

SCHOOL OF SCIENCES



UTTARAKHAND OPEN UNIVERSITY, HALDWANI (NAINITAL)
उत्तराखण्ड मुक्त विश्वविद्यालय, हल्द्वानी (नैनीताल)

M.Sc. Physics (MSCPHY12)

Second Year Assignment

Last Date of Submission: 15 May 2014

Course Title: Electromagnetic Theory and Spectroscopy Course Code: PHY-552

Year : 2013-14

Maximum Marks :40

Section A

Section 'A' contains 08 short answer type questions of 5 marks each. Students are required to answer 4 questions only. Answers of short answer type questions should be in 250 words approximately.

- 1- State and prove Poynting vector theorem.
- 2- Explain the reflection and transmission at normal incident.
- 3- Explain the principle of retarded potential, mention the equations.
- 4- Using Lienard- Wiechert potentials obtain expression for field of an accelerated charge.
- 5- Define spectroscopic terms and Russell-Saunders coupling.
- 6- Explain the normal and anomalous Zeeman Effects.
- 7- Illustrate with the help of diagrams the splitting of 2D levels of sodium when (i) a weak magnetic field, (ii) a strong magnetic field is applied.
- 8- Draw a schematic diagram to represent the energy levels of a diatomic molecule regarded as an anharmonic oscillator and show the allowed transitions and the expected spectrum.

Section B

Section 'B' contain 04 long answers type question of 10 marks each and students are required to answers 02 questions only.

- 1- Describe and explain the different types of couplings in atom. Give illustrate example.
- 2- Explain Raman Spectra in detail. A substance shows Raman line at 4567 \AA when exciting line 4358 \AA is used. Deduce the positions of Stokes and antistokes lines for the same substance when the excited line 4047 \AA is used.
- 3- Explain Franck-Condon principle. Give a account of Condon's wave mechanical treatment of this principle.
- 4- Explain the propagation of em waves in matter. Give the boundary condition, reflection, transmission and polarization in detail.