

Total No. of Questions: 09

B.Tech. (2011 Onwards) (Sem. – 1, 2)

ENGINEERING PHYSICS

M Code: 54105

Subject Code: BTPH-101

Paper ID: [A1102]

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select at least TWO questions from SECTION - B & C.

SECTION A

1. a) What is physical significance of Poynting vector?
b) EM waves are transverse in nature. Comment and justify your answer.
c) What do you understand by type I superconductors?
d) What do you mean by crystallography?
e) What do you mean by optical pumping?
f) State the working principle of holography
g) Explain the concept of Fibre connectors.
h) Does ether exist? Comment
i) Differentiate between phase velocity and group velocity
j) What is meant by nanoscale

SECTION B

2. a) A parallel plate capacitor is filled with insulating material of dielectric constant $k=2$.
What effect does this have on its capacitance?
b) What do you mean by electromagnetic spectrum? Where do we use it

(4,4)

3. a) Explain the production of surface waves using concept of magnetostriction.
b) Discuss domain structures in paramagnetic materials. (4,4)
4. a) Write a brief note on x-ray radiography.
b) The 1st order Bragg's maxima of electron diffraction in crystal having inter atomic spacing of $0.97 \text{ \AA}$ occurs at glancing angle of 60° . Calculate deBroglie wavelength of electrons and their velocities. (4,4)
5. a) Explain the pumping mechanism in the laser working and elaborate the concept of stimulated emission by taking a suitable example.
b) The output of a Ruby laser is not continuous. Comment and justify your answer (5,3)

SECTION C

6. a) The core of a glass fibre has a refractive index of 1.5 while its cladding is doped to give a fractional change in refractive index of 0.006. Find refractive index of cladding and the critical internal reflecting angle.
b) Elaborate important characteristics of multi index fibres. (4,4)
7. a) A metal sheet of specific heat capacity $430 \text{ J Kg}^{-1}\text{K}^{-1}$ is heated from 0 to 99°C . Find the percentage increase in its mass.
b) Discuss relevance of Michelson Morley experiment in reference to special theory of relativity. (4,4)
8. a) What is the minimum uncertainty in the energy state of an atom if an electron remains in this state for 5×10^{-8} seconds?
b) Develop time dependent Schrodinger wave equation and discuss its significance. (3,5)
9. a) Elaborate advantages and disadvantages of using Ball milling process for synthesizing nano materials.
b) Explain the utility of atomic structure and quantum mechanics in reference to nanophysics. (4,4)