Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Sem.–1/2)

ENGINEERING PHYSICS

Subject Code : BTPH-101 (2011 and 2012 Batch)

Paper ID : [A1102]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION 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 atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write briefly :

a. What is physical significance of gradient of a function?

b. What is free space? Does it exist?

c. What do you understand by magnetostriction effect?

d. Define remanence and coercivity.

e. What do you mean by space lattice?

f. Are all holograms the same?

g. Give main advantages of fibre communication.

h. Define 'proper length' and 'proper time'.

i. What do you understand by wave packet?

j. What is quantum dot?

SECTION-B

2. a) A parallel plate capacitor is filled with insulating material of dielectric constant k. What effect does this have on its capacitance?

   b) "*Maxwell equations are reformulation of existing laws*." Comment and justify your answer. (3,5)

3. a) Outline some experimental facts about superconductivity.

   b) Discuss domain structures in ferromagnetic materials. (4,4)

4. a) What is Bravias lattice? Discuss with suitable example.

   b) The first order Bragg's maxima of electron diffraction in crystal having inter atomic spacing of 0.99A° occurs at a glancing angle of 65°. Calculate deBroglie wavelength of electrons and their velocities. (4,4)

5. a) Differentiate between three level and four level lasers by taking suitable example(s).

   b) What is the difference between an ordinary image and a hologram? (5,3)

SECTION-C

6. a) The core of a glass fibre has a refractive index of 1.6 while its cladding is doped to give a fractional change in refractive index of 0.008. Find refractive index of cladding and the critical internal reflecting angle.

   b) Elaborate important characteristics of step index fibres. (4,4)

7. a) A block of metal of specific heat capacity 450 J Kg^{-1} K^{-1} is heated from 0 to 90°C. Find the percentage increase in its mass.

   b) "*No signal can travel with a velocity faster than light*". Comment and justify your answer. (4,4)

8. a) What is the minimum uncertainty in the energy state of an atom if an electron remains in this state for 10^{-8} seconds?

   b) Develop time independent Schrödinger Wave Equation and discuss its significance. (3,5)

9. a) Elaborate the concept of particle confinement in context of nanophysics.

   b) Elaborate advantages of using Sol-Gel process for synthesizing nanomaterials. (4,4)