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## First Semester B.Arch. Degree Examination, Dec.2023/Jan.2024 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 a. Explain the following according to IS-875:
  - (i) Dead load
  - (ii) Live load
  - (iii) Impact load
  - (iv) Earthquake load

(10 Marks)
- b. Explain the properties of concrete in fresh and hardened state. (10 Marks)

OR

- 2 a. What is force? What are the characteristics of force? (05 Marks)
- b. Explain the properties of the following:
  - (i) Steel
  - (ii) Wood
  - (iii) Glass
  - (iv) Aluminium
  - (v) Concrete

(15 Marks)

### Module-2

- 3 a. What is force system? Explain the classification of force system. (10 Marks)
- b. Determine the magnitude and direction of resultant for concurrent force system shown in Fig.Q3(b).

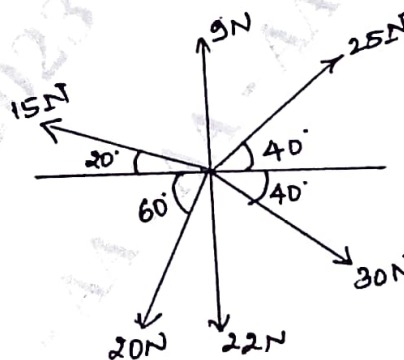


Fig.Q3(b)

(10 Marks)

OR

- 4 a. Briefly explain the following
  - (i) Resultant of force
  - (ii) Composition of force
  - (iii) Moment of force
  - (iv) Free body diagram

(08 Marks)

- b. A system of four forces acting at a point on a body is as shown in Fig.Q4(b). Determine the resultant and magnitude.

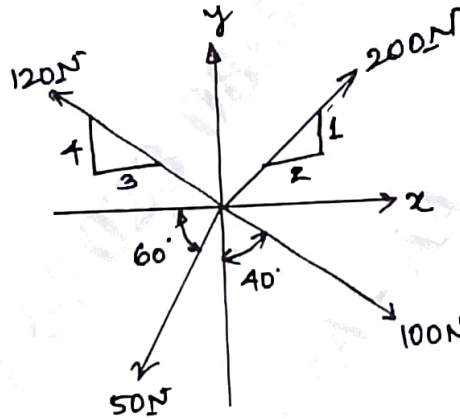


Fig.Q4(b)

(12 Marks)

**Module-3**

- 5 a. With neat sketch, explain different types of support. (08 Marks)  
 b. Determine the support reactions for the beam shown in Fig.Q5(b).

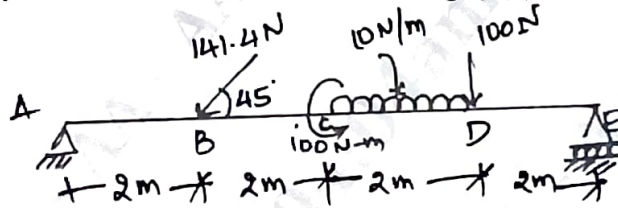


Fig.Q5(b)

(12 Marks)

OR

- 6 a. With neat sketch, explain different types of beams and classify them into statically determinate and statically indeterminate. (08 Marks)  
 b. Find the resultant for given force system. Refer Fig.Q6(b) and also comment on the result.

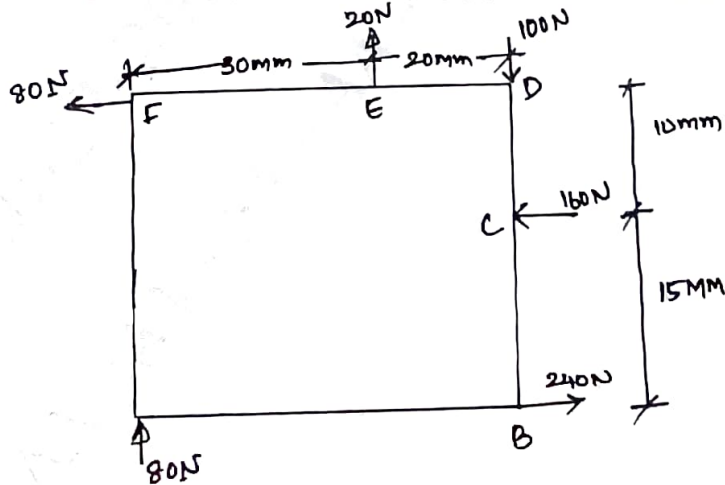


Fig.Q6(b)

(12 Marks)

**Module-4**

- 7 a. Define centroid. State and prove parallel axis theorem with neat sketch (08 Marks)  
 b. Determine the centroid for Fig.Q7(b).

