## First / Second Semester B.E. Degree Examination, June/July 08
## Elements of Civil Engineering

Time: 3 hrs.                                                                                          Max. Marks:100

**Note :1.** *Answer any FIVE full questions.*
**2.** *Draw neat sketches wherever necessary.*

a. What do you mean by infrastructural development? Explain its importance. **(06 Marks)**
b. Explain the significance of planning and scheduling for a project. **(06 Marks)**
c. Describe the physical and mechanical properties of timber. **(08 Marks)**

a. What do you mean by R.C.C.? List its advantages. **(06 Marks)**
b. Write a note on smart materials. **(06 Marks)**
c. What is total station? Describe briefly the features of total station. **(08 Marks)**

a. Describe briefly the factors affecting the strength of concrete. **(10 Marks)**
b. What is remote sensing? Explain briefly the procedure involved in remote sensing. **(10 Marks)**

a. A body weighing 1500 N is suspended by two cables of length 2 m and 3 m attached to two points in the same horizontal line 4 m apart, as shown in figure Q4 (a). Find the tensions in the cables. **(10 Marks)**
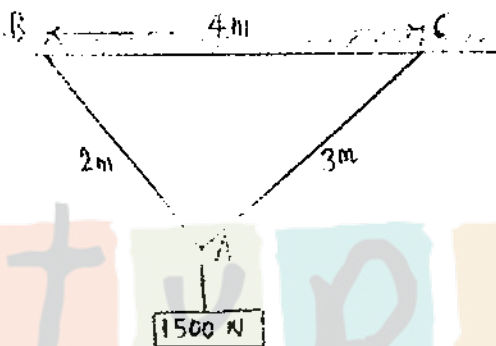
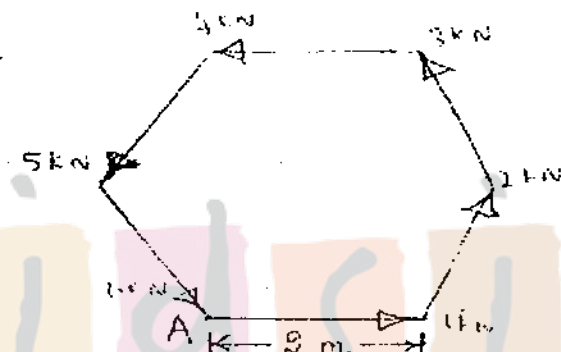Fig. Q4 (a)                                          Fig. Q4 (b)

b. The forces of 1, 2, 3, 4, 5 and 6 kN are acting along the sides of a regular hexagon of 2 m side length, taken in order. Find the magnitude, direction and position of resultant with respect to A as shown in figure Q4 (b). **(10 Marks)**

a. Two cylinders each of weight 100 N and 200 N rest on an inclined plane, which makes an angle of 70° with, the vertical wall as shown in figure Q5 (a). Find the reactions at all contact points assuming the surfaces to be smooth. **(10 Marks)**
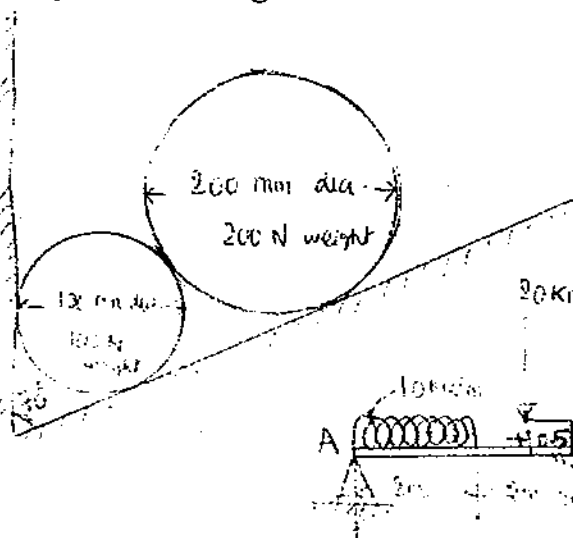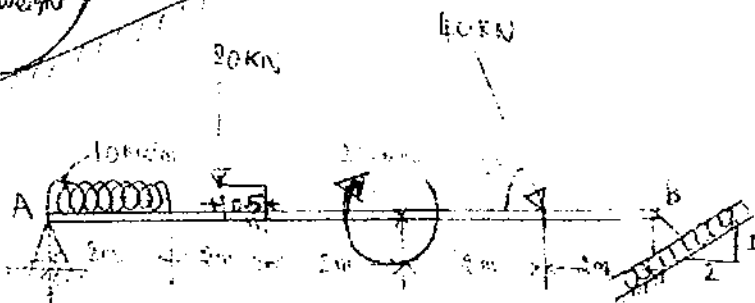
Fig. Q5 (a)                                          Fig. Q5 (b)

