R20 Regulation *Subject code: 3P3CE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, June 2026

METALLURGY AND MATERIAL SCIENCE

(ME)

Maximum Marks: 70 Date: 20.06.2026 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 and unit cell.	2M	1	L1
2	Define alloy and Toughness.	2M	1	L1
3	Distinguish between phase rule and Lever rule.	2M	2	L1
4	Distinguish between Isomorphous system and Eutectic system.	2M	2	L1
5	List out any five methods of heat treatment of steel.	2M	3	L1
6	Define Heat treatment and what are the stages in heat treatment.	2M	3	L1
7	State the influence of silicon and manganese of plain carbon steel.	2M	4	L1
8	What is the difference among cast iron, wrought iron and steel.	2M	4	L1
9	Why plasticizers and fillers are added to the polymers?	2M	5	L1
10	Define Metal matrix composites (MMC).	2M	5	L1

Part-B

	Answer All the following questions. (5X10M=50Marks)	Marks	CO	BTL
11	Describe the solidification of pure metal with a neat sketch.	10M	1	L2
	OR			
12	What is the necessity of alloying and explain Hume –Rothery rules.	10M	1	L2
13	Explain Eutectic phase diagram with an example of cu and silver.	10M	2	L2
	OR			
14	Explain the construction of Phase diagram.	10M	2	L2
15	Sketch the Iron – carbon equilibrium diagram, with reference to this diagram define eutectic eutectoid and peritectic reactions.	10M	3	L2
	OR			
16	Explain with neat sketch of Isothermal decomposition of austenite.	10M	3	L2
17	What is alloy steel? What is the purpose of alloying elements in steel? write any four advantages of alloy steel?	10M	4	L2
	OR			

18	Write down the composition, properties and applications of Gray cast iron and White cast iron.	10M	4	L2
19	Differentiate between thermoplastic polymers and thermosetting polymers. Give minimum three examples each.	10M	5	L2
	OR			
20	Write down the classification and properties and also applications of composites.	10M	5	L2