MOHAMED SATHAK A.J COLLEGE OF ENGINEERING, CHENNAI.

DEPARTMENT OF MECHANICAL ENINEERING

ME3392 - ENGINEERING MATERIALS AND METALLURGY

QUESTION BANK

PART - A

UNIT - I (2 MARKS)

1. What is meant by equilibrium phase diagram? **[AM2022]**
2. Distinguish between substitutional and interstioal solid solution? **[AM2022]**
3. Differentiate an alloy from pure metal. **[AM2019]**
4. State the reaction that initiates the formation of austenite in iron -iron carbon diagram. **[AM2019]**
5. What is the application of lever rule in phase diagram ? **[AM2021]**
6. What are the solid state analogue of the eutectic and peritectic reactions ? **[AM2021]**
7. Why are the metal phase Diagrams known as equilibrium phase Diagrams. **[ND2019]**
8. Classify steel based on its microstructure. **[ND2019]**
9. State Gibbs phase rule. **[ND2021]**
10. Give the typical eutectic and eutectoid reactions. **[ND2021]**
11. Name and explain the standard rule for the formation of substitutional type of solid solutions. **[ND2020]**
12. Name the system and sketch the labeled ideal binary phase diagrams for the system where the components are completely soluble in liquid and partially soluble in solid states. **[ND2020]**

UNIT - II (2 MARKS)

1. What is the purpose of spheroidising treatment? **[AM2022]**
2. Which hardening treatment yield large case depth, plasma hardening or induction hardening? why? **[AM2022]**
3. Define Hardenability of a material. **[AM2019]**
4. Why is the full annealing of asteel Component Performed? **[AM2019]**
5. What is martensite ? What are the two different morphologies of martensite ? **[AM2021]**
6. What is the use of time-temperature transformation (T-T-T) curves ? **[AM2021]**
7. Stress relief annealing is an important heat treatment process in Engineering Components - Comment. **[ND2019]**
8. How is Austempering differ from Martempering heat treatment Process? **[ND2019]**
9. What are the principal advantages of austempering over conventional quenching and temper method? **[ND2021]**
10. Mention few applications of induction hardening system. **[ND2021]**
11. What is meant by hardenability ? **[ND2020]**
12. Which type of surface hardening process that does not involve composition change ? **[ND2020]**

UNIT - III (2 MARKS)

1. List any two types of cast Iron and their applications. **[AM2022]**
2. What is precipitation strengthening? **[AM2022]**
3. List two important types of fracture. **[AM2019]**
4. What is the Prominent mechanism of Plastic deformation in Metals and Define it? **[AM2019]**
5. From the galvanic series, cite three metals or alloys that may be used to galvanically protect nickel in the active state. **[AM2021]**
6. The thermal conductivity of a plain carbon steel is greater than for a stainless steel. Why is this so ? **[AM2021]**
7. What is the effect of addition of Manganese in steel? **[ND2019]**
8. List the Characteristics of Duralumin alloy. **[ND2019]**
9. Which type of stainless steel is used for surgical instruments? **[ND2021]**
10. What is the typical constituent microstructure of bearing alloy? **[ND2021]**
11. List the important properties of HSLA. **[ND2020]**
12. What are Bronzes ? **[ND2020]**

UNIT - IV (2 MARKS)

1. What is the property of PSZ? **[AM2022]**
2. State the Fundamental differences between Phenol formaldehyde and polystyrene. **[AM2022]**
3. List the Two major alloying elements of aluminium alloys, 6061 and 7075. **[AM2019]**
4. Cite two reasons for the Extensive Usage of Ferrousalloys in Engineering applications. **[AM2019]**
5. How are fibers classified based on the diameter and the character ? **[AM2021]**
6. How will the crystallinity of a polymer be affected by the addition of a plasticizer ? **[AM2021]**
7. Composite materials are Replacing Metallic Materials in many engineering applications - Comment. **[ND2019]**
8. List the Characteristics of PMMA polymers and its advantageous over the transperant Polymers. **[ND2019]**
9. Define the term degree of polymerization. **[ND2021]**
10. State any four applications of Bakelite. **[ND2021]**
11. What is polymerization ? **[ND2020]**
12. State the advantages of fiber reinforced composites. **[ND2020]**

UNIT - V (2 MARKS)

1. Distinguish between Rockwell hardness test and Brinell Hardness test. **[AM2022]**
2. Define a slip system. **[AM2022]**
3. List two important Engineering Ceramics used in high temperature applications. **[AM2019]**
4. Why is the use of Composites increasing over metallic Alloys in Aerospace Industries. **[AM2019]**
5. What are the factors that affect the Critical Shear Stress ? **[AM2021]**
6. What are Neumann bands ? How are they formed ? **[AM2021]**

7. Mention the various factor sthat affects the fatigue strength of the material. **[ND2019]**
8. What do you mean by Ductile to Brittle Transition Temperature? **[ND2019]**
9. Draw a typical creep curve for ductile metal and explain the regions. **[ND2021]**
10. Draw a typical load versus percentage elongation curve for ductile material and explain the tensile properties. **[ND2021]**
11. Differentiate between ductile and brittle fracture. **[ND2020]**
12. What is the difference between HRB and HRC (Rockwell 'B' scale and 'C' scale) ? **[ND2020]**