Reg. No.															

Question Paper Code	12808

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Second Semester

Mechanical Engineering

(Common to Mechanical and Automation Engineering)

20BSPH202 – PHYSICS OF MATERIALS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Define solid solution and give an example.	2	K2	CO1
2.	Write a short note about isomorphous system.	2	K1	CO1
3.	On which condition do you obtain martensite phase of Fe-C system?	2	K2	CO2
4.	State Fick's law of diffusion.	2	K2	CO2
5.	Discuss slip plane system.	2	K1	CO3
6.	Define creep resistance.	2	K2	CO3
7.	Distinguish between soft and hard magnetic materials.	2	K2	CO4
8.	Write a short note on dielectric breakdown in materials.	2	K2	CO4
9.	Define ceramics and mention any two applications of ceramics.	2	K2	CO5
10.	List out the types of carbon nanotubes.	2	K1	CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	Define binary phase diagram. Explain in detail about binary isomorphous system and the region present in it.	13	K3	CO1
		OR			
	b)	Explain in detail the different phases in a eutectic phase diagram with their microstructural changes during cooling.	13	K3	CO1
12.	a)	Elaborate the different microstructures of slowly cooled steels.	13	K2	CO2
		OR			
	b)	Sketch the Iron carbon / Fe – Fe_3C phase diagram and explain the various phases and invariant reactions in it.	13	K2	CO2
13.	a)	Discuss grain size reduction and precipitation hardening methods for enhancing yield strength of material.	13	K3	CO3
		OR			

b) Explain the mechanisms of creep and creep-resistance in materials. *13 K3 CO3*

14. a) Discuss the domain theory of ferromagnetism and the types of energy involved in ferromagnetic materials. *13 K2 CO4*

OR

b) Elaborate the hysteresis behavior of ferromagnetic materials and discuss it based on domain theory. *13 K2 CO4*

15. a) Classify the composites on the matrix phase. Compare them based on their properties and applications. *13 K3 CO5*

OR

b) Explain the properties and applications of shape memory alloys. *13 K3 CO5*

PART - C (1 × 15 = 15 Marks)

16. a) Discuss in detail about metallic glasses, methods of preparation and list out its applications. *15 K3 CO6*

OR

b) Elaborate the preparation methods of nanomaterials and its applications. *15 K3 CO6*