

# COMBINED COMPETITIVE EXAMINATION (MAIN)

## CIVIL ENGINEERING

Paper—I

Time : 3 hours

Full Marks : 200

**Note :** (1) The figures in the right-hand margin indicate full marks for the questions.

(2) Attempt **five** questions in all.

(3) Question No. **1** is compulsory.

1. Answer any *ten* from the following :

4×10=40

- (a) What are the differences between static and kinematic indeterminacy?
- (b) A propped cantilever of length  $L$  carrying a u.d.l. of  $w$  kN/m. Find the moment at the fixed end. Assume  $EI$  is constant.
- (c) What are the differences between slope deflection and moment distribution method?
- (d) Write down the theorems of moment area methods.
- (e) Define Newtonian fluids.
- (f) Two horizontal plates are spaced 12.5 mm apart with the space between them being filled with a oil of viscosity 14 poise. Calculate the shear stress in the oil if the upper plate moves with a velocity 2.5 m/s relative to the lower one.
- (g) A square surface of size 3 m × 3 m is submerged in water and lies in a vertical plane. Determine the position of the centre of pressure and the total force on the surface when its upper edge coincides with free surface of water.
- (h) How does clay absorb water? Explain.

