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First Semester B.Arch. Degree Examination, June/July 2023
Building Structures – I

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 Explain the properties of the following :
   i)   Concrete
   ii) Wood
   iii) Steel
   iv) Aluminium
   v)   Glass   (20 Marks)

OR

2 a. Define the following :
      i)   Dead load
      ii) Live load
      iii) Impact load
      iv) Earthquake road
      v)   Static load   (05 Marks)
   b. Explain load path in a structure with a neat figure.   (10 Marks)
   c. Write a short note on concrete.   (05 Marks)

Module-2

3 a. What is a force system? Explain the classification of force system (Any 5).   (10 Marks)
   b. What is a couple? List the characteristics of a couple.   (05 Marks)
   c. Find the resultant of the coplanar concurrent force system shown in the Fig.Q3(c).
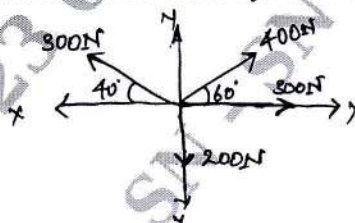

Fig.Q3(c)   (05 Marks)

OR

4 a. Define and explain transmissibility of force with neat sketches.   (06 Marks)
   b. Define the following :
      i)   Resultant
      ii) Moment
      iii) Reaction
      iv) Equilibriant   (04 Marks)
   c. Four coplanar forces acting at a point are shown in Fig.Q4(c). One of the force is unknown and its magnitude is shown by P. The resultant has a magnitude of 500 N and is acting along the x-axis. Determine the unknown force P and its inclination with the x-axis.   (10 Marks)
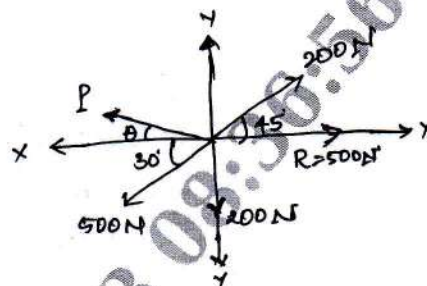
Fig.Q4(c)

Module-3

5 a. What are different types of supports? Explain with figure. **(08 Marks)**
   b. Determine the magnitude, direction of the resultant force for the force system shown in Fig.Q5(b). Also locate the resultant force with respect to point D.
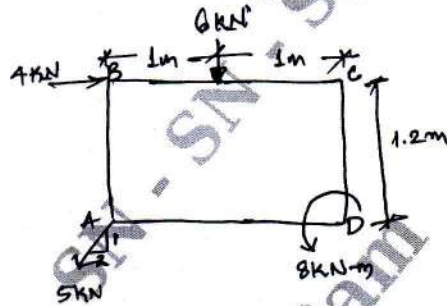

Fig.Q5(b) **(12 Marks)**

OR

6 a. Explain different types of beams with figure. **(10 Marks)**
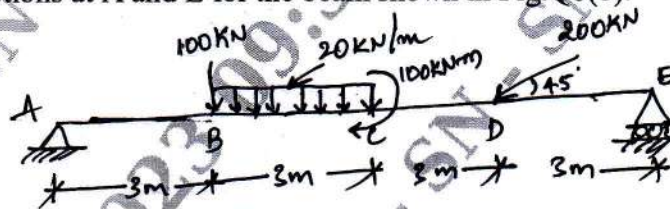   b. Determine the reactions at A and E for the beam shown in Fig.Q6(b).

Fig.Q6(b) **(10 Marks)**
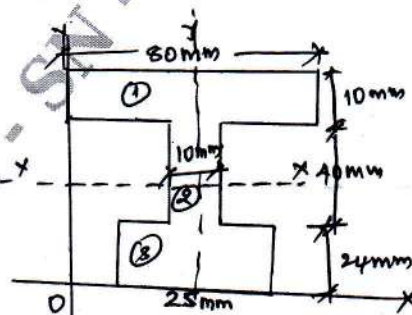
Module-4

7 a. Find the centroid of Fig.Q7(a).

