

Code: 23ME3302

**II B.Tech - I Semester – Regular Examinations - DECEMBER 2024****MATERIAL SCIENCE AND METALLURGY  
(MECHANICAL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.

2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.

3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.

4. All parts of Question paper must be answered in one place.

BL – Blooms Level

CO – Course Outcome

**PART – A**

		BL	CO
1.a)	Define coordination number and atomic packing factor (APF).	L2	CO1
1.b)	What is Peritectic reaction?	L2	CO1
1.c)	Write the differences between low carbon steel and high carbon steels.	L2	CO2
1.d)	List the alloys of titanium and write their properties.	L2	CO2
1.e)	What is cryogenic treatment?	L2	CO3
1.f)	Define Hardening.	L2	CO3
1.g)	Define Powder Metallurgy.	L2	CO4
1.h)	What is granulation in powder metallurgy?	L2	CO4
1.i)	List out the types of glasses.	L2	CO5
1.j)	What is composite? Give examples.	L2	CO5

## PART – B

			BL	CO	Max. Marks
<b>UNIT-I</b>					
2	Stage and explain Hume Rothery's rules with suitable examples.	L2	CO1	10 M	
<b>OR</b>					
3	Discuss the phase diagram of an isomorphous alloy system.	L2	CO1	10 M	
<b>UNIT-II</b>					
4	Discuss the micro structure, properties and applications of white cast iron and spheroidal graphite cast iron.	L2	CO2	10 M	
<b>OR</b>					
5	Explain the Titanium and its alloys.	L2	CO2	10 M	
<b>UNIT-III</b>					
6	Define annealing? List the types of annealing and explain the process of annealing.	L2	CO3	10 M	
<b>OR</b>					
7	Discuss surface hardening methods.	L2	CO3	10 M	

<b>UNIT-IV</b>				
8	Discuss the applications of powder metallurgy.	L3	CO4	10 M
<b>OR</b>				
9	Analyze the process of powder metallurgy including methods of powder preparation.	L3	CO4	10 M
<b>UNIT-V</b>				
10	Classify composites and explain fiber reinforced composites.	L3	CO5	10 M
<b>OR</b>				
11	Explain about nano-materials and their applications.	L3	CO5	10 M