CBCS SCHEME

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18ENG15

First Semester B.Arch. Degree Examination, Feb./Mar. 2022
Building Structures – I

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Follow written dimension do not scale.

Module-1

1 a. What are the ingredients used in "Plane Cement Concrete". Indicate the properties of the ingredients. **(10 Marks)**

b. What is workability of concrete? What are the tests conducted in the laboratory to determine the workability, explain slump test in detail. **(10 Marks)**

OR

2 a. Explain Dead load, Live load, Impact load and Earthquake load. **(10 Marks)**

b. Name five major construction materials indicate the properties of steel and bricks. What are tests conducted to evaluate the quality of cement as per IS standards. **(10 Marks)**

Module-2

3 a. Differentiate between
(i) Coplanar force system and Concurrent force system
(ii) Resultant of a force and equilibrant
(iii) Law of triangle of forces and law of polygon of forces. **(10 Marks)**

b. Determine the magnitude and direction of Resultant force from Fig.Q3(b).

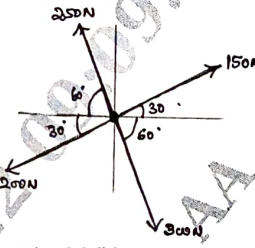


Fig.Q3(b) **(10 Marks)**

OR

4 a. State and prove "Varignon's Theorem" **(05 Marks)**

b. What are statically determinate and statically indeterminate beams? Give examples. **(05 Marks)**

c. Determine the magnitude, direction and position of the "Resultant Force". Refer Fig.Q4(c).

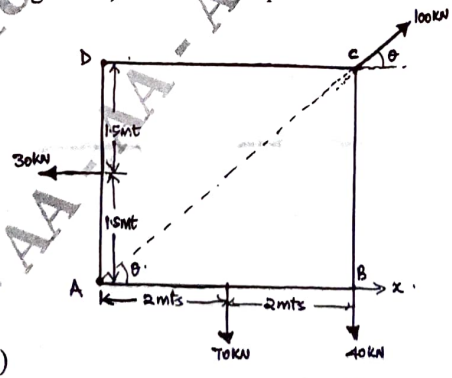


Fig.Q4(c) **(10 Marks)**

Module-3

5 a. With neat sketches explain the different types of supports. **(10 Marks)**

b. For the beam shown in Fig.Q5(b) determine the support reactions.

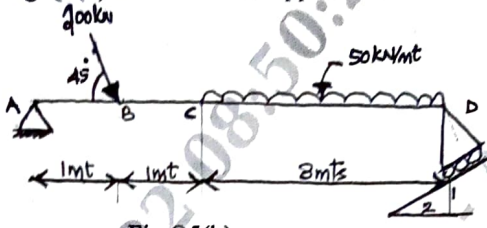


Fig.Q5(b) **(10 Marks)**

OR

6 a. Explain briefly with sketch :
(i) Free body diagram (ii) Lami theorem. **(05 Marks)**

b. A wire is fixed at 2 points A and D. 2 weights 20 kN and 25 kN are supported at B and C. When equilibrium is reached, it is shown that inclination of AB is 30° and inclination of CD is 60° to the vertical. Determine the tension in AB, BC, CD and also inclination of BC to the vertical. Refer Fig.Q6(b).

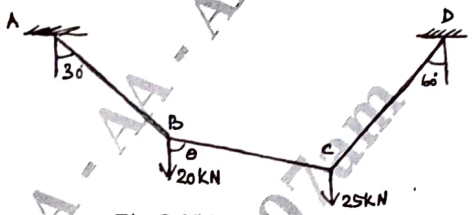


Fig.Q6(b) **(15 Marks)**

Module-4

7 a. Locate the centroid of composite sections shown about 'A'. Refer Fig.Q7(a).

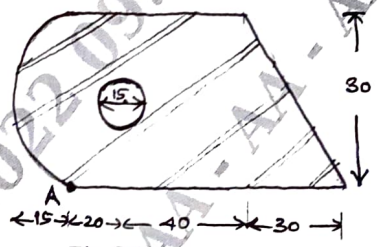


Fig.Q7(a) **(10 Marks)**

b. Locate the centroid of shaded area as shown in Fig.Q7(b).

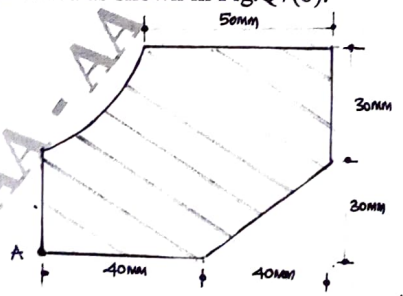
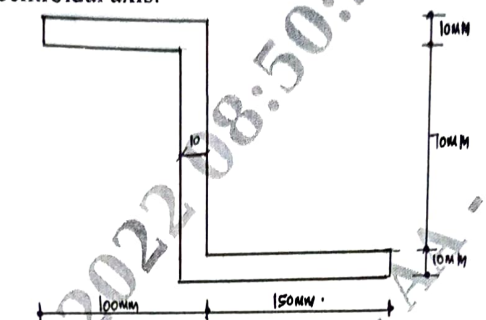


Fig.Q7(b) **(10 Marks)**

OR

8 a. State and prove "Parallel Axis Theorem". **(05 Marks)**

b. For the composite section shown in Fig.Q8(b), determine the moment of inertia about its horizontal and vertical centroidal axis.



(Follow written dimensions do not scale)
Fig.Q8(b) **(15 Marks)**

Module-5

9 a. With neat sketches explain :
(i) Perfect frame (ii) Deficient frame (iii) Redundant frame **(09 Marks)**

b. For frame shown in Fig.Q9(b) determine the support reactions. **(06 Marks)**

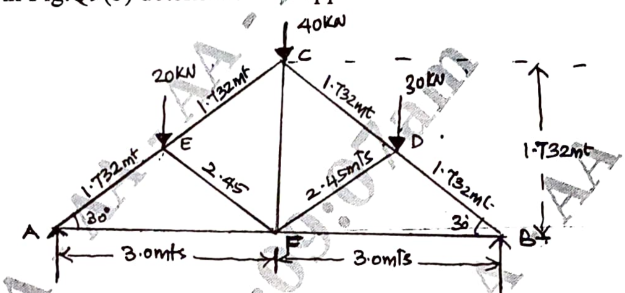


Fig.Q9(b)

c. If the frame is provided with single angle of 50mm × 50mm × 6mm @ 4.5 kg/mt for each angle. **(05 Marks)**

OR

10 Analyse the frame shown in Fig.Q10 by the method of Joints. **(20 Marks)**

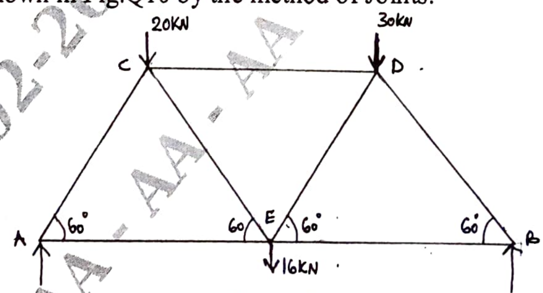


Fig.Q10

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