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Question Paper Code: R2P05

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

Second Semester

Electrical and Electronics Engineering

R21UPH205- PHYSICS FOR ELECTRONICS ENGINEERING

(Regulations R2021)

(Common to ECE Engineering branches)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Conducting materials are generally   **CO1-U**

    (a) Metals only   (b) Alloys only   (c) Nonmetals   (d) Metals and alloys

2. When the high resistivity material (Nichrome) is connected in AC current   **CO1- U**

    (a) Heat produced   (b) Cool   (c) No effect   (d) Melt the wire

3. A circular coil carrying current behaves as a   **CO2- U**

    (a) Magnetic Shell   (b) Solenoid   (a) Bar magnet   (b) Horse shoe magnet

4. What is the net magnetic flux through a closed surface?   **CO2- U**

    (a) Positive   (b) Negative   (c) zero   (d) nature of the substance

5. What is the unit of Dipole moment?   **CO2- U**

    (a) Coulomb metre   (b) Coulomb   (c) Metre   (d) None of these

6. Which of the following easily adapt itself to store electrical   **CO2- U**
    energy?

    (a) Passive dielectric   (b) Superconductor   (c) Active dielectric   (d) Polar molecules

7. Quantum dot optical memory is used to _____.   **CO2- U**

    (a) Store data   (b) Reject data   (c) Does not store data   (d) None of these

8. What are the charge carriers in semiconductors?   **CO1- U**

    (a) Electrons and holes   (b) Electrons   (c) Holes   (d) Electron-hole pair

9. Nanotubes have __ times strength to weight ratio that of steel   **CO2- U**

(a) 100   (b) 200   (c) 300   (d) 400

10. In which one of the following, the aspect ratio is small?   **CO2- U**

(a) Nanoparticles   (b) Nanorods   (c) both (a) and (b)   (d) None of the above

PART – B (5 x 2= 10 Marks)

11. Distinguish between relaxation time and collision time.   **CO1- U**

12. Give the relation between magnetic flux density and magnetic field intensity.   **CO1-U**

13. Define dielectric constant.   **CO2- U**

14. What is meant by solar cell?   **CO1- U**

15. What are the optical materials?   **CO1- U**

PART – C (5 x 16= 80 Marks)

16. (a) Deduce mathematical expressions for electrical conductivity and **CO3- App** (16)
thermal conductivity of a conducting material and hence obtain
Wiedemann-Franz law.

Or

(b) Obtain an expression for the density of states and carrier **CO3- App** (16)
concentration in metals.

17. (a) State and explain in detail of Biot-Savart's law   **CO2-U**   (16)

Or

(b) Write short notes on Faradays laws of electromagnetic induction.   **CO2-U**   (16)

18. (a) Discuss the different types of polarization mechanism and **CO2- U**   (16)
polarizability involved in dielectric materials.

Or

(b) Describe the ferromagnetic domain theory in detail and how will **CO2- U**   (16)
you account hysteresis of ferromagnetic material based on domain
theory.

19. (a) What is solar cell? Discuss in detail the construction and working **CO1- U**   (16)
of solar cell.

Or

(b) Explain the theory, construction and working of light emitting **CO1- U**   (16)
diode (LED).

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20. (a) Explain the electron density in bulk material and size dependence **CO1- U** (16)
of Fermi energy.

<div align="center">Or</div>

20. (b) Describe single electron phenomena and single electron transistor. **CO1- U** (16)

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