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**B.E. / B.TECH. DEGREE EXAMINATIONS, DEC 2019**

Second Semester

**PH16251 – ENGINEERING PHYSICS - II***(Common to all branches except Biotechnology)***(Regulation 2016)****Time: Three Hours****Maximum : 100 Marks**

Answer ALL questions

**PART A - (10 X 2 = 20 Marks)**

	CO	RBT
1. Define drift velocity.	1	R
2. What are the merits of classical free electron theory of metals?	1	U
3. Why compound semiconductors are called direct band gap semiconductors? Give its application.	2	AP
4. The Hall Co-efficient of a specimen of doped silicon is found to be $3.66 \times 10^{-4} \text{ m}^3/\text{C}$ . The resistivity of specimen is $8.93 \times 10^{-3} \Omega \text{ m}$ . Find the mobility and density of charge carriers.	2	AP
5. What is Bohr Magnetron? Write its value.	1	R
6. Mention the energies involved in origin of domains in ferromagnetic material.	1	R
7. Define dielectric constant.	2	R
8. What are the factors that influence the dielectric loss?	2	U
9. What are shape memory alloys?	3	R
10. What are non-linear optical materials?	3	R

**PART B - (5 X16 = 80 Marks)**

11. (a) Deduce mathematical expression for electrical conductivity and thermal conductivity of a conducting material and hence obtain Wiedemann-Franz law. (16) 1 AP

**(OR)**

- (b) Derive an expression for the density of states use it to calculate the carrier concentration in metals. (16) 1 AP

12. (a) Derive the intrinsic carrier concentration for pure semiconductor. (16) 2 AP
- (OR)**
- (b) (i) State and explain Hall effect. (4) 2 R  
(ii) With necessary theory and diagram, derive the Hall coefficient. (12) 2 U
13. (a) (i) Explain ferromagnetic domain theory. (8) 1 U  
(ii) Briefly explain different types of energy involved in domain wall growth. (8) 1 R
- (OR)**
- (b) (i) Distinguish Type I and Type II superconductors. (8) 1 U  
(ii) Explain various properties of superconducting Materials. (8) 1 R
14. (a) (i) Discuss different polarization mechanisms in dielectric materials. (12) 2 U  
(ii) Explain their frequency and temperature dependence. (4) 2 R
- (OR)**
- (b) (i) What is meant by local field in a dielectric and how it is calculated for a cubic structure? (8) 2 AP  
(ii) Deduce the Clausius-Mosotti equation. (8) 2 AP
15. (a) Give a detailed account on metallic glasses, their method of production, properties and applications. (16) 3 U
- (OR)**
- (b) (i) What are nano materials? Discuss the methods of production of nano materials. What are the advantages of nano materials? (12) 3 U  
(ii) List out any four properties and applications of nano phase materials. (4) 3 R