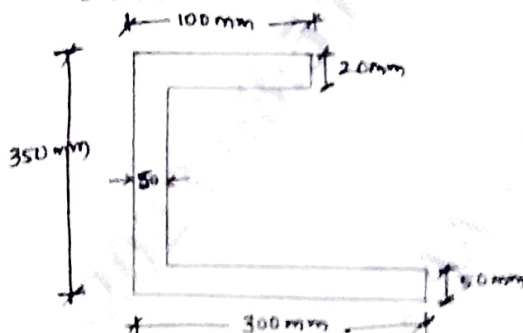


Fig.Q7(b)

(12 Marks)

OR

- 8 a. Define the following:  
 (i) Center of gravity  
 (ii) Perpendicular axis theorem  
 (iii) Radius of gyration (06 Marks)  
 b. Find the MOI about the central axis in Fig.Q8(b)

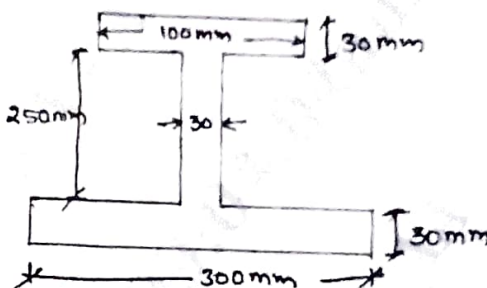


Fig.Q8(b)

(14 Marks)

**Module-5**

- 9 a. With neat sketch, explain:  
 (i) Perfect frame  
 (ii) Deficient frame  
 (iii) Redundant frame (08 Marks)  
 b. Mention the assumptions made in the analysis of frame. (03 Marks)  
 c. A truss is shown in Fig.Q9(c), find the support reactions and calculate the total weight of truss if each member has 2 angles  $50 \times 50 \times 6$  @ 4.5 kg/mtr each angle

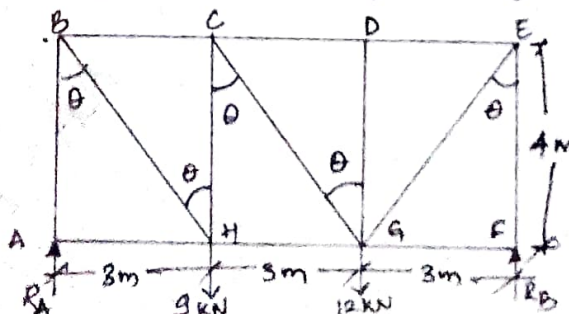


Fig.Q9(c)

(09 Marks)

OR

- 10 Determine the forces in the members of truss shown in Fig.Q10.

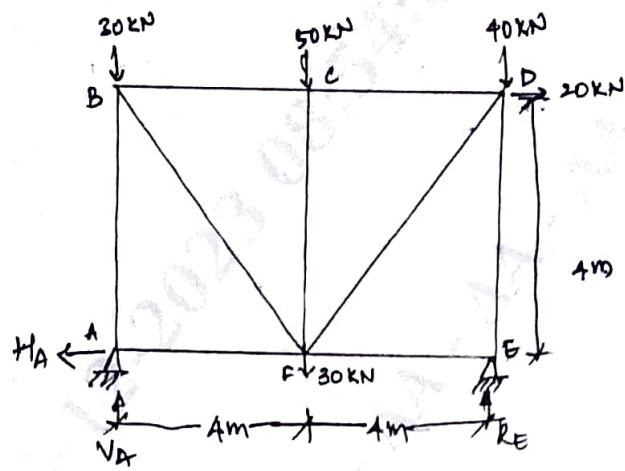


Fig.Q10

(20 Marks)

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