

B. Tech I Year II Semester (R17) Supplementary Examinations, July/August - 2018

ENGINEERING PHYSICS

(Common to ME & ECE)

Time: 3 hours

Max Marks: 70

PART – A

1. Answer any **TEN** questions (10 x 2 = 20 Marks)
- (a) Define the term diffraction. What is a diffraction grating?
 - (b) Write any five differences between spontaneous emission and stimulated emission of radiation.
 - (c) Sketch the neat diagram of an optical fiber and explain its construction.
 - (d) Define the following terms :
 - i. space lattice
 - ii. packing fraction.
 - (e) Explain the term piezoelectric effect.
 - (f) Write any four properties of matter waves.
 - (g) What is Bloch theorem related to periodic potential in a crystalline solid?
 - (h) Compare direct bandgap semiconductor with an indirect bandgap semiconductors.
 - (i) Define the following terms :
 - i. magnetic dipole.
 - ii. magnetic flux density.
 - (j) Discuss any two applications of superconductors in day to day life.
 - (k) Write a note on nanoscale. Give some comparisons to understand how small is one a nanometer.
 - (l) What do you understand by the term biasing of a junction diode. Explain forward biasing of a pn junction diode.

PART - B

Answer all **FIVE** units (5 x 10 = 50 Marks)

UNIT-I

2. (a) With the help of a neat diagram, give the theory of Fraunhofer diffraction due to a single Slit and hence obtain the condition for minima and maxima of waves.
(b) Considering laws of optics, explain the principle of superposition of waves.

OR

3. (a) Explain the principle, construction and working of semiconductor diode laser with a neat energy level diagram of the PN junction
(b) A semi conductor diode laser has a peak emission wavelength of 1.55 μm , find its energy gap in eV.

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UNIT-II

4. (a) What are the crystal systems. Describe the seven crystal systems with the help of diagrams and give atleast one example of each kind.
(b) Give the statement of Bragg's law. Derive Bragg's law of X-ray diffraction from the parallel planes of a crystal.

OR

5. (a) What are the properties of ultrasonic waves , due to which they have become Technically important.
(b) Give an account of applications of ultrasonic waves in non-destructive testing.

UNIT-III

6. (a) Based on the concept of dual nature on waves, derive Schroedinger's time independent wave equation.
(b) If the kinetic energy of the neutron is 0.025eV, calculate its de-Broglie wavelength.
(mass of neutron =1.674X10⁻²⁷ Kg)

OR

7. (a) Classify the solids into conductors , semiconductors, and insulators based on band theory of solids.
(b) What are the assumptions of classical free electron theory according to Drude and Lorentz.

UNIT-IV

8. (a) Draw V-I characteristic curve of a forward and reverse biasing of PN junction diode and explain the concept.
(b) Write a note on intrinsic semiconductors. Explain with the help of energy level diagram.

OR

9. (a) Give the classification of magnet material into diamagnetic material , paramagnetic material and ferromagnetic materials.
(b) Explain Hysteresis of a ferromagnetic material.

UNIT-V

10. (a) Explain the concept of superconductivity. Also show that it exhibits perfect diamagnetism By proving that B=0 for a superconductor using Meissner effect.
(b) Discuss the effect of temperature and magnetic field on a superconductor.

OR

- 11 (a) Explain chemical vapour deposition method of fabrication of nanomaterials.
(b) Write the applications of nanomaterials in the field of technology.

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