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Question Paper Code: U2P08

B.E./B.Tech. DEGREE EXAMINATION, MAY 2024

Second Semester

Electronics and Communication Engineering

21UPH208- Electromagnetic Theory

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- Highest energy level that can be occupied by an electron at 0 K CO1-U
(a) Excited state (b) Conduction state (c) Fermi energy (d) Average energy
- Which material is used for the manufacture of ground wire? CO1-U
(a) Aluminium (b) Galvanised steel (c) Cast iron (d) Stainless steel.
- The potential inside a charged hollow sphere is ----- CO1-U
(a) Same as that on the surface (b) Zero
(c) Less than that on the surface (d) None of these
- For a charge Q1, the effect of charge Q2 on Q1 will be CO1-U
(a) $F_1 = F_2$ (b) $F_1 = -F_2$ (c) $F_1 = F_2 = 0$ (d) F_1 and F_2 are not equal
- What is the relationship between magnetic field strength and current density? CO1-U
(a) $\nabla \cdot H = J$ (b) $\nabla \cdot J = H$ (c) $\nabla \times H = J$ (d) $\nabla \times J = H$
- Magnetic flux will be _____ if the surface area vector of a surface is perpendicular to the magnetic field. CO1-U
(a) Zero (b) Unity (c) Close to maximum (d) Maximum
- is a type of photo detector, which can convert optical signals into electrical signals CO1-U
(a) PIN diode (b) Avalanche diode (c) zener diode (d) schottky diode

8. In photo diode the carriers are generated in the CO1-U
 (a) P region (b) depletion region (c) N region (d) terminal of the diode
9. A material with one dimension in Nano range and the other two CO1-U
 dimensions are large is called
 (a) micro-material (b) quantum wire (c) quantum well (d) quantum dot
10. Which one of the following is an example for semiconducting nanowires? CO1-U
 (a) Nickel (b) Platinum (c) Silicon (d) All of the above

PART – B (5 x 2= 10Marks)

11. Give any two postulates of classical free electron theory. CO1-U
12. Explain Coulomb laws of forces CO1-U
13. Give any two properties of electric lines of force. CO1-U
14. What is solar cell? CO1-U
15. What are the drawbacks of QD lasers? CO1-U

PART – C (5 x 16= 80Marks)

16. (a) Explain density of states and arrive an expression for the number CO1-U (16)
 of allowed states for unit volume of a solid.
 Or
 (b) Using Fermi function, evaluate the temperature at which there is CO3-App (16)
 1% probability that an electron in a metal will have an energy
 0.5eV above E_F of 5 eV
17. (a) Derive the differential form of Gauss's law. Also derive Poisson's CO2-U (16)
 and Laplace equations.
 Or
 (b) Explain electric dipole in a uniform electric field CO2-U (16)
18. (a) Derive the differential and integral forms of Gauss law in CO1-U (16)
 electrostatics
 Or
 (b) The magnetic field strength of copper is 10^6 ampere/meter. If the CO6-Ana (16)
 magnetic susceptibility of copper is -0.8×10^{-5} , calculate the
 magnetic flux density and magnetization in copper
19. (a) Describe the construction and working of photodiode CO1-U (16)
 Or
 (b) Explain the construction and working of Solar cell. CO1-U (16)

20. (a) Describe Nano electronic devices with suitable diagram. CO1-U (16)
- Or
- (b) Explain quantum confinement and quantum structures in Nano material. CO1-U (16)

