

**PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(AUTONOMOUS)**

II B.Tech I Semester Supplementary Examinations, June - 2024

**METALLURGY AND MATERIAL SCIENCE
(ME)**

Max. Marks: 70

Time: 3 hours

**Answer ONE Question from each Unit
All Questions Carry Equal Marks**

Q. No.	Questions	BTL	CO	Marks
UNIT – I				
1.	a) Explain the effect of grain boundaries and grain size on the properties of alloys.	K2	CO1	7M
	b) Explain and classify crystal imperfections?	K1	CO1	7M
OR				
2.	a) What are Hume Rothery's rules? Discuss in detail	K1	CO1	7M
	b) Discuss in-detail Necessity of alloying.	K2	CO1	7M
UNIT – II				
3.	a) Discuss various invariant reactions in phase Diagram quoting with an example.	K2	CO2	7M
	b) Draw the Cu-Ni alloy phase diagram and explain cooling of any alloys from liquid stage to room temperature.	K1	CO2	7M
OR				
4.	a) Draw Fe-Fe ₃ C phase diagram and indicate salient features on it	K2	CO2	7M
	b) Define phase? How do you apply phase rule to understand phases in the phase diagram?	K2	CO2	7M
UNIT – III				
5.	a) Give the classification of steels? Explain properties and application of plain carbon steels.	K1	CO3	7M
	b) Explain the structure and properties of Gray cast iron?	K2	CO3	7M
OR				
6.	a) Explain the structure and properties of copper and its alloys?	K2	CO3	7M
	b) Explain the structure and properties of Nodular cast iron	K2	CO3	7M
UNIT – IV				
7.	a) Discuss the effect of various alloying elements on Fe-Fe ₃ C system,	K2	CO4	7M
	b) What is annealing? Explain different types of annealing process and their applicability for industrial requirements.	K2	CO4	7M
OR				
8.	a) Clearly explain about any two types of case hardening methods.	K2	CO4	7M
	b) What is tempering? What is the necessity of carrying it after hardening process?	K2	CO4	7M
UNIT – V				
9.	a) Define and discuss the composite material how it differ from alloys?	K1	CO5	7M
	b) Explain the filament winding method for manufacturing composites with neat sketch?	K2	CO5	7M
OR				
10.	a) Give the brief note on classification of composites?	K1	CO5	7M
	b) Explain the Ceramic matrix composite and discuss about their properties	K2	CO5	7M