

GUJARAT TECHNOLOGICAL UNIVERSITY

DI -3 SEMESTER – OLD PAPER – S22 TO S25 – QUESTION BANK(English)

Subject Name & Code:

Engineering Material- 4300020

Unit I: Engineering Materials

Repeated Questions:

1. **Define/Explain: Grain, Crystal, and Grain Boundary.**
 - Appeared in: SUM 22 (Q1a, 03 marks), WIN 23 (Q1a, 03 marks)
2. **Draw a neat sketch of BCC, FCC & HCP metal crystal structures.**
 - Appeared in: SUM 22 (Q2a, 03 marks), WIN 23 (Q1b, 04 marks), 4300020 (Q1a, 03 marks)
3. **State the effect of the following alloying elements on steel: (i) Sulphur (ii) Manganese (iii) Tungsten (iv) Nickel.**
 - Appeared in: SUM 22 (Q1b, 04 marks), 4300020 (Q1b, 04 marks)
4. **List the ceramic materials and state the characteristics which make it useful as an engineering material.**
 - Appeared in: SUM 22 (Q1c, 07 marks), WIN 23 (Q3c, 07 marks)
5. **Explain the factors to be considered while selecting an Adhesive. Mention the merits and demerits of adhesive materials.**
 - Appeared in: SUM 22 (Q1c-OR, 07 marks), 4300020 (Q1c-OR, 07 marks)
6. **Explain Cloud Point and Pour Point.**
 - Appeared in: SUM 22 (Q3a, 03 marks), 4300020 (Q2a, 03 marks)
7. **Explain Vulcanizing process.**
 - Appeared in: SUM 22 (Q3a-OR, 03 marks), 4300020 (Q3a, 03 marks), WIN 23 (Q5b, 04 marks)
8. **Explain Electric Vehicle in brief.**
 - Appeared in: SUM 22 (Q4a, 03 marks), 4300020 (Q3a-OR, 03 marks)
9. **Explain about Abrasive and Adhesive material. / What is an abrasive? State different abrasive materials.**
 - Appeared in: WIN 22 (Q3b, 04 marks), 4300020 (Q3b-OR, 04 marks)
10. **Explain the basic concept of powder metallurgy with its application, advantages and limitations.**
 - Appeared in: SUM 22 (Q3c-OR, 07 marks), 4300020 (Q3c-OR, 07 marks)
11. **Differentiate between Sustainable and Renewable material.**
 - Appeared in: WIN 23 (Q5b, 04 marks), 4300020 (Q5b-OR, 04 marks)

Other Important Questions:

1. Give the classification of Nonmetallic materials and give application of Thermo setting plastic. (SUM 22 - Q2c, 07 marks)
2. Write a short note on Heat treatment. (SUM 22 - Q2a-OR, 03 marks)
3. Explain surface coating through electrolysis set up. (SUM 22 - Q2b-OR, 04 marks), (4300020 - Q2b, 04 marks)
4. Explain Designation and coding method per BIS for Steel. (SUM 22 - Q2c-OR, 07 marks), (4300020 - Q2c, 07 marks)
5. State types of Corrosion and explain pitting corrosion. (SUM 22 - Q3b, 04 marks)
6. Explain manufacturing of cemented carbide products by powder metallurgy process with a flow diagram. (SUM 22 - Q3c, 07 marks)
7. Enlist various Green material and explain any two of them. (SUM 22 - Q4b, 04 marks),

