Reg. No.												

Question Paper Code	12462

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023

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 Hume – Rothery's rule.	*2,K1,CO1*
2.	What is a phase diagram?	*2,K1,CO1*
3.	Draw iron-carbon phase diagram?	*2,K2,CO2*
4.	State second fick's law of diffusion.	*2,K1,CO2*
5.	What is tempering?	*2,K1,CO3*
6.	Define plastic deformation.	*2,K1,CO3*
7.	Distinguish between soft & hard magnetic materials. (any two)	*2,K2,CO4*
8.	What is Neel temperature?	*2,K1,CO4*
9.	What are ceramic materials?	*2,K1,CO5*
10.	Classification carbon nano tube based on their structure.	*2,K2,CO5*

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	Explain the eutectic phase diagram with the various micro structural changes on cooling.	*13,K2,CO1*
		OR	
	b)	Explain unary phase diagram of iron and explain different phases.	*13,K2,CO1*
12.	a)	Sketch the Iron carbon / Fe – Fe_3C phase diagram and explain the various phases and invariant reactions in it.	*13,K2,CO2*
		OR	
	b)	Explain microstructural changes that take place in the steel during cooling.	*13,K2,CO2*
13.	a)	Explain the different types of steel (plain carbon steel, stainless steel and cast iron).	*13,K2,CO3*

OR

b) Explain the mechanism of plastic deformation by slipping and twinning. *13,K2,CO3*

14. a) Explain the hysteresis behavior of ferromagnetic materials and discuss it based on domain theory. *13,K2,CO4*

OR

b) Explain the structure, properties and applications of ferrites. *13,K2,CO4*

15. a) Define dielectric breakdown. Explain five types of dielectric breakdown that occur in dielectric materials. *13,K2,CO5*

OR

b) Explain in detail about preparation and properties nano materials. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) Explain the preparation, properties and applications of shape memory alloys. *15,K2,CO6*

OR

b) Summarize the preparation, properties and applications of metallic glasses. *15,K2,CO6*