

GUJARAT TECHNOLOGICAL UNIVERSITY

DI -1 SEMESTER – OLD PAPER – W24 TO S25 – QUESTION BANK(English)

Subject Name & Code:

Engineering Materials Science-DI01000181

Unit 1: Introduction of Engineering Materials

Repeated Questions:

1. **Define/Differentiate: (i) Crystal (ii) Grain (iii) Grain boundary.**
 - Appeared in: **Summer 2025 (Q1e, Marks: N/A), Winter 2024 (Q2a, 03 marks)**
2. **List and explain physical properties of material.**
 - Appeared in: **Summer 2025 (Q1f, Marks: N/A), Winter 2024 (Q2c, 07 marks)**
3. **Explain BCC and FCC structure with figures/sketch.**
 - Appeared in: **Summer 2025 (Q1b, Marks: N/A), Winter 2024 (Q2c, 07 marks)**

Other Important Questions:

4. **Define: (a) Ductility (b) Electrical Conductivity (c) Melting Point.**
 - Appeared in: **Summer 2025 (Q1a, Marks: N/A)**
5. **Define solid solution and explain about types of solid solution with neat figure.**
 - Appeared in: **Summer 2025 (Q1d, Marks: N/A)**
6. **List Factors to be considered for selection of materials.**
 - Appeared in: **Winter 2024 (Q1a, 03 marks)**
7. **Explain Covalent bond.**
 - Appeared in: **Summer 2025 (Q3a, Marks: N/A)**
8. **Describe BCC, FCC and HCP Structure with sketch.**
 - Appeared in: **Winter 2024 (Q2c, 07 marks)**

Unit 2: Phase Diagrams and Heat Treatment

Repeated Questions:

1. **Explain the Iron-carbon equilibrium diagram with a neat sketch / Explain the concept, need and characteristics of Fe-C diagram.**
 - Appeared in: **Summer 2025 (Q1c, Marks: N/A), Winter 2024 (Q1c, 07 marks)**
2. **Differentiate between annealing and normalizing process.**
 - Appeared in: **Summer 2025 (Q3b, Marks: N/A), Winter 2024 (Q1b, 04 marks)**
3. **Classify heat treatment furnaces and explain any two.**
 - Appeared in: **Summer 2025 (Q3c, Marks: N/A), Winter 2024 (Q1c OR, 07 marks)**

Other Important Questions:

4. **State objectives of heat treatment process.**
 - Appeared in: **Summer 2025 (Q2c, Marks: N/A)**
5. **Write Short Note on Heat Treatment Process.**
 - Appeared in: **Winter 2024 (Q2a, 03 marks)**
6. **Define solid solution and explain about types of solid solution with neat figure.**
 - Appeared in: **Summer 2025 (Q1d, Marks: N/A)**
7. **Define: (i) Crystal (ii) Grain (iii) Grain boundary. (Also listed in Unit 1 as it's a core concept for this unit).**
 - Appeared in: **Summer 2025 (Q1e, Marks: N/A), Winter 2024 (Q2a, 03 marks)**

Unit 3: Metals and Its Alloys

Repeated Questions:

1. **Classify cast iron and state the property and use of any three.**
 - Appeared in: **Summer 2025 (Q3c, 07 marks), Winter 2024 (Q3c, 07 marks)**
2. **Explain the effects of any six alloying elements on properties of steel / cast iron.**
 - Appeared in: **Winter 2024 (Q3a, 03 marks), Winter 2024 (Q3a OR, 03 marks)**

Other Important Questions:

3. Classify Ferrous Metals.
 - Appeared in: **Winter 2024 (Q4a, 03 marks)**
4. Classify metals.
 - Appeared in: **Summer 2025 (Q3b, 04 marks)**
5. Explain Flow Diagram for Production of Iron and Steel.
 - Appeared in: **Summer 2025 (Q2c, 07 marks)**
6. Classify metals and Explain flow diagram for the production of iron and steel.
 - Appeared in: **Winter 2024 (Q3c OR, 07 marks)**
7. List the uses of non-ferrous metals and alloys in daily life.
 - Appeared in: **Summer 2025 (Q4a, Marks: N/A)**
8. Differentiate between brass and bronze.
 - Appeared in: **Summer 2025 (Q4b, 04 marks)**
9. Write the application of copper in engineering field.
 - Appeared in: **Winter 2024 (Q4a OR, 03 marks)**
10. Explain Cloud point and pour point.
 - Appeared in: **Summer 2025 (Q3a OR, 03 marks)**

