

Reg. No.

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

Second Semester

**PH18251– ENGINEERING MATERIALS***(Automobile Engineering)***(Regulation 2018)****Time: Three Hours****Maximum : 100 Marks**Answer **ALL** questions**PART A - (10 X 2 = 20 Marks)**

	<b>CO</b>	<b>RBT</b>
1. Differentiate Meissner effect from Josephson effect.	1	R
2. Mention any two names of Bio materials.	4	R
3. What are Metallic glasses?	4	U
4. Why the materials are Nitrated?	2	U
5. Identify the conductor, insulator from semiconductors.	4	R
6. Write any two applications of Hall effect.	4	R
7. What is dielectric loss and complex dielectric constant?	2	AP
8. What is Kirkendal effect?	2	U
9. Explain lever rule in Binary phases.	1	AP
10. List the Hume Rothery rule.	1	R

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

11. (a) (i) What are phase rules and discuss with suitable examples? **(8)** 1 U
- (ii) How the cooling curve tends to draw phase diagram of a metal? **(8)** 1 R
- (OR)**
- (b) (i) What are invariant reactions and explain at least four of them with generic equations of each? **(8)** 2 AP
- (ii) Describe single component Iron cooling response with change of crystal structures. **(8)** 2 U

12. (a) (i) Describe Fick's law of diffusion and types of diffusion. (8) 2 AP  
(ii) Explain any three methods of hardening a metal. (8) 2 U  
(OR)
- (b) Draw TTT diagram and explain the features of Iron at various temperatures, time and transformations. (16) 2 R
13. (a) Explain the significant temperatures, phase transformations, and reactions of Iron carbon mixture. (16) 2 U  
(OR)
- (b) Obtain the expression for the density of electrons in Intrinsic semiconductors. (16) 4 R
14. (a) What is internal field and derive an expression for Lorentz internal field in dielectric material? (2+14) 3 AP  
(OR)
- (b) (i) Explain Josephson effect and types of superconductors. (8) 3 R  
(ii) What are ferrites and write note on ferrite structures? (8) 4 U
15. (a) Write notes on various methods in production of metallic glasses and describe any four properties of metallic glasses. (16) 4 U  
(OR)
- (b) (i) Describe the preparation and properties of biomaterials. (8) 4 R  
(ii) Explain the preparation of Nano materials and mention the properties. (8) 4 U