- (4300020 - Q3b, 04 marks), (WIN 23 - Q5b, 04 marks)
8. Explain working of metallurgical microscope using a diagram. (SUM 22 - Q4a-OR, 03 marks), (4300020 - Q4a, 03 marks)
 9. List types of furnaces and explain any one furnace. (SUM 22 - Q4b-OR, 04 marks), (4300020 - Q4b, 04 marks)
 10. Enlist case Hardening processes and explain in brief any two of them. (SUM 22 - Q4c-OR, 07 marks), (4300020 - Q4c, 07 marks)
 11. Explain Nitriding process. (SUM 22 - Q5a, 03 marks)
 12. Differentiate between tempering and hardening process. (SUM 22 - Q5b, 04 marks)
 13. Give properties of Ionic solids. (SUM 22 - Q5a-OR, 03 marks), (4300020 - Q5a-OR, 03 marks)
 14. Explain the concept of a cooling curve with a plotting method and write sequential steps to draw an equilibrium diagram with the help of them. (SUM 22 - Q5c-OR, 07 marks), (4300020 - Q5c-OR, 07 marks)
 15. Write the industrial applications of Electrolysis. (4300020 - Q4a-OR, 03 marks)
 16. Explain pitting corrosion and erosion corrosion. (4300020 - Q4b-OR, 04 marks)
 17. Draw and explain the flow diagram for the production of steel and iron. (4300020 - Q4c-OR, 07 marks)
 18. Give the comparison between thermoplastic and thermosetting plastic. (4300020 - Q5b, 04 marks)
 19. Explain the Construction and Working of an electrochemical cell. (4300020 - Q5c, 07 marks), (WIN 22 - Q5c, 07 marks)
 20. State engineering applications of Non-metallic materials. (WIN 23 - Q2a, 03 marks)
 21. List Electrical properties & Explain any Two properties. (WIN 23 - Q2b, 04 marks)
 22. Classify metals and Explain flow diagram for the production of iron and steel. (WIN 23 - Q2c, 07 marks)
 23. Write a short note on – composite materials. (WIN 23 - Q2a-OR, 03 marks)
 24. List Physical properties of material & Explain any Two properties. (WIN 23 - Q2b-OR, 04 marks)
 25. Classify cast iron and state the composition and use of any three of them. (WIN 23 - Q2c-OR, 07 marks)
 26. Classify insulating material and state their properties. (WIN 23 - Q3a, 03 marks)
 27. Explain the effect of any six Alloying elements on the properties of steel. (WIN 23 - Q3b, 04 marks)
 28. Give the classification of Polymer on the basis of thermal behaviors. And Give the comparison between thermoplastic and thermosetting plastic. (WIN 23 - Q3c, 07 marks)
 29. Classify abrasive material and state their properties. (WIN 23 - Q3a-OR, 03 marks)
 30. Describe the effect of the following alloying elements on the properties of Cast Iron: 1) Nickel 2) Chromium 3) Copper 4) Molybdenum (WIN 23 - Q3b-OR, 04 marks)
 31. Write the application of copper in engineering fields. (WIN 23 - Q4a, 03 marks), (4300020 - Q5a, 03 marks)
 32. Write the various types of corrosion in metal with reasons. (WIN 23 - Q4b, 04 marks)
 33. Write the application of electrolysis in the industry. (WIN 23 - Q4c, 07 marks)
 34. List the uses of non-ferrous metals and alloys in daily life. (WIN 23 - Q4a-OR, 03 marks)
 35. List the quality of rubber which makes it a useful engineering material. (WIN 23 - Q4b-OR, 04 marks)
 36. Draw a diagram of the Electroplating process and Explain the principal purpose and difficulties of it. (WIN 23 - Q4c-OR, 07 marks)
 37. Define battery electric vehicles (BEV) and write advantages of it. (WIN 23 - Q5a, 03 marks)
 38. Enlist the equipment's and materials necessary for the preparation of a micro specimen and Explain the procedure for the preparation of a micro specimen. (WIN 23 - Q5c, 07 marks)
 39. List the Need for Advanced Material for Mechanical and Automobile sector. (WIN 23 - Q5a-OR, 03 marks)
 40. Classify heat treatment processes and Differentiate between tempering and hardening process. (WIN 23 - Q5c-OR, 07 marks)

Unit II: Phase Diagrams

Repeated Questions:

1. **Draw and explain the Iron-Carbon (Fe-C) equilibrium diagram.**
 - **Appeared in:** SUM 22 (Q4c, 07 marks), WIN 23 (Q1c-OR, 07 marks), 4300020 (Q3c, 07 marks)
2. **Explain the concept, need, and characteristics of the Fe-C diagram.**
 - **Appeared in:** WIN 22 (Q2c, 07 marks)
3. **Explain the Lever rule with its diagram.**
 - **Appeared in:** WIN 22 (Q5a, 03 marks)
4. **Draw TTT curve diagram with nomenclatures.**
 - **Appeared in:** WIN 22 (Q3a, 03 marks)
5. **Explain the concept of a cooling curve with a plotting method and write sequential steps to draw an equilibrium diagram with the help of them.**
 - **Appeared in:** SUM 22 (Q5c-OR, 07 marks), 4300020 (Q5c-OR, 07 marks)
6. **Draw and explain an equilibrium diagram for two metals completely soluble in the liquid state but partially soluble in the solid state.**
 - **Appeared in:** WIN 22 (Q5a-OR, 03 marks)

Other Important Questions:

