First Semester B.Arch. Degree Examination, June/July 2014
Structures – I

Time: 3 hrs. Max. Marks:100

Note: *Answer any FIVE full questions.*

1 a. Define the force and state the characteristics of force. **(06 Marks)**
   b. The four coplanar forces act at a point as shown in Fig.Q1(b). Determine the magnitude and direction of the resultant.
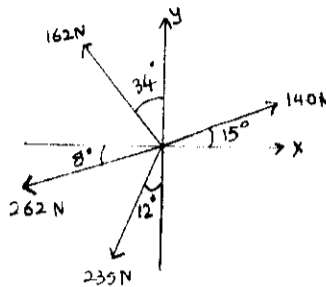

Fig.Q1(b) **(14 Marks)**

2 a. Define principle of transmissibility of force. **(04 Marks)**
   b. Explain Free Body Diagram with an example. **(04 Marks)**
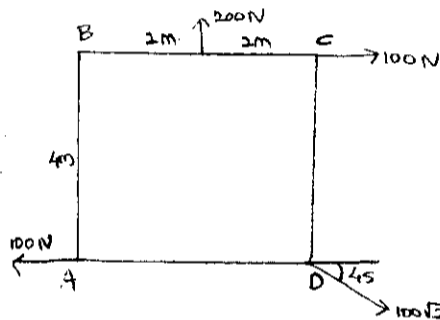   c. Determine the magnitude, direction and position with respect to point A as shown in Fig.Q2(c).

Fig.Q2(c) **(12 Marks)**

3 a. Sketch the types of beams. **(05 Marks)**
   b. A beam ABC is hinged @ A and roller @ B carrying loads shown in Fig.Q3(b). Determine support reactions.
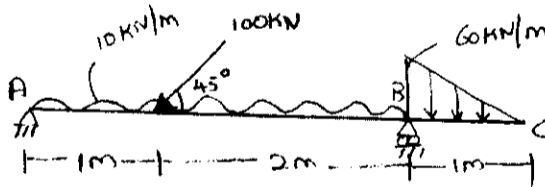

Fig.Q3(b) **(15 Marks)**

4 a. State and explain: i) Coefficient of friction, ii) Angle of Repose. **(06 Marks)**
   b. A ladder 6 m long is resting on a vertical wall with an inclination 60° to the horizontal. The weight of the ladder is 150 N. A man weighing 600 N is climbing the ladder. What is the height he can climb along the ladder before the ladder starts slipping? Take μ = 0.25 on all surfaces. **(14 Marks)**

5   a.   Determine the centroid of a triangle base 'b' and height 'h'.   (05 Marks)
    b.   Determine the CG for the Lamina shown in Fig.Q5(b). All dimensions in mm.   (15 Marks)
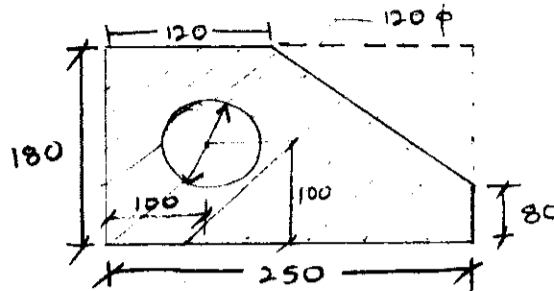

Fig.Q5(a)

6   a.   Define parallel axis theorem and perpendicular axis theorem.   (06 Marks)
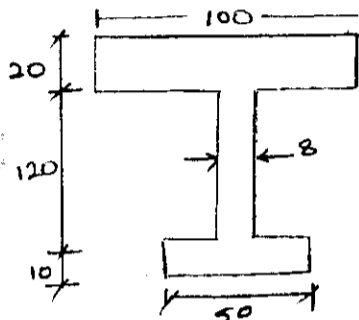   b.   Determine MI about centroidal axis shown in Fig.Q6(b). All dim in mm.   (14 Marks)

Fig.Q6(b)

7   a.   Define perfect, deficient and redundant truss.   (09 Marks)
    b.   Explain steps involved to solve any given truss by method of joint with an example.
                                                                              (11 Marks)

8   Write short notes on any FOUR:
    a.   Define resolution and composition of forces.
    b.   Explain polar moment of inertia.
    c.   Define Lami's theorem.
    d.   Explain method of section.
    e.   Explain different types of friction.   (20 Marks)

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