer Type questions covering the whole syllabus and is compulsory. Sections B, C, D and E will consist of two questions each. The candidates are required to attempt one from each Section. All questions carry equal marks.

## UNIT-I
**Co-ordination Chemistry:** Introduction, Werner's coordination theory, naming of co-ordinate complexes. Co-ordination numbers 1-12 and their stereo-chemistries.Factors affecting co-ordination numbers and stereo-chemistry
(a)        Configurational Isomers
(b)        Conformational isomerism, VSPER theory, molecular orbital theory applied to homoneuclear diatomic molecules and heteronuclear Diatomic molecules.
**Bonding in metal complexes:**Valence bond theory for co-ordinate complexes, inner And outer orbital complexes, Electro-neutrality and back bonding, limitations of V.B. theory.
**Stability of coordination compounds:** Introduction, Stability constant, stepwise stability constant, overall stability constant. Factors affecting the stability of metal ion complexes with general ligands, HSAB principle.

## UNIT-II
**Crystal field theory:**Splitting of d-orbitals in octahedral, tetrahedral, cubic and square planer fields of ligands. Calculation of C.F.S.E. in high spin and low spin octahedral and High spin tetrahedral complexes, factors affecting the 10 Dq Value. Structural effects of crystal field splitting (Jahn-Teller distortion, variation of Ionic radii with increase in atomic number). Thermodynamics effects of C.F. splitting, variation in lattice energies, Hydration energies, Dissociation energies, Formation constants of hexammines. Site selection in spinels, Paramagnetism, diamagnetism, ferro and anti ferromagnetism. Microstates and spectroscopic terms, a calculation of spectroscopic terms for $d^1$ electronic configurations, L S coupling, Hund's rule for finding the ground state terms, Electronic spectral properties of Ist transition series, Orgel Diagrams for $d^1$ - $d^{10}$ systems, for weak field octahedral and tetrahedral complexes, limitations of C.F.T

## UNIT-III
**Molecular Orbital Theory**: Evidence for covalent character in Bonding, MOEL diagram for octahedral and tetrahedral complexes involving bonding, charge transfer transitions.
**πAcid Ligands:** Definition Carbon monoxide complexes, bonding in linear MCO groups, polynuclear metal carbonyls, vibrational spectra, Reactions, carbonyl hydrides and halides. Metal-metal bonding metal-metal multiple bonding , isolable analogies, Structure of high nuclearity carbonyl clusters, counting of electrons in carbonyl clusters.

## UNIT-IV
**Alkali metal and alkaline earth metal chelators:** Macrocyclic ligands, macrocyclic effect,

crown ethers and podands, coronands, cryptands, structure of 18 crown-6 complex with KNCS, ion cavity complex, effect of anion and cation type on complex structure, simultaneous complexation of metal ion and water or of two metal ions, sandwich formation, cryptands and their cation complexes, podands with aromatic donors and groups.

**Text and Reference Books:**

1. J.E. Huheey, Inorganic Chemistry, 3$^{rd}$ Ed.
2. F.A. Cotton and G. Wilkinson, Advanced Inorganic Chemistry.
3. B.E. Douglas and D.H. McDaniel, Concepts and Models of Inorganic Chemistry.
4. R. Hilgenfeld and W. Saengar, Topics in current chemistry Vol-II.

**BHP 205-COMMUNICATIVE ENGLISH – II**

**Time: 3 Hours**                                                                **Total Marks:50**

**(Max. Marks: 40+Internal Assessment: 10)**

**Pass Marks: 35%**

**Course Contents:**

**1. Reading and Comprehension Skills:**

Students will be required to read and comprehend the essays in Unit 3 and 4 of the book *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition. They will be required to answer the questions given after each essay.

**2. Writing Skills**

Students will be required to learn Paragraph and Essay Writing and Note Making, Summarizing and Abstracting as in the book *The Written Word* by Vandana R. Singh, Oxford University Press, New Delhi.

**Suggested Paper Pattern:**

1. Practical Question on Essay Writing with internal choice as prescribed in *The Written Word* (8marks)

2. Short answer type questions from Unit 3 and 4 of *Making Connections: A Strategic Approach to Academic Reading* (12 marks)

3. Essay type question with internal choice from Unit 3 and 4 of *Making Connections: A Strategic Approach to Academic Reading* (8marks)

4. Practical Question on Note Making from *The Written Word* (6 marks)

5. Theoretical Question(s) based on the two chapters from the book *The Written Word*

   (6 marks)

# BHP 206 PUNJABI – II

**Time: 3 Hours**

**Total Marks:50**

**(Max. Marks: 40+Internal Assessment: 10)**

**Pass Marks: 35%**

## ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਸਾਹਿਤ ਦੇ ਰੰਗ** (ਸੰਪਾ. ਡਾ. ਮਹਿਲ ਸਿੰਘ), ਭਾਗ ਦੂਜਾ (ਵਾਰਤਕ ਅਤੇ ਰੇਖਾ-ਚਿੱਤਰ), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

