



TKR COLLEGE OF ENGINEERING AND TECHNOLOGY  
Indian In Character International In Excellence

R20 Regulation

Subject code: 3P3CE

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech III Semester Supplementary Examinations, November 2025

## METALLURGY AND MATERIAL SCIENCE (ME)

Maximum Marks: 70

Date: 24.12.2025

Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
  2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
  3. Part B consists of 5 Units. Answer any one full question from each unit.
  4. Each question carries 10 marks and may have a, b, c, d as sub questions.

### Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	Define Crystallography.	2M	1	L1
2	Define malleability and ductility with suitable examples.	2M	1	L1
3	Write Gibbs Phase rule.	2M	2	L1
4	Write the different types of cooling curves.	2M	2	L1
5	Define Hardenability.	2M	3	L1
6	Define Phase diagram.	2M	3	L1
7	Write about the malleable cast iron.	2M	4	L1
8	Draw microstructure of grey cast iron.	2M	4	L1
9	Write down applications of ceramics.	2M	5	L1
10	Write the properties of polymers.	2M	5	L1

### Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Explain FCC & HCP with their packing efficiency in detail.	10M	1	L2
OR				
12	Define Resilience, Toughness, Strength, Fatigue, Creep and hardness.	10M	1	L2
13	Explain Lever rule with suitable phase diagram.	10M	2	L2
OR				
14	Draw and explain the phase diagram where two components are completely soluble in both liquid and solid state with suitable examples.	10M	2	L2
15	Explain Iron- Iron Carbide diagram with neat sketch.	10M	3	L2
OR				
16	Define Surface hardening and classify in detail?	10M	3	L2
17	Explain copper-tin equilibrium diagram and mechanical properties?	10M	4	L2
OR				
18	Explain Al-Cu equilibrium diagram and mechanical properties?	10M	4	L2

19	Write the classification and application of ceramics?	10M	5	L2
	OR			
20	Write the classification, properties, applications, advantages and disadvantages of glass?	10M	5	L2