Unit 4: Non-Metallic Materials

Repeated Questions:

1. **Compare Thermoplastics and Thermosetting plastics. / Give the classification of Polymer on the basis of thermal behaviors. And give the comparison between thermoplastic and thermosetting plastic.**
 - Appeared in: **Summer 2025 (Q4c, 07 marks), Winter 2024 (Q4c OR, 07 marks)**

Other Important Questions:

2. Classify Nonmetallic Materials.
 - Appeared in: **Summer 2025 (Q4b OR, 04 marks)**
3. Classify insulating material and state their properties.
 - Appeared in: **Winter 2024 (Q2b, 04 marks)**
4. Classify Abrasive material and state their properties.
 - Appeared in: **Winter 2024 (Q2b OR, 04 marks)**
5. Write Properties and Engineering Application of Abrasive Materials.
 - Appeared in: **Summer 2025 (Q4c OR, 07 marks)**
6. Explain about ceramic material.
 - Appeared in: **Summer 2025 (Q4a, 03 marks)**
7. Classify ceramic material and state the characteristics which makes it useful as an engineering material.
 - Appeared in: **Winter 2024 (Q4c, 07 marks)**
8. Classify Rubber and explain at least four Industrial uses of rubber.
 - Appeared in: **Summer 2025 (Q4b, 04 marks)**
9. Classify insulating material and state their properties. (Also listed in Unit 4 as it's a core topic here).
 - Appeared in: **Winter 2024 (Q2b, 04 marks)**

Unit 5: Electrolytes, Oils, Paints/Varnish and Corrosion

Repeated Questions:

1. **Explain Paints and Varnishes in detail / Describe in Details Coating Methods for Applying Paints And Varnish.**
 - Appeared in: **Winter 2024 (Q5c, 07 marks), Summer 2025 (Q5c, 07 marks)**
2. **List the various types of corrosion in metal and explain any 4 with reasons. / List types of corrosion and explain about it.**
 - Appeared in: **Winter 2024 (Q3b OR, 04 marks), Summer 2025 (Q5c OR, 07 marks)**

Other Important Questions:

3. Explain Surface coating through electrolysis setups.
 - Appeared in: **Winter 2024 (Q3b, 04 marks)**
4. State industrial applications of electrolysis.
 - Appeared in: **Summer 2025 (Q4a OR, 03 marks)**
5. Draw diagram of Electroplating process and explain principal, purpose and difficulties of it.
 - Appeared in: **Winter 2024 (Q5c, 07 marks)**
6. Explain Cloud point and pour point.
 - Appeared in: **Summer 2025 (Q3a OR, 03 marks)** (Also listed in Unit 3, relevant here for oil properties).

Unit 6: Green Material

Repeated Questions:

1. **Define Green Material and briefly describe concept of Green Material / Briefly Describe Concept of Green Material.**
 - Appeared in: **Summer 2025 (Q5a, 03 marks), Winter 2024 (Q5a, 03 marks)**
2. **Enlist Various Green Material and Explain any two of them.**
 - Appeared in: **Winter 2024 (Q5b, 04 marks), Summer 2025 (Q5b OR, 04 marks)**
3. **Identify need of advanced material in mechanical and automotive sector / List the need of advanced material for mechanical and automobile sector.**
 - Appeared in: **Summer 2025 (Q5a OR, 03 marks), Winter 2024 (Q5a OR, 03 marks)**

Other Important Questions:

4. **Differentiate between sustainable and renewable Material.**
 - Appeared in: **Winter 2024 (Q4b OR, 04 marks)**
5. **Explain about electric vehicle.**
 - Appeared in: **Summer 2025 (Q5b, 04 marks)**
6. **Define Battery Electric Vehicles and Write advantage of it.**
 - Appeared in: **Winter 2024 (Q5b, 04 marks)**
7. **Explain Solar Energy and Solar Panels.**
 - Appeared in: **Winter 2024 (Q4b, 04 marks)**
