Structure I

Maximum time allowed: 90 minutes

Mid-term exam

**Problem -1 30%**

A cantilever beam of 3m length carries a concentrated force of 35 kN at its free end. The maximum bending stress is not exceeding 125 MPa. Determine the required diameter if the bar has a circular cross-sectional shape.

**Problem -2 30%**

Locate the centroid of the channel-type section shown in Figure (1), and determine the moment of inertia of the cross- sectional area about a horizontal axis through the centroid.

**All dimensions in mm**

200

200

50

50

50

125

*x*

Figure (1)

**Problem -3 40%**

A cantilever beam is loaded as shown in Figure (2). Draw shear force and bending moment diagrams.

**500 N**

**400 N/m**

**2 m**

**4 m**

**2 m**

**1000 N**

**500 N**

**400 N/m**

**2 m**

**4 m**

**2 m**

**1000 N**

Figure (2)

**500 N**

**400 N/m**

**2 m**

**4 m**

**2 m**

**1000 N**

Notes: 1. Electronic calculators may be used

2. Answer ALL questions

**END OF EXAMINATION PAPER**