*Seat No.: _____* *Enrolment No._____*

# *GUJARAT TECHNOLOGICAL UNIVERSITY*

**M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014**

**Subject code: 1722801** **Date: 02-12-2014**

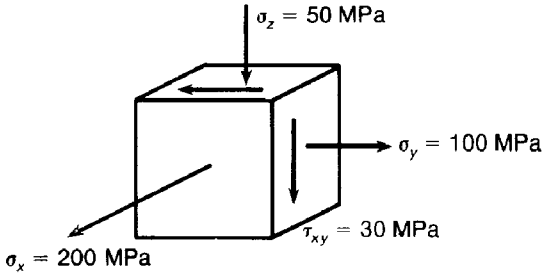
**Subject Name: Mechanics of Metal Forming**

**Time: 02:30 pm - 05:00 pm** **Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full mark.**

| | | | |
|---|---|---|---|
| **Q.1** | **(a)** | Explain different characteristics of engineering strain and true strain. | **07** |
| | **(b)** | What is super plasticity & Strain rate? | **07** |
| **Q.2** | **(a)** | Explain importance of metal forming in manufacturing? State the names of various metal forming theory. | **07** |
| | **(b)** | Discuss about von-mises yield condition. | **07** |
| | | **OR** | |
| | **(b)** | Stress analysis of a space craft structural member gives the state of stress shown below. If the part is made from 7075-T6 aluminum alloy with yield strength $\sigma_0$ = 500 MPa, will it exhibit yielding? If not, what is the safety factor? | **07** |




| | | | |
|---|---|---|---|
| **Q.3** | **(a)** | Derive the relationship between yield strength in Shear and Yield strength in tension according to Trescaôs hypothesis. | **07** |
| | **(b)** | Explain in detail about Strain Hardening effect. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | What is the importance of Mohrôs circle in analysis of metal forming? | **07** |
| | **(b)** | Explain about Instability in Tension. | **07** |
| **Q.4** | **(a)** | Explain in detail about Baushinger effect. | **07** |
| | **(b)** | Explain about importance of Upper bound and Lower bound theorem in forging. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Prove P=2K- $\sigma_x$, By Slab Analysis for Sheet Drawing. Write the assumptions. | **07** |
| | **(b)** | Define Incremental Plastic Strain | **07** |
| **Q.5** | **(a)** | List out CAD/CAM application in Extrusion, Forging and Sheet Metal Forming. | **07** |
| | **(b)** | What is the important of Bulge Test? Explain it. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Explain about Hills Anisotropic Plasticity Theory. | **07** |
| | **(b)** | Discuss various extrusion processes with applications. | **07** |

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