1. Give the difference between High carbon steel and Tool steel. (WIN 22 - Q3c-ii, Part of 07 marks)
2. What is Quenching medium? Why is it required? Which type of quenching mediums are used? (WIN 22 - Q4a, 03 marks)
3. What is furnace? Give its type. (WIN 22 - Q4a-OR, 03 marks)
4. List the heat treatment process. Explain annealing process and normalizing process, its objectives. (WIN 22 - Q2c-OR, 07 marks)
5. Write the need and advantages of surface hardening and case hardening process. (WIN 22 - Q3a-OR, 03 marks)
6. Tempering process always follows _____ process. (WIN 24 - MCQs, Conceptual)
7. The lower critical point for all steel is _____. (WIN 24 - MCQs, Conceptual)
8. Steel with carbon above 0.8% is known as _____ steel. (WIN 24 - MCQs, Conceptual)
9. Softest phase of steel is _____. (WIN 24 - MCQs, Conceptual)
10. _____ Structure has maximum hardness. (WIN 24 - MCQs, Conceptual)
11. Annealing improves _____ of steel. (WIN 24 - MCQs, Conceptual)
12. To construct a TTT diagram, the specimen of steels is heated and then cooled. (SUM 23 - MCQs, Conceptual)

13. Continuous cooling transformation diagrams are mainly drawn for _____. (SUM 23 - MCQs, Conceptual)
14. Time temperature transformation diagrams are drawn for _____. (SUM 23 - MCQs, Conceptual)
15. Which of the following phase will be resulted when the transformation temperature of steel is more than 750 °C? (SUM 23 - MCQs, Conceptual)

Unit III: Metals and Alloys

Repeated Questions:

1. **Classify metals and Explain the flow diagram for the production of iron and steel.**
 - **Appeared in:** WIN 23 (Q2c, 07 marks), SUM 22 (Q5c, 07 marks)
2. **Classify cast iron and state the composition and use of any three of them.**
 - **Appeared in:** WIN 23 (Q2c-OR, 07 marks)
3. **Explain about Aluminium and its alloy, its types, properties, and application.**
 - **Appeared in:** WIN 22 (Q1c-OR, 07 marks)
4. **Write the difference between (i) Ferrous and Non-ferrous metal. (ii) Wrought alloy and Cast alloy.**
 - **Appeared in:** WIN 22 (Q3b, 04 marks)
5. **Explain the meaning of the following IS code for the following: (1) 65 T S5 (2) C10 (3) 25 Cr1 Mg2 G**
 - **Appeared in:** WIN 22 (Q3c-i, Part of 07 marks)
6. **Give the designation of steel (i) C15 (ii) T90 (iii) 65TS5 (iv) 25Cr4Mo1G**
 - **Appeared in:** SUM 22 (Q2b, 04 marks)

Other Important Questions:

1. Write the types, properties, and applications of bearing metals. (WIN 22 - Q3c, 07 marks)
2. Explain about bearing material, its types, properties, and application of bearing material. (WIN 22 - Q1c, 07 marks)
3. List the uses of non-ferrous metals and alloys in daily life. (WIN 23 - Q4a-OR, 03 marks)
4. Describe the effect of the following alloying elements on the properties of Cast Iron: 1) Nickel 2) Chromium 3) Copper 4) Molybdenum (WIN 23 - Q3b-OR, 04 marks)
5. List the quality of rubber which makes it a useful engineering material. (WIN 23 - Q4b-OR, 04 marks)
6. Which brass alloy is suitable for high-speed machining? (SUM 23 - MCQs, Conceptual)
7. How much carbon is present in cast irons? (SUM 23 - MCQs, Conceptual)
8. Cast iron is a _____ alloy. (SUM 23 - MCQs, Conceptual)
9. Iron obtained from broken _____ is known as white iron. (SUM 23 - MCQs, Conceptual)
10. Which of these are applications of grey cast iron? (SUM 23 - MCQs, Conceptual)
11. Which of the following cast irons cannot be machined? (SUM 23 - MCQs, Conceptual)
12. How are malleable cast irons designated for different grades? (SUM 23 - MCQs, Conceptual)
13. What is the effect of Nickel on cast irons? (SUM 23 - MCQs, Conceptual)

