Enrolment No./Seat No_____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–VII EXAMINATION – SUMMER 2025**

**Subject Code:3171921** **Date:14-05-2025**

**Subject Name:Metal forming analysis**

**Time:02:30 PM TO 05:00 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** |
|---|---|---|---|
| **Q.1** | **(a)** | State general advantages of Metal Forming. | **03** |
| | **(b)** | How do you represent strain hardening effect? | **04** |
| | **(c)** | Explain typical stress strain diagram for ductile material. | **07** |
| **Q.2** | **(a)** | Define (i) Yield strength (ii) Strain Rate (iii) Plasticity. | **03** |
| | **(b)** | Define Principle plane & stresses. | **04** |
| | **(c)** | Explain two dimensional stresses with Mohr Circle Diagram. | **07** |
| | | **OR** | |
| | **(c)** | Explain Isotropic & Kinematic work hardening with neat sketch. | **07** |
| **Q.3** | **(a)** | Explain forging process with classification. | **03** |
| | **(b)** | How impression die forging different from closed die forging. | **04** |
| | **(c)** | Derive equation for rate of work done due to deformation for compression of strip. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Explain various rolling defects. | **03** |
| | **(b)** | Define angle of bite & discuss its effect in rolling. | **04** |
| | **(c)** | Derive formula for Rolling load using slab method with usual notations. | **07** |
| **Q.4** | **(a)** | Difference between direct & indirect extrusion. | **03** |
| | **(b)** | What are the benefits of hydrostatic extrusion? | **04** |
| | **(c)** | Explain analysis of strip drawing process with usual notations. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | State difference between compound & progressive die. | **03** |
| | **(b)** | Difference between punching & blanking. | **04** |
| | **(c)** | Explain hydrodynamic extrusion in wiredrawing with neat sketch. | **07** |
| **Q.5** | **(a)** | Why friction measurement is necessary in forming process? | **03** |
| | **(b)** | Explain forming limit diagram. | **04** |
| | **(c)** | Explain upper bond & lower bond theory. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Explain clearance in sheet metal operations. | **03** |
| | **(b)** | Explain spring back effect in bending. | **04** |
| | **(c)** | Prove Hency first theorem for slip line with usual notations. | **07** |

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