Roll No. ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚   **Total No. of Pages : 02**

Total No. of Questions : 09

B.Tech. (2011 to 2017)   (Sem.–1,2)
ENGINEERING PHYSICS
Subject Code : BTPH-101
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

Q.1   Answer briefly :

i   What do you understand by dielectric polarization?

ii   Discuss relevance of Meissner effect in context of superconductivity.

iii   What do you mean by Space lattice?

iv   Give working principle of X-ray radiography.

v   What do you understand by holography.

vi   What do you mean by fibre optic cable splicing?

vii   Does ether exist? Comment.

viii   Explain the concept of twin paradox.

ix   Explain the concept of wave particle duality.

x   What is meant by quantum dot?

SECTION-B

Q.2   a)   What do you understand by displacement current, explain using a suitable example?   (4)

     b)   Discuss relevance of Poynting theorem in context of EM wave propagation.   (4)

Q.3   a)   Explain the concept of Magnetostriction effect and discuss its relevance in production of ultrasonic waves.   (4)

     b)   The penetration depth of Hg at 3.4K is about 740A°. Estimate the value of penetration depth as temperature tends to zero. Given (Tc=4.12K)   (4)

Q.4   a)   Discuss the importance of excitation and absorption limit in X-ray spectra.   (4)

     b)   Explain the concept of Miller indices.   (4)

Q.5   a)   What are Einstein coefficients? Discuss their significance in context of Laser operations.   (5)

     b)   Discuss working principle of CO_2 Laser.   (3)

SECTION-C

Q.6   a)   If a graded index fibre has radius of 25 μm, numerical aperture 0.15, calculate the total number of modes propagating through the fibre operating at wavelength of 0.90 μm.   (4)

     b)   What are couplers? When do we need them?   (4)

Q.7   a)   Compute the wavelength of a photon whose energy is equal to the rest energy of an electron.   (4)

     b)   Justify that no signal can travel faster than light.   (4)

Q.8   a)   Develop energy time uncertainty relation and discuss some relevant application.   (4)

     b)   Define an operator, Eigen function and Eigen value.   (4)

Q.9   a)   Discuss why, the surface to volume ratio increases at nanoscale.   (4)

     b)   Give procedure for synthesis of nanomaterials using Sol-gel method.   (4)