14. Which is the primary element used for making stainless steel alloy? (SUM 23 - MCQs, Conceptual)
15. Stainless steels with little carbon and no nickel are called _____. (SUM 23 - MCQs, Conceptual)
16. Which of the following are applications of Ferritic stainless steels? (SUM 23 - MCQs, Conceptual)
17. Which of the following is an alloy of copper? (WIN 24 - MCQs, Conceptual)
18. Bronze is commonly used material for _____. (WIN 24 - MCQs, Conceptual)
19. High conductivity copper is used _____. (SUM 23 - MCQs, Conceptual)
20. The percentage of Iron present in Pig Iron is _____. (WIN 24 - MCQs, Conceptual)
21. The Melting Point of Aluminium is _____. (WIN 24 - MCQs, Conceptual)
22. Compared to steel, aluminum has _____. (WIN 24 - MCQs, Conceptual)
23. The Percentage of Chromium in Stainless Steel Alloy is _____. (WIN 24 - MCQs, Conceptual)
24. Medium carbon steel contains _____% carbon. (WIN 24 - MCQs, Conceptual)
25. C35 Mn75 Ni 20 steel has _____ Carbon percentage. (WIN 24 - MCQs, Conceptual)
26. Major constituent of Phosphor bronze is _____. (WIN 24 - MCQs, Conceptual)
27. Heating elements of electrical heaters are made of _____. (WIN 24 - MCQs, Conceptual)
28. Scissors and Drill bit is made of _____. (WIN 24 - MCQs, Conceptual)
29. Magnetite is known as _____. (WIN 24 - MCQs, Conceptual)
30. Bauxite is a ore of _____. (WIN 24 - MCQs, Conceptual)

Unit IV: Non-Metallic Materials

Repeated Questions:

1. **Give the classification of Polymer on the basis of thermal behaviors. And Give the comparison between thermoplastic and thermosetting plastic.**
 - **Appeared in:** WIN 23 (Q3c, 07 marks), 4300020 (Q5b, 04 marks)
2. **Give the classification of Nonmetallic materials and give application of Thermo setting plastic.**
 - **Appeared in:** SUM 22 (Q2c, 07 marks)
3. **Write properties and application of polymer.**
 - **Appeared in:** WIN 22 (Q4b-OR, 04 marks)
4. **Explain about Ceramics material and its classification.**
 - **Appeared in:** WIN 22 (Q5b, 04 marks)

Other Important Questions:

1. List the ceramic material and state the characteristics which makes it useful as an engineering material. (SUM 22 - Q1c, 07 marks), (WIN 23 - Q3c, 07 marks)
2. Write a short note on – composite materials. (WIN 23 - Q2a-OR, 03 marks)
3. What is the composites material? Explain and write its characteristics. (WIN 22 - Q4b, 04 marks)
4. Classify insulating material and state their properties. (WIN 23 - Q3a, 03 marks)
5. Classify abrasive material and state their properties. (WIN 23 - Q3a-OR, 03 marks)
6. Which of the following is an example of a thermoplastic? (SUM 23 - MCQs, Conceptual)
7. Which of the following is not a characteristic trait of polymer materials? (SUM 23 - MCQs, Conceptual)
8. The number of repeating units in a polymer is known as _____. (SUM 23 - MCQs, Conceptual)
9. A polymer made of identical monomer units is called _____. (SUM 23 - MCQs, Conceptual)
10. Which of the following is a property of ceramics? (SUM 23 - MCQs, Conceptual)
11. Porcelain is a type of _____ ceramic. (SUM 23 - MCQs, Conceptual)
12. Diamond and corundum are examples of _____ ceramics. (SUM 23 - MCQs, Conceptual)
13. Which of the following is not a step in making ceramics? (SUM 23 - MCQs, Conceptual)
14. Which material is commonly used in electronic devices? (SUM 23 - MCQs, Conceptual)
15. Which of the following carbides are used for cutting tools? (SUM 23 - MCQs, Conceptual)
16. Thermoplastics are formed by _____. (SUM 23 - MCQs, Conceptual)

17. Which of the following is not a property of thermoplastics? (SUM 23 - MCQs, Conceptual)
18. What does the numbered suffix used in nylon polymers mean? (SUM 23 - MCQs, Conceptual)
19. Which of the following is an example of heterochain polymers? (SUM 23 - MCQs, Conceptual)
20. Polyethylene and polystyrene are examples of which kind of polymers? (SUM 23 - MCQs, Conceptual)
21. Which of the following is a requirement for thermal insulation in materials? (SUM 23 - MCQs, Conceptual)
22. How does moisture affect the thermal insulation of a body? (SUM 23 - MCQs, Conceptual)
23. Which of the following is an example of organic insulating material? (SUM 23 - MCQs, Conceptual)
24. Which of the following is not a characteristic of natural rubber? (SUM 23 - MCQs, Conceptual)
25. Teflon is known as the trademark name for _____. (SUM 23 - MCQs, Conceptual)
26. Which of the following is not a property of fiberglass? (SUM 23 - MCQs, Conceptual)
27. Which chemical composition of fiberglass is used when chemical resistance is not essential? (SUM 23 - MCQs, Conceptual)
28. _____ is not a plastic material. (WIN 24 - MCQs, Conceptual)
29. _____ is a thermosetting plastic. (WIN 24 - MCQs, Conceptual)
30. Which among the following is an Organic Polymer? (WIN 24 - MCQs, Conceptual)
31. Polymerisation is associated with _____. (WIN 24 - MCQs, Conceptual)
32. Example of refractory material is _____. (WIN 24 - MCQs, Conceptual)
33. _____ is a heat insulating material. (WIN 24 - MCQs, Conceptual)
34. Material which can withstand high temperature is called _____ material. (WIN 24 - MCQs, Conceptual)
35. Cermet is a _____ material. (WIN 24 - MCQs, Conceptual)

