RollNo. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APR / MAY 2025

COMMON TO ALL BRANCHES
Second Semester
PH3205 & MATERIALS SCIENCE
(Regulation2023)

Time:3hrs Max.Marks: 100

CO1	To make the students understand the basics of phase diagrams and their applications
CO2	To impart knowledge about diffusion and Phase transformations
CO3	To introduce various mechanical properties and their measurement
CO4	To learn about iron-carbon systems, and about various ferrous and non-ferrous alloys
CO5	To introduce the preparation, properties and applications of ceramics, composites and nanomaterials

BL – Bloom's Taxonomy Levels
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A(10x2=20Marks)
(Answer all Questions)

Q.No.	Questions	Marks	CO	BL
1	Mention the Hume Rothery's rules.	2	1	L2
2	State Gibb's phase rule.	2	1	L2
3	Define critical radius of nucleation.	2	2	L1
4	What is meant by glass transition?	2	2	L2
5	Define plastic deformation by slip.	2	3	L2
6	Write the basic principle for Vicker's hardness test.	2	3	L1
7	What is cast iron?	2	4	L1
8	How carbon steels are classified?	2	4	L4
9	Give an account on fiber reinforced composites.	2	5	L2
10	What are two routes through which nanoparticles can be synthesized?	2	5	L3

PART- B(5x 13=65 Marks)
(Restrict to a maximum of 2 subdivisions)

Q.No.	Questions	Marks	CO	BL
11 (a)	Explain in detail about the Cu-Ni isomorphous system with necessary phase diagram.	13	1	L3
	OR			
11 (b)	Explain the microstructural development of eutectic, hypereutectic and hypoeutectic compositions during slow cooling.	13	1	L3
12 (a)	Explain the concepts of nucleation and growth with nucleation kinetics. Describe the homogeneous and heterogeneous process of nucleation.	13	2	L4
	OR			
12 (b)	State and explain the Fick's law for steady state and non-steady state flow of diffusion.	13	2	L4

13 (a)	Explain fatigue limit (fatigue test) using S-N diagram.	**13**	3	L4
	OR			
13 (b)	Sketch and explain different stages of creep. Mention the effect of stress and temperature in creep curve.	**13**	3	L4
14 (a)	Describe the marternsitic transformation and its microstructural feature during cooling.	**13**	4	L3
	OR			
14 (b)	Draw Fe-Fe_3C phase diagram and explain the phase transformation reaction in the diagram.	**13**	4	L3
15 (a)	Discuss the carbon nanotube types and their applications.	**13**	5	L3
	OR			
15 (b)	Write a brief note on types of ceramics and their respective applications.	**13**	5	L3

PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

Q.No.	Questions	Marks	CO	BL
16.	Explain the isothermal transformation (TTT) diagram for eutectoid steel.	**15**	4	L5