

Enrollment No./ Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

MASTER OF ENGINEERING - SEMESTER - 2 EXAMINATION – SUMMER 2026

Subject Code: 3722801

Date: 16-06-2026

Subject Name: Mechanics of Metal Forming

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.**

- Q.1** (a) Explain about importance of Upper bound and Lower bound theorem in forging **07**
(b) Derive the relation between yield strength in shear and yield strength in tension considering Von-mises theory of plastic deformation **07**
- Q.2** (a) Explain yield strength. Explain the factors affecting yield strength. **07**
(b) Demonstrate the application of slip line theory for extrusion process. **07**
- OR**
- (b) Define work hardening. Discuss kinematic work hardening with diagram. **07**
- Q.3** (a) Explain bending in sheet metal forming. Show various stresses in bending process **07**
(b) Explain the normality principle related to plastic stress strain relation **07**
- OR**
- Q.3** (a) Explain buldge test. State its importance. **07**
(b) Explain the concept of constitutive relationship. State the general form of a constitutive equation and explain the importance of it. **07**
- Q.4** (a) Explain: (1) Strain Rate (2) Super-plasticity **07**
(b) Derive the relationship between α and β slip lines **07**
- OR**
- Q.4** (a) Explain slip line field theory. Discuss various assumptions made in slip line theory. **07**
(b) What is Mohr's circle diagram? State the importance of Mohr's circle in the analysis of metal forming? **07**
- Q.5** (a) Explain Hill's anisotropic plasticity theory. **07**
(b) Discuss various extrusion processes with applications **07**
- OR**
- Q.5** (a) Explain plastic instability in tension. **07**
(b) Explain CAD/CAM application in extrusion, forging and sheet metal forming **07**
