Q. Code:176471

Reg. No. | | | | | | | | | | | | | |

B.E./ B. TECH DEGREE EXAMINATIONS, MAY 2024

Second Semester

PH18253 – MATERIALS SCIENCE

(Common to ME Branch)

(Regulation 2018 / 2018 A)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Students will understand the thermal and magnetic properties of materials.	**2**
CO 2	Students will gain the ability to distinguish conducting, semiconducting and superconducting materials.	**2**
CO 3	Students will get the exposure of the dielectric properties and material and its applications in various fields.	**3**
CO 4	Students will analyze the requirements of advanced materials for different applications.	**3**

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Define the coefficient of thermal expansion.	**1**	**2**
2.	Distinguish between tempered glass and normal glass.	**1**	**2**
3.	Calculate the probability of occupancy of electron in energy greater than Femi energy level at T = 0 K.	**2**	**2**
4.	State the density of energy states.	**2**	**3**
5.	Give any four properties of semiconductors.	**2**	**2**
6.	Differentiate LED from photodiodes.	**2**	**2**
7.	Calculate the electronic polarisability of Neon. The radius of Neon atom is 0.158nm. (Given ε_0 = 8.854 x 10-12 F/m).	**3**	**2**
8.	List the remedies to avoid breakdown in dielectric materials.	**3**	**2**
9.	Identify top down and bottom up approach in the preparation of nano materials.	**4**	**2**
10.	Mention any two applications of biomaterials.	**4**	**2**

PART- B (5 x 14 = 70 Marks)

		Marks	CO	RBT LEVEL
11.(a)	**(i)** What are the Ferrites? Discuss about structure and applications of Ferrites.	**(7)**	**1**	**3**
	(ii) Write short notes on bimetallic strip.	**(7)**	**1**	**3**

(OR)

(b)	Explain in detail about domain theory of ferromagnetism and describe how it helps to understand the hysteresis property of Ferromagnetic materials.	**(10 + 4)**	**1**	**3**
12.(a)	Deduce the expressions for electrical and thermal conductivities of a conducting material.	**(14)**	**2**	**3**

(OR)

(b)	**i)** Distinguish between Type I and Type II superconductors. **ii)** Explain the various properties of superconducting materials.	**(7+7)**	**2**	**3**
13.(a)	Derive an expression for density of holes in the valence band of an intrinsic semiconductor.	**(14)**	**2**	**3**

(OR)

(b)	Derive the equation for Hall coefficient for a N-type semiconductor and explain experimental method to determine the Hall coefficient.	**(14)**	**2**	**3**
14.(a)	Derive equation for the internal field in the dielectric material and hence deduce Claussius – Mosotti relation.	**(14)**	**3**	**3**

(OR)

(b)	Derive an expression for various types of polarizations the dielectric materials and hence arrive Langevin-Debye equation in dielectrics.	**(7+7)**	**3**	**3**
15.(a)	Paraphrase the properties and applications of shape memory alloys	**(14)**	**4**	**2**

(OR)

(b)	Discuss the Preparation, properties and applications of Metallic glasses.	**(14)**	**4**	**2**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Discuss the importance of NLO materials in the field of engineering.	**(10)**	**4**	**3**

****