

# CBCS SCHEME

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21ENG26

## Second Semester B.Arch. Degree Examination, Dec.2024/Jan.2025 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. What is Concrete? Explain the properties of fresh and hardened concrete. (10 Marks)
- b. What is workability of concrete? Explain the factors affecting the workability of concrete. (10 Marks)

OR

- 2 a. Explain the important properties and uses of the following building materials :  
i) Concrete ii) Steel iii) Wood. (12 Marks)
- b. Explain the different types of loads the structure is being subjected to as per IS 875 – 1987 (Part I and II). (08 Marks)

### Module-2

- 3 a. Differentiate between :  
i) Coplanar and non-coplanar force system (02 Marks)  
ii) Coplanar concurrent and coplanar parallel force system (04 Marks)  
iii) Law of triangle of forces and law of polygon of forces. (04 Marks)
- b. Determine the magnitude and direction of the resultant force for the force system shown in Fig.Q3(b).



Fig.Q3(b)

(10 Marks)

OR

- 4 a. Explain the principle of transmissibility of forces and moment of a force with an example. (10 Marks)
- b. Determine the resultant of the 3 forces acting on a hook as shown in Fig.Q4(b). Also find the direction of the resultant force.

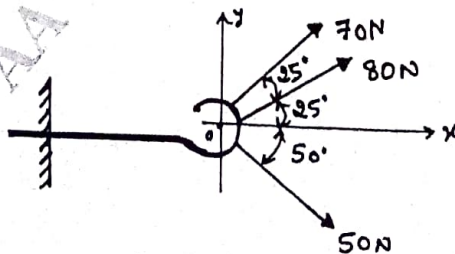


Fig.Q4(b)

(10 Marks)

**Module-3**

- 5 a. Define couple. What are the characteristics of a couple? (05 Marks)  
 b. State and prove "Varignon's Theorem". (05 Marks)  
 c. Determine the magnitude, direction and position of the resultant force from point 'A'. Refer Fig.Q5(c).

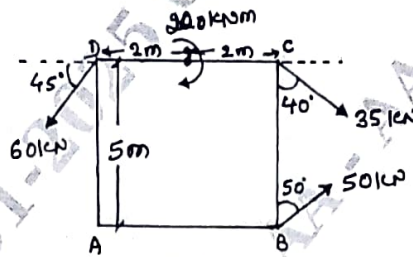


Fig.Q5(c)

(10 Marks)

OR

- 6 a. With neat sketches, explain the different types of supports and loads. (10 Marks)  
 b. Determine the support reactions for the beam shown in Fig.Q6(b).

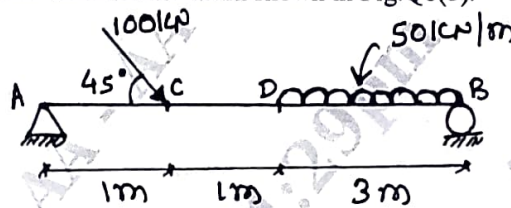


Fig.Q6(b)

(10 Marks)

**Module-4**

- 7 a. Locate the Centroid of composite section shown in Fig.Q7(a).

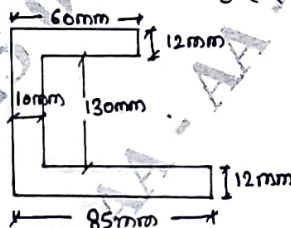


Fig.Q7(a)

(10 Marks)

- b. Locate the Centroid of the shaded portion shown in Fig.Q7(b).

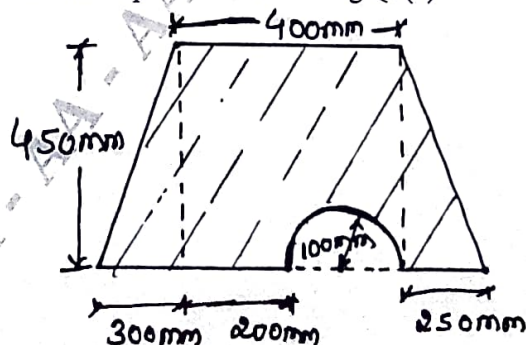


Fig.Q7(b)

(10 Marks)

OR

- 8 a. State and prove "Parallel axis theorem". (06 Marks)  
 b. For the composite section shown in Fig.Q8(b), determine the moment of inertia about its horizontal and vertical centroidal axis. Also find the corresponding radius of gyration.

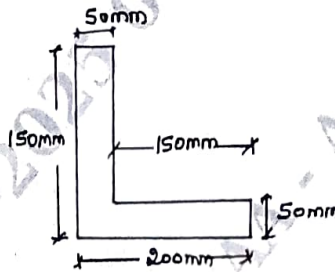


Fig.Q8(b)

(14 Marks)

Module-5

- 9 a. With a neat sketch explain :  
 i) Perfect frame  
 ii) Deficient frame  
 iii) Redundant frame.  
 b. Mention the assumptions used in the analysis of truss.  
 c. Determine the support reactions for the truss shown in Fig.Q9(c).

(09 Marks)

(05 Marks)

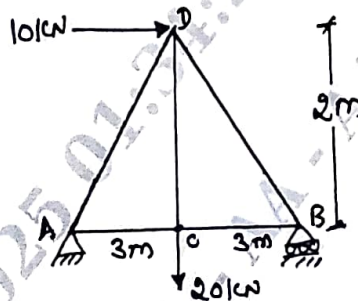


Fig.Q9(c)

(06 Marks)

OR

- 10 Analyze the frame shown in Fig.Q10 by the method of joints. Length of each member is 2m.

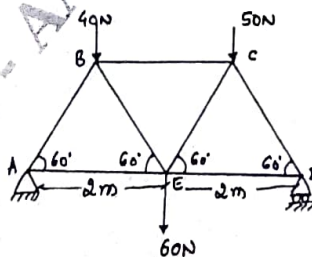


Fig.Q10

(20 Marks)

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