

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER- VI EXAMINATION – SUMMER 2026

**Subject Code:3162110**

**Date:22-05-2026**

**Subject Name: Materials Processing**

**Time:10:30 AM TO 01:00 PM**

**Total Marks:70**

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

|             |                                                                                                                                                            | MARKS     |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Q.1*</b> | (a) What is the role of Metallurgy in understanding Materials processing?                                                                                  | <b>03</b> |
|             | (b) Compare the Bulk metal forming and sheet metal forming processes with examples of each.                                                                | <b>04</b> |
|             | (c) Describe the principles of plasticity in relation to metal forming and how it influences material behavior during                                      | <b>07</b> |
| <b>Q.2</b>  | (a) Differentiate between slab, billets and bloom and draw diagram of the primary metal products produced out of them                                      | <b>03</b> |
|             | (b) Define Metal Rolling Process. Draw schematics of types of rolling mill set up.                                                                         | <b>04</b> |
|             | (c) Explain the differences between cold working, warm working, and hot working in metal forming processes                                                 | <b>07</b> |
|             | <b>OR</b>                                                                                                                                                  |           |
|             | (c) Discuss the changes in grain structure during rolling and process of dynamic recovery and recrystallisation.                                           | <b>07</b> |
| <b>Q.3</b>  | (a) Explain with neat schematics Deep Drawing Process and state the suitable sheet metal grades.                                                           | <b>03</b> |
|             | (b) Critically compare the microstructure and mechanical properties of cast & forged material.                                                             | <b>04</b> |
|             | (c) Describe the difference between open-die forging and closed-die forging and list out the automobile industry products manufactured by forging process. | <b>07</b> |
|             | <b>OR</b>                                                                                                                                                  |           |
| <b>Q.3</b>  | (a) With the help of diagrams, state the working principles of wire drawing.                                                                               | <b>03</b> |
|             | (b) How Forging and wire drawing dies are made? state materials and required mechanical properties.                                                        | <b>04</b> |
|             | (c) Explain the extrusion process and draw different types of extrusion methods used in metal forming.                                                     | <b>07</b> |
| <b>Q.4</b>  | (a) Define “Welding Arc” and List out various Arc welding processes.                                                                                       | <b>03</b> |
|             | (b) Describe the effect of carbon equivalent on the weldability of ferrous alloys.                                                                         | <b>04</b> |
|             | (c) Compare the basic principle of working of Shielded Metal Arc Welding and Gas Metal Arc welding Process.                                                | <b>07</b> |

**OR**

|            |            |                                                                                         |           |
|------------|------------|-----------------------------------------------------------------------------------------|-----------|
| <b>Q.4</b> | <b>(a)</b> | State the basic difference between MIG and MAG Process.                                 | <b>03</b> |
|            | <b>(b)</b> | Write short notes on TTT and CCT diagrams and their relevance in welding metallurgy.    | <b>04</b> |
|            | <b>(c)</b> | State the difference between Hot cracking and cold cracking with suitable examples.     | <b>07</b> |
| <b>Q.5</b> | <b>(a)</b> | Discuss the importance of heat transfer during the solidification of metal castings.    | <b>03</b> |
|            | <b>(b)</b> | Draw a flow diagram of any metal casting process.                                       | <b>04</b> |
|            | <b>(c)</b> | Explain the various types of casting defects with appropriate illustrations.            | <b>07</b> |
|            |            | <b>OR</b>                                                                               |           |
| <b>Q.5</b> | <b>(a)</b> | What is ceramic material and state important properties of it.                          | <b>03</b> |
|            | <b>(b)</b> | Critically compare the processing and applications of ceramics versus metals.           | <b>04</b> |
|            | <b>(c)</b> | Describe the structure of ceramics and how it differs from that of metallic materials.. | <b>07</b> |

\*\*\*\*\*