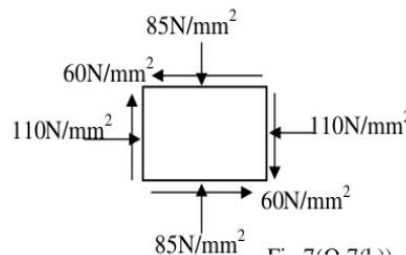


GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV (NEW) EXAMINATION – WINTER 2023****Subject Code:3142108****Date:11-01-2024****Subject Name: Mechanical Properties of Materials****Time: 10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

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.

MARK

- Q.1**
- | | | |
|-----|--|-----------|
| (a) | What is importance of yield strength? | 03 |
| (b) | Explain Engineering Stress-strain curve showing yield point. | 04 |
| (c) | The state of stress in two-dimensionally stressed body at a point is as shown in fig. Determine the principal stresses and maximum shear stress. | 07 |



- Q.2**
- | | | |
|-----|--|-----------|
| (a) | Explain engineering stress-strain diagram of brittle materials | 03 |
| (b) | Explain resilience and toughness. | 04 |
| (c) | Differentiate elasticity and plasticity. | 07 |

OR

- | | | |
|-----|---|-----------|
| (c) | Distinguish cold working and hot working. | 07 |
|-----|---|-----------|

- Q.3**
- | | | |
|-----|--|-----------|
| (a) | Explain solid solution strengthening. | 03 |
| (b) | Explain grain boundary hardening. | 04 |
| (c) | Explain recrystallization, recovery, and grain growth. | 07 |

OR

- Q.3**
- | | | |
|-----|---|-----------|
| (a) | Explain stiffness. | 03 |
| (b) | Explain strengthening from fine particles. | 04 |
| (c) | Distinguish Edge dislocation and Screw dislocation. | 07 |

- Q.4**
- | | | |
|-----|--|-----------|
| (a) | Explain point defects. | 03 |
| (b) | Explain ductile to brittle transition. | 04 |
| (c) | Differentiate slip and twinning. | 07 |

OR

- Q.4**
- | | | |
|-----|--|-----------|
| (a) | Explain climb. | 03 |
| (b) | Justify-Fatigue failure are intergranular. | 04 |
| (c) | Explain CRR. | 07 |

- Q.5**
- | | | |
|-----|--|-----------|
| (a) | Show the planes in cubic unit cell: (111), (10-1), (110). | 03 |
| (b) | Justify- Stiffness of a given material is does not change with change in microstructure. | 04 |

(c) Discuss with examples the ductile and brittle fracture.

07

OR

Q.5 (a) Explain single crystal.

03

(b) Find the angle between (110) & (1 -1 0).

04

(c) State and explain Griffith's theory of fracture.

07
