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**Question Paper Code : 43085**

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Second Semester

Civil Engineering

PH 2161 – ENGINEERING PHYSICS – II

(Common to All Branches)

(Regulations 2008)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. What are the sources of resistance in metals ?
2. Define Fermi energy.
3. Sketch the variation of Fermi level in intrinsic semiconductor with temperature.
4. What are direct band gap semiconductors ? Give example.
5. Define magnetic susceptibility.
6. What is Isotope effect ?
7. What is the effect of temperature on electronic and ionic polarizabilities ?
8. Define dielectric loss.
9. What is the advantage of chromium in metallic glasses ?
10. List out various forms of Carbon Nano tubes.

PART – B

(5×16=80 Marks)

11. a) i) State the postulates of classical free electron theory and list out its drawbacks. (8)
- ii) Deduce a mathematical expression for electrical conductivity of a conducting materials. (8)

(OR)

- b) Derive an expression for the density of states and obtain a general expression for the Fermi energy of electrons in solids at 0K. (16)



12. a) Derive an expression for the density of the electrons in an intrinsic semiconductor and hence derive the relation for its Fermi energy. (16)

(OR)

- b) Define Hall Effect. Describe the theory of Hall Effect and how will you determine the electrical conductivity of a semiconductor. (16)

13. a) i) Explain the domain theory of ferromagnetic materials. (12)

- ii) Write short notes on soft magnetic materials. (4)

(OR)

- b) i) Explain BCS theory of superconductivity. (12)

- ii) Write short notes on high  $T_c$  superconductors. (4)

14. a) Explain electronic polarization and ionic polarization and derive their polarizabilities. (16)

(OR)

- b) Write notes on : i) Intrinsic breakdown and Electro chemical breakdown. (8)

- ii) Ferroelectric materials and its applications. (8)

15. a) Explain the shape memory effect in shape memory alloys and write its applications. (16)

(OR)

- b) i) What are Nano materials ? How the physical properties of Nano materials vary with geometry ? (8)

- ii) Explain the chemical vapor deposition method to produce Carbon Nano Tubes. (8)