Assignment 1.

M.Sc. DEGREE EXAMINATION,
DECEMBER 2020.
Second Year
Physics

ELECTROMAGNETIC THEORY AND MODERN OPTICS
MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1. (a) Explain the achievement of polarization by reflection and refraction.

    (b) Explain the changes of phase on reflection.

2. (a) Explain the total internal reflection

    (b) Discuss the preparation of EM waves obliquely to conducting surface

3. (a) Explain the absorption and emission process in Lasers.

    (b) Write a note on amplification in a Laser medium.

4. (a) Write a note on collision and Doppler broadening mechanisms.

    (b) Explain the working of Co_2 Gas Laser.

5. (a) Explain the principle and basic theory of Holography.

    (b) Write a note on Hologram recording materials.

Assignment **2**

(DPHY 21)

M.Sc. DEGREE EXAMINATION,
DECEMBER 2020.
Second Year
Physics

ELECTROMAGNETIC THEORY AND MODERN OPTICS
MAXIMUM MARKS: 30
ANSWER ALL QUESTIONS

1. (a)   Explain the applications of holography.

   (b)   Explain the ray optics representation in step index fiber structure.

2. (a)   Obtain the wave guide equations for step index fibres.

   (b)   Explain the signal distortions on optical wave guides.

3. (a)   Explain the material broadening in wave guide dispersion.

   (b)   Explain the mechanical properties of optical fibres and Fibre cabling.

4.   Write any TWO of the following:
   (a)   Explain the boundary condition of dielectric surface.
   (b)   He-Ne Laser
   (c)   Characteristics of holograms
   (d)   Mode theory of circular wave guides

(DPHY 22)

Assignment 1

M.Sc. DEGREE EXAMINATION,
DECEMBER 2020.
Second Year
Physics

NUCLEAR PHYSICS, MOLECULAR AND RESONANCE SPECTROSCOPY

MAXIMUM MARKS: 30

ANSWER ALL QUESTIONS

1. (a) Explain the electric and magnetic moments of the nucleus.

    (b) Explain the characteristics of nuclear forces.

2. (a) Explain the Meson theory of nuclear forces.

    (b) Explain the shell model of the nucleur.

3. (a) Explain the threshold energy and cross section for nuclear reactions.

    (b) Write a note on Nuclear isorrerism.

4. (a) Describe the classification of elementary particles.

    (b) Explain the conservation laws among the elementary particles.

Assignment **2**

(DPHY 22)

M.Sc. DEGREE EXAMINATION,
DECEMBER 2020.
Second Year
Physics

NUCLEAR PHYSICS, MOLECULAR AND RESONANCE SPECTROSCOPY

MAXIMUM MARKS: 30

ANSWER ALL QUESTIONS

1. (a)   Explain the basic principles and theory of NMR.

    (b)   Obtain Bloch equations.

2. (a)   Explain the characteristics of 'A' and 'g' values in E.S.R.

    (b)   Describe the working of NQR spectrometer with block diagram.

3. (a)   Explain the spectra of Non rigid rotator.

    (b)   Explain how diatomic molecule an a simple harmonic oscillation.

4. (a)   Explain the energy levels of diatomic molecule.

    (b)   Write a note on PQR braches.

5. Write notes on the TWO of the following:

    (a)   Bohro wheeler theory

    (b)   Multiple radiation and selection rules.

    (c)   Hypertime structure of unpaired electrons.

    (d)   IR spectroscopy.

———————

Assignment 1

M.Sc. DEGREE EXAMINATION,
DECEMBER 2020.
Second Year
Physics

SOLID STATE PHYSICS — I

MAXIMUM MARKS: 30

ANSWER ALL QUESTIONS

1. (a) Briefly explain the symmetry operations in crystals.

   (b) Explain the Millar indices of line direction and a lattice plane.

2. (a) Explain Bragg's law in X–ray diffraction

   (b) Explain the construction of reciprocal lattice.

3. (a) Explain the elastic constants of crystal.

   (b) Discuss the Normal nodes of one dimensional nano atomic chain.

4. (a) Explain the quantization of Lattice Vibrations.

   (b) Discuss the measurement of phoron dispersion by inelastic neutron scattering.

(DPHY 23)

M.Sc. DEGREE EXAMINATION,
DECEMBER 2020.
Second Year
Physics

SOLID STATE PHYSICS — I

MAXIMUM MARKS: 30

ANSWER ALL QUESTIONS

1. (a) Briefly explain the quantum theory of heat capacity.

   (b) Write a note on anhormonic effects.

2. (a) Explain the wave mechanical interpretation of energy bands.

   (b) Briefly explain kroning penny model.

3. (a) Explain briefly the nearly free electron model.

   (b) Describe the zone schemes for energy bands.

4. (a) Discuss the population of zonor and acceptor levels in the state of thermal equilibrium.

   (b) Write a note on Magneto resistance.

5. Write notes on any TWO of the following:

   (a) Explain unit cell, basis and primitive structures.

   (b) General theory of harmonic approximation.

   (c) Obtain an expression for heat capacity.

   (d) P-n junction diode.

———————

Assignment 1

M.Sc. DEGREE EXAMINATION,
DECEMBER 2020.
Second Year
Physics
SOLID STATE PHYSICS – II

. MAXIMUM MARKS: 30

ANSWER ALL QUESTIONS

1. (a) Explain Local electric field in dielectrics.

   (b) Explain the sources of polarizability.

2. (a) Explain the theory of ferroelectric displacive transitions.

   (b) Write a note on ferroelectric domains.

3. (a) Define dislocations and explain the stress fields of dislocations.

   (b) Write a note on grain boundaries.

4. (a) Briefly explain the quantum theory of magnetic susceptibility.

   (b) Write a note on vanvlek paramagetism.

5. (a) Explain the Weiss theory of Ferromagnetism.

   (b) Explain what exchange interaction is.

Assignment **2**

M.Sc. DEGREE EXAMINATION,
DECEMBER 2020.
Second Year
Physics
SOLID STATE PHYSICS – II

MAXIMUM MARKS: 30

ANSWER ALL QUESTIONS

1. (a) Explain the Neel model of Anti ferromagnetism.

   (b) Write a note on Spin Waves.

2. (a) Explain the quantization phenomena in superconductivity.

   (b) Explain the effect of isotopes in superconductor.

3. (a) Explain BCS theory of superconductivity.

   (b) Write a note on High TC superconductors.

4. Write notes on any TWO of the following :

   (a) Dielectric losses

   (b) Role of dislocations in crystal growth

   (c) Heisenberg model in the ferromagnetism

   (d) Ginzburg – Landan theory.

———————