Fig.Q7(a) **(08 Marks)**

b. Determine the moment of inertia about the horizontal axis of the plane lamina shown in Fig.Q7(b). Also find radius of gyration (k) about the horizontal axis.
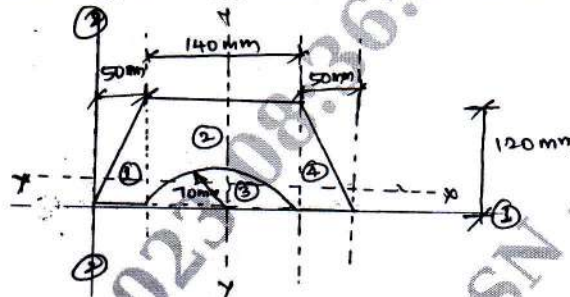

Fig.Q7(b)   **(12 Marks)**

OR

8 a. Define the following :
   i) Centroid
   ii) Centre of Gravity
   iii) Parallel axis theorem with equation   **(05 Marks)**

b. Determine the moment of inertia of the section shown in Fig.Q8(b) about its centroidal axis. Also calculate the least radius of gyration for the section as well.
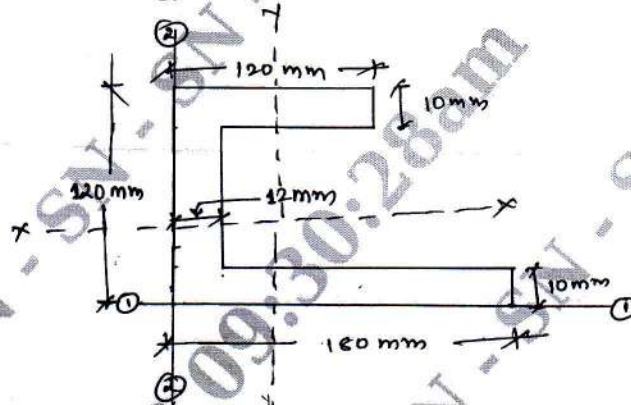

Fig.Q8(b)   **(15 Marks)**

Module-5

9 a. What are the assumptions made in the analysis of truss?   **(03 Marks)**
b. What are the different types of truss? Explain with figures.   **(09 Marks)**
c. A truss is shown in Fig.Q9(c), find the support reactions and calculate the total weight if each member has 2 angles 50×50×6 @ 4.5 kg/mt each angle.
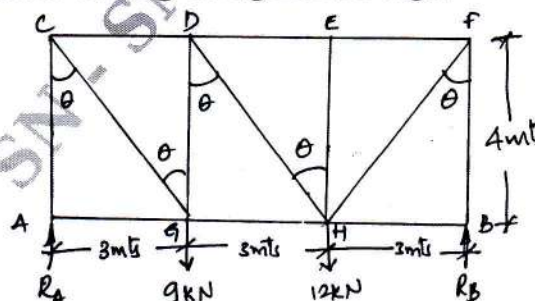

Fig.Q9(c)   **(08 Marks)**

OR

10   Analyse the truss shown in Fig.Q10 by the method of joints. Tabulate the result and indicate the nature of force in the truss.
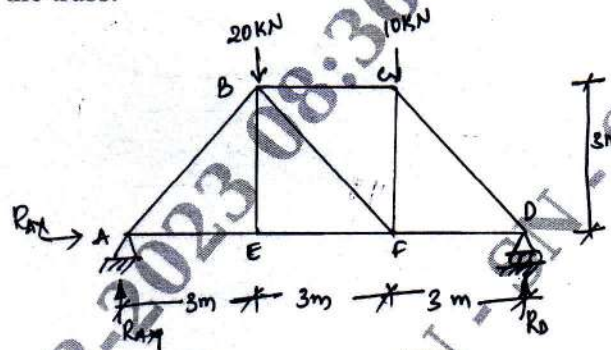

Fig.Q10   **(20 Marks)**

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