Roll No. | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (Automation & Robotics/Automobile Engg./BT/CE/CSE/Electrical & Electronics Engg./EE/ECE/Electronics & Electrical Engg./ Electronics & Telecom Engg./IT/ME/Textile Engg.) (2012 to 2017) (Sem.–1,2)

ENGINEERING PHYSICS

Subject Code : BTPH-101

M.Code : 54105

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

Write briefly :

1) What is physical significance gradient of scalar field?

2) What does a Poynting vector measures?

3) What are Type-I and Type-II superconductors?

4) What is meant by Critical temperature in context of superconductors?

5) Why X-rays are suitable for studying crystal diffraction?

6) Write two properties of laser beam.

7) What is role of cladding in the optical fibre?

8) What is meant by the relativity of simultaneity?

9) Show that a particle which travels with speed of light must have a zero rest mass.

10) Define Matter Wave associated with material particle.

SECTION-B

11) a) What is meant by polarization of a material? Mention the different mechanism of polarization in a dielectric.

b) Write down the Maxwells equations in differential and integral forms and specify their physical significance.

12) a) Explain the hysteresis curve shown by ferromagnetic materials on basis of domain theory.

b) What is Meissner effect? Discuss the significance of this effect in context of superconductivity.

13) a) Define Atomic Packing fraction. Calculate the packing fraction for hexagonal close packed (hcp) unit cell?

b) Calculate the wavelength of an X-ray beam incident at 12° for the first order reflection from calcite crystal, if the grating constant of the crystal is 3.035 A^0. (sin12° = 0.2079)

14) a) What is population inversion in laser and how it is achieved?

b) Describe the principle, construction and working of He-Ne laser.

SECTION-C

15) a) Explain the basic principle used in optical fibre for transmission of light. What is acceptance angle for an optical fibre? How it is related to numerical aperture.

b) Find out the numerical aperture and acceptance angle of an optical fibre, if the refractive indices for core and cladding are 1.6 and 1.5 respectively.

16) a) Write down the postulates of special theory of relativity. Derive Lorentz transformation equation.

b) Derive an expression for the variation of mass with velocity. What inferences do you draw from it?

17) a) How Quantum mechanics is different from classical mechanics? Derive an expression for time independent Schrodinger wave equation.

b) Solve the Schrodinger wave equation for a particle having mass M confined to one dimensional infinite potential box of width L in order to obtain its eigen-values.

18) a) Discuss Ball milling and Sol-gel methods for synthesis of nanoparticles.

b) What do you mean by carbon nanotubes? Give two procedures for synthesis of carbon nanotubes.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.