First Semester B.Arch. Degree Examination, Dec.2013/Jan.2014
Structures – I

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions.*

1 a. Explain in detail the force system with all the forces inclusive.   **(08 Marks)**
   b. Five co-planar forces are acting at a point as shown in Fig. Q1 (b). Determine the resultant in magnitude and direction.   **(12 Marks)**
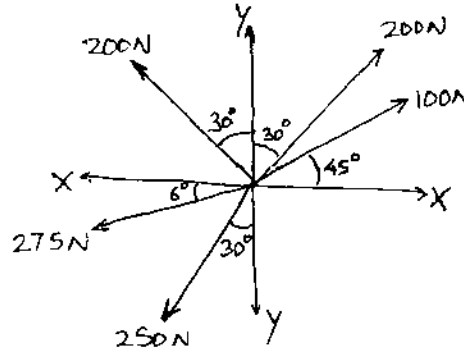

Fig. Q1 (b)

2 a. Explain the principle of transmissibility of force.   **(04 Marks)**
   b. State and prove Varignon's theorem.   **(04 Marks)**
   c. Determine the magnitude and y-intercept of resultant of force system acting on lamina as shown in Fig. Q2 (c).   **(12 Marks)**
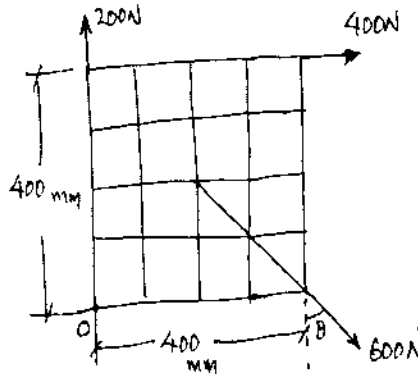

Fig. Q2 (c)

3 a. What are the various types of loadings and types of supports?   **(08 Marks)**
   b. A simply supported beam of span 5 m is loaded as shown in Fig. Q3 (b). Find the reactions at A and B.   **(12 Marks)**
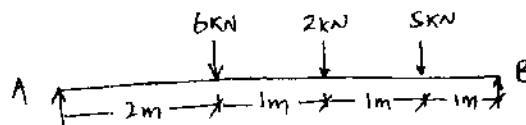

Fig. Q3 (b)

4 a. Define angle of friction, cone of friction and angle of repose.   **(06 Marks)**
   b. A uniform ladder of length 10 m and weight 20 N is placed against a smooth wall with its lower end 8 m from the wall. When the ladder is just to slip, determine (i) co-efficient of friction between ladder and floor (ii) frictional force acting on the ladder at the point of contact between ladder and floor.   **(14 Marks)**

5 a. Distinguish between centroid and centre of gravity. (04 Marks)
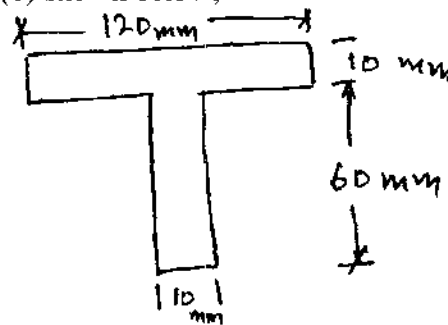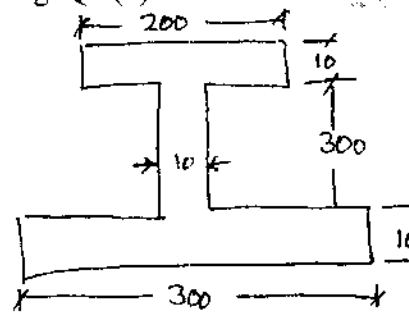b. Find the centroid of Fig. Q5 (b) shown below, (16 Marks)

Fig. Q5 (b)

6 a. State and explain parallel axis theorem. (04 Marks)
b. Find the moment of inertia along the horizontal axis and vertical axis passing through the centroid of a section shown in Fig. Q6 (b). (16 Marks)

(All dimensions are in mm)
Fig. Q6 (b)

7 a. Define : (i) Radius of gyration (ii) Polar moment of inertia. (06 Marks)
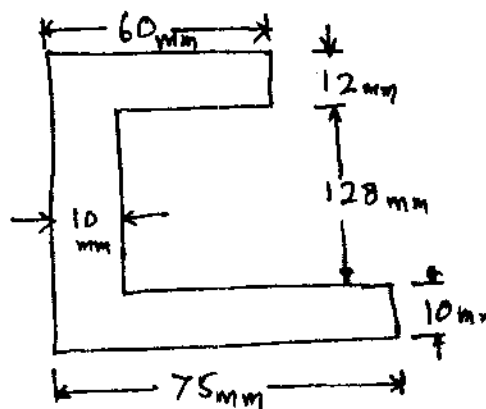b. Determine the centroid of Fig. Q7 (b). (14 Marks)

Fig. Q7 (b)

8 a. Define perfect, deficient and redundant trusses with examples. (06 Marks)
b. Explain the steps involved in the analysis of truss by method of joints. (14 Marks)

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