A **Reg. No. :** | | | | | | | | | | | | |

Question Paper Code: U2P08

B.E./B.Tech. DEGREE EXAMINATION, MAY 2022

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)

1. The metal having the lowest temperature coefficient of resistance is ---- CO1-U

   (a) Gold (b) Copper (c) Aluminium (d) Canthal

2. Which material is used for the manufacture of ground wir**e?** CO1-U

   (a) Aluminium (b) Galvanised steel (c) Cast iron (d) Stainless steel.

3. 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

4. For a charge Q1, the effect of charge Q2 on Q1 will be CO1-U

   (a) F1 = F2 (b) F1 = -F2 (c) F1 = F2 = 0 (d) F1 and F2 are not equal

5. What is the relationship between magnetic field strength and current density? CO1-U

   (a) $\nabla.H = J$ (b)$\nabla.J = H$ (c)$\nabla \times H = J$ (d) $\nabla \times J = H$

6. 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

7. -------- 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 dimensions are large is called CO1-U

(a) micro-material (b)quantum wire (c)quantum well (d) quantum dot

10. The size of atoms is nearly CO1-U

(a) 0.01 nm (b)0.1 nm (c)1 nm (d) 10 nm

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. Magnetic field intensity of a paramagnetic material is 10^4 ampere/meter. At room temperature its susceptibility is 3.7×10^{-3}. Calculate the magnetization of the material. CO3-App

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) Deduce mathematical expressions for electrical conductivity and thermal conductivity of a conducting material and hence obtain Wiedemann-Franz law CO1-U (16)

Or

(b) Explain density of states and arrive an expression for the number of allowed states for unit volume of a solid. CO1-U (16)

17. (a) Derive the differential form of Gauss's law. Also derive Poisson's and Laplace equations. CO2-U (16)

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 electrostatics CO1-U (16)

Or

(b) The magnetic field strength of copper is 10^6 ampere/meter. If the magnetic susceptibility of copper is -0.8×10^{-5}, calculate the magnetic flux density and magnetization in copper CO6-Ana (16)

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 construction and working of single electron transistor.	CO1-U	(16)
		Or		
	(b)	Describe principle, construction and working of quantum dot laser	CO1-U	(16)