2. **ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ** : ਪਰਿਭਾਸ਼ਾ, ਮੁੱਢਲੇ ਸੰਕਲਪ।

3. **ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ**

4. ਪੈਰਾ ਰਚਨਾ

5. ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ

6. ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ

## ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਕਿਸੇ ਲੇਖ/ਨਿਬੰਧ ਦਾ ਸਾਰ ਜਾਂ ਉਸਦਾ ਵਿਸ਼ਾ ਵਸਤੂ (ਦੋ ਵਿਚੋਂ ਇੱਕ) (8 **ਅੰਕ**)

2. ਰੇਖਾ ਚਿਤਰ : ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਸ਼ਖ਼ਸੀਅਤ ਦੇ ਗੁਣ (8 **ਅੰਕ**)

3. ਯੂਨਿਟ 3-4 ਨੰਬਰ ਉੱਤੇ ਦਿੱਤੀ ਵਿਆਕਰਣ ਦੇ ਆਧਾਰ ਤੇ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ (8 **ਅੰਕ**)

5. ਪੈਰਾ ਰਚਨਾ : ਤਿੰਨ ਵਿਸ਼ਿਆਂ ਵਿਚੋਂ ਕਿਸੇ ਇੱਕ ਉੱਤੇ ਪੈਰਾ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇ । (4 **ਅੰਕ**)

6. ਪੈਰਾ ਦੇ ਕੇ ਉਸ ਬਾਰੇ ਚਾਰ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ (4 **ਅੰਕ**)

7. ਨੰਬਰ 7 ਵਿਚ ਅੱਠ ਅਖਾਣ ਅਤੇ ਅੱਠ ਮੁਹਾਵਰੇ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ ਚਾਰ-ਚਾਰ ਨੂੰ ਵਾਕਾਂ ਵਿਚ ਵਰਤ ਕੇ ਅਰਥ ਸਪੱਸ਼ਟ ਕਰਨੇ ਹੋਣਗੇ। (4+4 = 8 **ਅੰਕ**)

**ਨੋਟ:** ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 10 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਇਨ੍ਹਾਂ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 40+10 = 50 ਹਨ।

## BHP 207 ਮੁੱਢਲੀ ਪੰਜਾਬੀ – II

**Time: 3 Hours**

**Total Marks:50**

**(Max. Marks: 40+Internal Assessment: 10)**

**Pass Marks: 35%**

**B. A., B.A. (SS), B. A. (Hons. – English), B. Com. (Hons. & R), B. Sc. Agri./Bio-Tech./Comp. Sc./Eco./FD/Food Sc./Food Sc. & QC/IT/Med./NMed./ B. Sc. Hons. – Ch./Phy./B. Int. & Mob.Tech./B. of Mult./BBA/BCA/BJMC**

### ਮੁੱਢਲੀ ਪੰਜਾਬੀ

(In Lieu of Compulsory Punjab)

### ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ** : ਧਾਤੂ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਮਧੇਤਰ, ਪਿਛੇਤਰ), ਪੰਜਾਬੀ ਕੋਸ਼ਗਤ ਸ਼ਬਦ ਅਤੇ ਵਿਆਕਰਣਿਕ ਸ਼ਬਦ 15 ਅੰਕ

2. **ਪੰਜਾਬੀ ਸ਼ਬਦ ਪ੍ਰਕਾਰ** :

ੳ) ਸੰਯੁਕਤ ਸ਼ਬਦ, ਸਮਾਸੀ ਸ਼ਬਦ, ਦੋਜਾਤੀ ਸ਼ਬਦ, ਦੋਹਰੇ/ਦੁਹਰੁਕਤੀ ਸ਼ਬਦ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ

ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ 10 ਅੰਕ

3. **ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ** :

ੳ) ਇੱਕ-ਵਚਨ ਬਹੁ-ਵਚਨ, ਲਿੰਗ-ਪੁਲਿੰਗ, ਬਹੁ-ਅਰਥਕ ਸ਼ਬਦ, ਸਮਾਨ-ਅਰਥਕ ਸ਼ਬਦ, ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਲਈ ਇੱਕ ਸ਼ਬਦ, ਸ਼ਬਦ ਜੋੜ, ਵਿਰੋਧਆਰਥਕ ਸ਼ਬਦ

ਅ) ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ : ਖਾਣ-ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ, ਮਾਰਕੀਟ/ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਧੰਦਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ। 10+5=15 ਅੰਕ

### ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਭਾਗ ਪਹਿਲਾਂ ਵਿੱਚੋਂ ਚਾਰ ਪ੍ਰਸਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿੱਚੋਂ ਤਿੰਨ ਪ੍ਰਸਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹਨ। ਹਰ ਪ੍ਰਸਨ ਦੇ ਪੰਜ-ਪੰਜ ਨੰਬਰ ਹਨ । 15 ਅੰਕ

2. ਭਾਗ ਦੂਸਰਾ ਵਿੱਚੋਂ ਦੋ-ਦੋ ਨੰਬਰ ਦੇ ਪੰਜ ਪ੍ਰਸਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸਨ ਲਾਜ਼ਮੀ ਹਨ। 10 ਅੰਕ

3. ਭਾਗ ਤੀਸਰਾ ਦੇ (ੳ) ਭਾਗ ਵਿੱਚੋਂ ਦੋ ਸਵਾਲ ਅਤੇ (ਅ) ਭਾਗ ਵਿੱਚੋਂ ਇੱਕ ਸਵਾਲ ਪੁਛਿਆ ਜਾਵੇਗਾ। ਹਰ ਪ੍ਰਸਨ ਦੇ ਪੰਜ-ਪੰਜ ਅੰਕ ਹਨ। 10+5=15 ਅੰਕ

**ਨੋਟ:** ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 10 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਇਨ੍ਹਾਂ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 40+10 = 50 ਹਨ।

## BHP 208 PHYSICS LAB-II
**General Guidelines for Practical Examination**
**8 Periods/Week**
**Time: 3 Hours**                                   **Total Marks:50**
(**Max. Marks: 40+Internal Assessment: 10**)
**Pass Marks: 35%**

I. The distribution of marks is as follows:
i) One experiment **20 Marks**
ii) Brief Theory **5 Marks**
iii) Viva–Voce **10Marks**
iv) Record (Practical file) **5 Marks**
II. There will be one sessions of 3 hours duration. The paper will have one session and will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.
III. Number of candidates in a group for practical examination should not exceed 12.
IV. In a single group no experiment be allotted to more than three examinee in any group.
1. To study the magnetic field produced by a current carrying solenoid using a search coil and calculate permeability of air.
2. To study the induced e.m.f. as a function of the velocity of the magnet.
3. To study the phase relationships using impedance triangle for LCR circuit and calculate impedance.
4. Resonance in a series and parallel LCR circuits for different R–value and calculate Q–value.
5. To measure the charge sensitivity of a moving coil Ballistic galvanometer using a known capacitor.
7. To measure the self-inductance L of a given coil by Anderson Bridge method.
8. To find the value of $B_H$, the horizontal component of earth's magnetic field in the lab using a deflection & vibration magnetometer.
9. To study the variation of magnetic field with distance along the axis of coil carrying current by plotting a graph.
10. To plot a graph between the distance of the knife edge from the centre of gravity and the time period of a compound pendulum from graph find (a) acceleration due to gravity, (b) the radius of gyration and moment of intertia about an axis passing through centre of gravity.
11. To determine the acceleration due to gravity by Kater's reversible pendulum.
12. To verify the laws of vibrating string by using Meldes apparatus and to show that $\lambda/2$ is constant.
13.To measure logarithmic decrement, coefficient of damping, relaxation time and quality factor of a damped simple pendulum.
**Reference Books:**
1. Practical Physics Vol. I, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications.
2. Practical Physics, C.L. Arora, S. Chand & Co.

## BHP 209 CHEMISTRY LAB-II

**General Guidelines for Practical Examination**
**6 Periods/week**
**Time: 3 Hours**                                                                **Total Marks:50**
**(Max. Marks: 40+Internal Assessment: 10)**
**Pass Marks: 35%**

I. The distribution of marks is as follows:
Identification of cations and anions in a mixture which may contain combinations of acid
ions. These must contain interferring acid anions and one, the insoluble.

**a) Special Tests for Mixture of Anions**
**(i)** Carbonate in the presence of sulphate.
**(ii)** Nitrate in the presence of nitrite
**(iii)** Nitrate in the presence of bromide and iodide.
**(iv)** Nitrate in the presence of chlorate.
**(v)** Chloride in the presence of bromide and iodide.
 **(vi)** Chloride in the presence of iodide.
**(vii)** Bromide and iodide in the presence of each other and of chloride.
 **(viii)** Phosphate, arsenate and arsenite in the presence of each other.
**(ix)** Sulphide, sulphite, thiosulphate and sulphate in the presence of each other.
**(x)** Borate in the presence of copper and barium salts.
**(xi)** Oxalate in the presence of fluoride.

**b) Separation and Identification of Cations in Mixtures**
**(i)** Separation of cations in groups.
**(ii)** Separation and identification of Group I, Group II (Group IIA and IIB), Group III,
Group IV, Group V and Group VI cations.

**Book:** Vogel's book on Inorganic Qualitative Analysis