**5** b. Find the reactions at the supports for the beam loaded as shown in figure Q5 (b). **(10 Marks)**

**6** a. Find the co-ordinates of centroid of any triangle ABC. **(08 Marks)**
b. Determine the co-ordinates of centroid for the lamina shown in figure Q6 (b). **(12 Marks)**



semi-circle
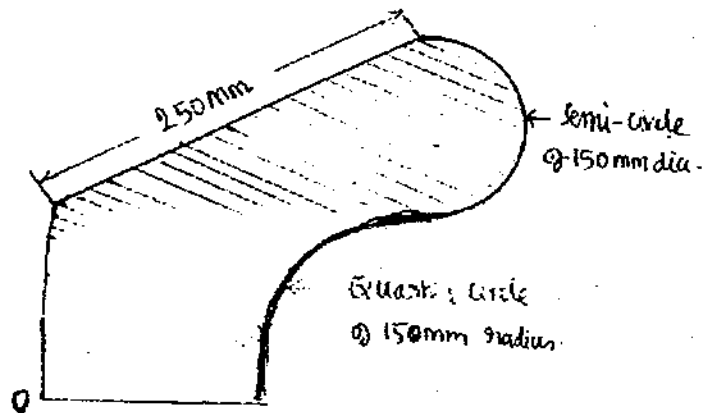@ 150 mm dia.

Quadrant circle
@ 150mm radius.

Fig. Q6 (b)

**7** Determine the radii of gyration about the horizontal and vertical centroidal axes for the shaded area shown in figure Q7. **(20 Marks)**
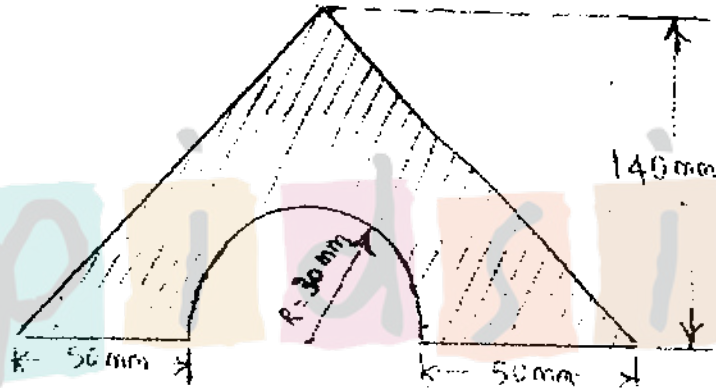


Fig. Q7

**8** a. For a block of weight 60 kN resting on an inclined plane of 30° shown in figure Q8 (a), find the horizontal force i) just barely to prevent the block from sliding down the plane and ii) to move the block up the plane with uniform velocity. Take the coefficient of friction between the sliding surfaces of 0.35. **(10 Marks)**
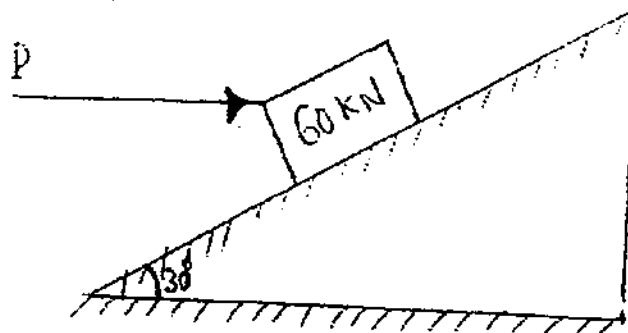


Fig. Q8 (a)

b. A ladder 5 m long, 400 N weight rests against a wall, the angle of inclination with the vertical wall being 30°. The coefficient of friction at both the wall and the ground is 0.3. Determine how high a man weighing 800 N can climb before the ladder slips. **(10 Marks)**

*****