



**R20 Regulation**  
**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**  
(Autonomous, Accredited by NAAC with 'A' Grade)

**Subject code:3P3CE**

**B.Tech III Semester Supplementary Examinations, July 2022**  
**METALLURGY AND MATERIAL SCIENCE**

(ME)

**Maximum Marks: 70**

Date:29.07.2022 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)

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

Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11 Define space lattice and unit cell and also how are space lattice mainly classified? Explain with sketches. [10]  
OR
- 12 What is the necessity of alloying and explain Hume –Rothery rules. [10]
- 13 Explain with neat graphs cooling curves of pure metal with slow cooling and super cooling. [10]  
OR
- 14 Explain the construction of Phase diagram. [10]
- 15 Sketch the Iron – carbon equilibrium diagram, with reference to this diagram define eutectic eutectoid and peritectic reactions. [10]  
OR
- 16 Explain with neat sketch of Isothermal decomposition of austenite. [10]
- 17 What is alloy steel? What is the purpose of alloying elements in steel? Write any four advantages of alloy steel. [10]  
OR
- 18 Write down the composition, properties and applications of Gray cast iron and White cast iron. [10]
- 19 Differentiate between thermoplastic polymers and thermosetting polymers. Give minimum three examples each. [10]  
OR
- 20 Write the classification, properties, applications and advantages and disadvantages of composite materials? [10]