Code: **CE2T5**

I B.Tech-II Semester-Regular Examinations - July 2014

ENGINEERING MECHANICS
(Civil Engineering)

Duration: 3 hours   Marks: 5x14=70

Answer any FIVE questions.   All questions carry equal marks

1. a) State and explain parallelogram law of forces.   4 M

   b) Discuss the equations for the equilibrium of a body under concurrent forces in a plane.   4 M

   c) Explain the law of superposition and the theorem of transmissibility with suitable Diagrams.   6 M

2.   Find the centroid of the composite figure given below:

                                                                 14 M
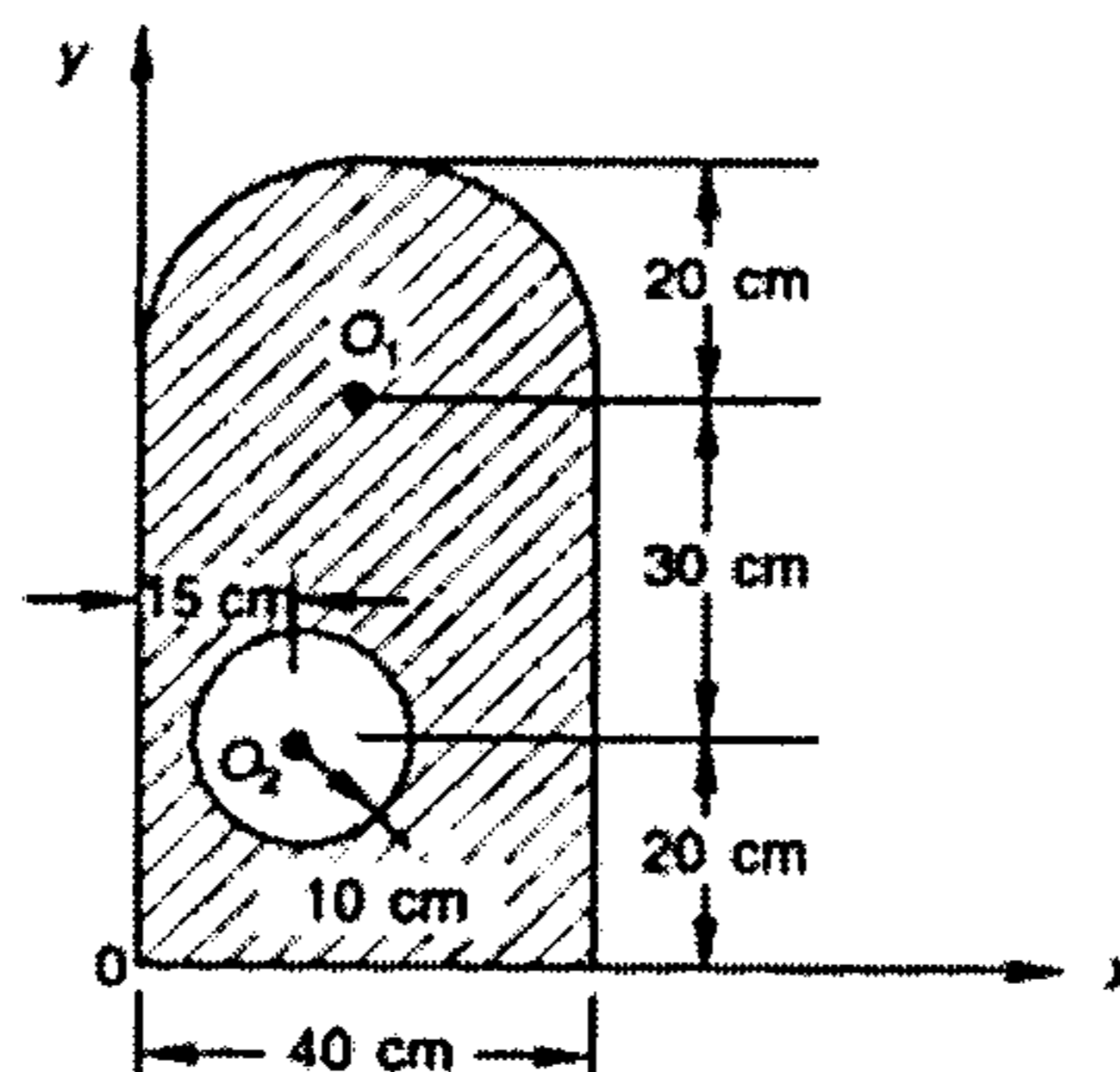
3. a) Find the forces in the members of the truss given below:
   (Take V = 1000kN ; W = 2000 kN and a = 2m)   14 M
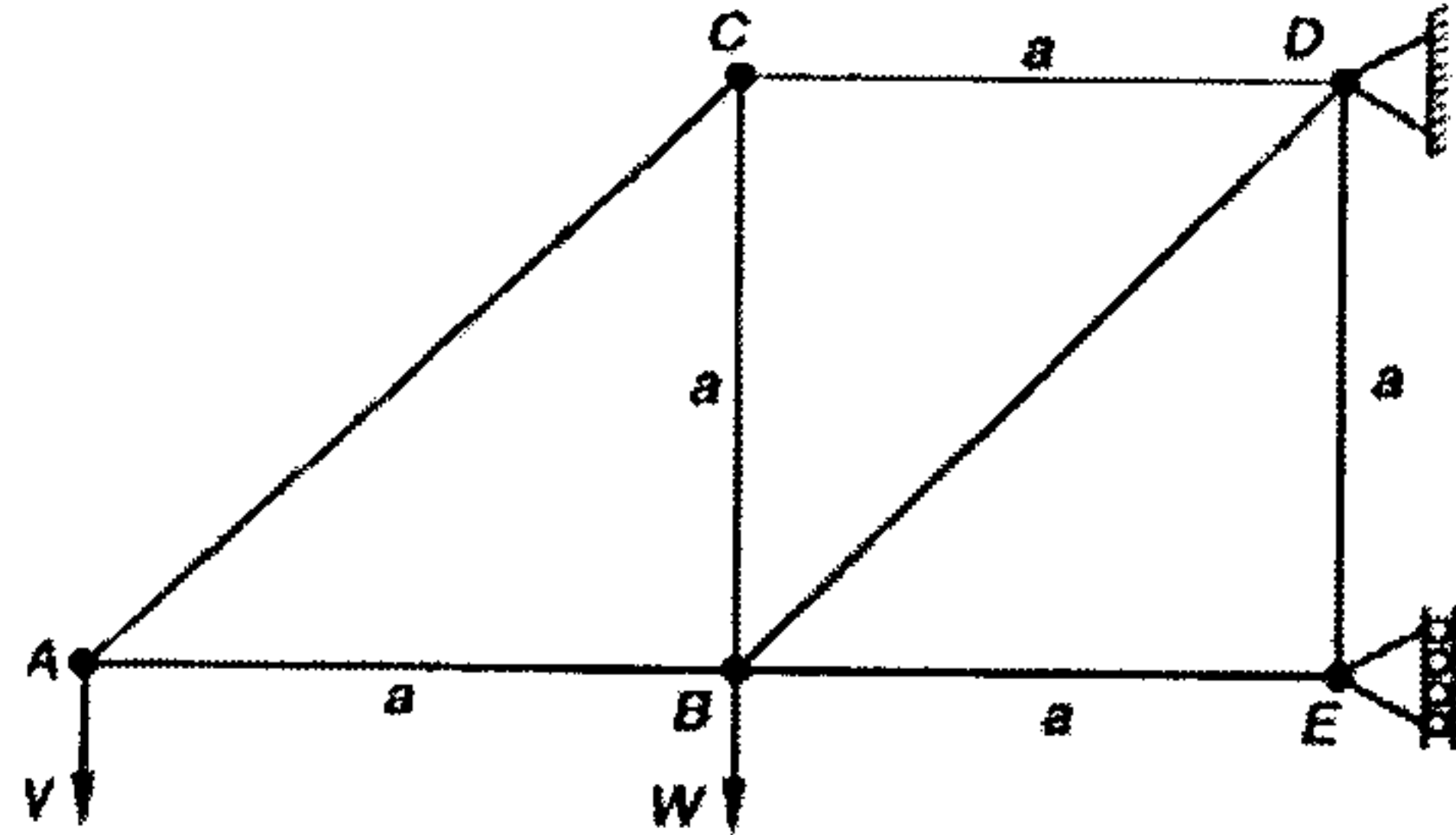
4.   Find the moment of Inertia of a T-Section having flange
     and Web both 120mm x 30mm about an axis passing
     through its centre of gravity and parallel to x-x and y-y
     axes.   14 M

5.   An elevator ascends with an upward acceleration of 1.2
     m/s^2. At the instant when the upward speed is 2.4 m/s., a
     loose bolt drops from the ceiling of the elevator located
     2.75 m from its floor. Calculate:
     (a) the time of flight of the bolt from ceiling to floor of the
         elevator   7 M
     (b) the displacement and the distance covered by the bolt
         during the free fall relative to the elevator shaft.   7 M

6. a) A block of weight 400 N is pulled up along an inclined
      plane having inclination 30^0 to the horizontal at a steady
      speed. If the coefficient of friction between the body and
      the plane is 0.3 and force is applied parallel to the inclined
      plane, find the force required.   10 M

b) Explain the concept of cone of friction. 4 M

7. a) Explain D'Alembert's principle for rectilinear motion. 4 M

b) Two bodies of weights 50 N and 30 N are connected to two ends of a light inextensible string. The string is passing over a smooth pulley. Determine
   i) the acceleration of the system 5 M
   ii) tension in the string 5 M

8. A beam AB of span 8m carries two point loads of 10 kN and 15 kN at 3m and 5m from the end A respectively. Determine the reactions by the principle of virtual work. 14 M