Unit V: Electrolytes, Oils, Paints/Varnish and Powder Material

Repeated Questions:

1. **Write the application of electrolysis in industry. / Write the industrial applications of Electrolysis.**
 - **Appeared in:** WIN 23 (Q4c, 07 marks), 4300020 (Q4a-OR, 03 marks)
2. **Draw a diagram of the Electroplating process and Explain the principal purpose and difficulties of it.**
 - **Appeared in:** WIN 23 (Q4c-OR, 07 marks)
3. **Explain surface coating through electrolysis set up.**
 - **Appeared in:** SUM 22 (Q2b-OR, 04 marks), 4300020 (Q2b, 04 marks)
4. **Explain the Construction and Working of an electrochemical cell.**
 - **Appeared in:** 4300020 (Q5c, 07 marks), WIN 22 (Q5c, 07 marks)
5. **Explain the basic concept of powder metallurgy with its application, advantages and limitations.**
 - **Appeared in:** SUM 22 (Q3c-OR, 07 marks), 4300020 (Q3c-OR, 07 marks)

Other Important Questions:

1. Explain manufacturing of cemented carbide products by powder metallurgy process with a flow diagram. (SUM 22 - Q3c, 07 marks)
2. What is corrosion? Write its type and give reasons why they are produced? Explain it. (WIN 22 - Q4c-OR, 07 marks)
3. Write the various types of corrosion in metal with reasons. (WIN 23 - Q4b, 04 marks)
4. Give difference (1) Erosion Corrosion & Pitting Corrosion. (WIN 22 - Q5c-i, Part of 07 marks)
5. Write Faraday's laws of electrolysis. (WIN 22 - Q5c-ii, Part of 07 marks)
6. The solution which permits flow of current is called _____. (WIN 24 - MCQs, Conceptual)
7. Which of the following materials will undergo Corrosion? (SUM 23 - MCQs, Conceptual)
8. The dimensional accuracy in powder metallurgy is _____. (SUM 23 - MCQs, Conceptual)
9. Wastage of material in powder metallurgy as scrap is _____. (SUM 23 - MCQs, Conceptual)
10. Complex shape can be formed effectively using? (SUM 23 - MCQs, Conceptual)
11. Process of forming metal powder by directing molten metal through an orifice after which it is broken into small particle using high pressure fluid is known as? (SUM 23 - MCQs, Conceptual)

12. Formation of metal powder to use in powder metallurgy by reducing some compound with CO or other molecules is known as? (SUM 23 - MCQs, Conceptual)
13. Wastage of material in powder metallurgy is _____. (WIN 24 - MCQs, Conceptual)
14. Compacting is a process carried out in _____. (WIN 24 - MCQs, Conceptual)
15. The temperature at which oil solidifies while cooling is called _____. (WIN 24 - MCQs, Conceptual)

Unit VI: Green Material

Repeated Questions:

1. **Enlist various Green material and explain any two of them.**
 - **Appeared in:** WIN 23 (Q5b, 04 marks), SUM 22 (Q4b, 04 marks), 4300020 (Q3b, 04 marks)
2. **Differentiate between Sustainable and Renewable material.**
 - **Appeared in:** WIN 23 (Q5b-OR, 04 marks), 4300020 (Q5b-OR, 04 marks)
3. **“Today the Green material is very important and required.” Explain it.**
 - **Appeared in:** WIN 22 (Q2a-OR, 03 marks)
4. **Write only ten name of green material. Explain about any three.**
 - **Appeared in:** WIN 22 (Q2a, 03 marks)

Other Important Questions:

1. List the Need of Advanced Material for Mechanical and Automobile sector. (WIN 23 - Q5a-OR, 03 marks)
2. Define battery electric vehicles (BEV) and write advantages of it. (WIN 23 - Q5a, 03 marks)
3. Full form of EV is _____. (SUM 23 - MCQs, Conceptual)
4. Electric Vehicles are generally powered by _____. (SUM 23 - MCQs, Conceptual)
5. Who invented the battery? (SUM 23 - MCQs, Conceptual)
