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First Semester B.Arch. Degree Examination, Jan./Feb. 2023 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 dimensions, do not scale the drawing.*

Module-1

- 1 a. Define durability and explain the factors affecting durability. (10 Marks)
b. Define dead load. Explain reduction in live load on floor according to IS875 Part II. (10 Marks)

OR

- 2 a. Write important properties of structural steel, concrete, aluminium and glass. (12 Marks)
b. Define live load and give the classification of live load on roof as per IS 875 Part II. (08 Marks)

Module-2

- 3 a. Write classification of mechanics with help of flow chart. (04 Marks)
b. Explain classification of system of forces with figure. (08 Marks)
c. A system of four forces acting at a point on a body is as shown in Fig. Q3 (c). Determine the magnitude and direction of resultant force. (08 Marks)

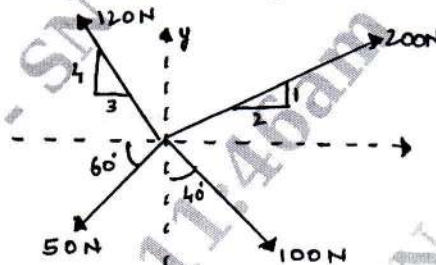


Fig. Q3 (c)

OR

- 4 a. Mention the axioms in mechanics and state principle of transmissibility. (07 Marks)
b. The resultant of two forces, one of which is double the other is 260 N. If the direction of the larger force is reversed and the other one remains unaltered, the resultant reduces to 180 N. Determine the magnitude of the forces and angle between them. (13 Marks)

Module-3

- 5 a. Define couple and mention the characteristics of couple. (04 Marks)
b. Explain different types of support conditions with figure. (08 Marks)
c. The system of forces acting on a bell crank is shown in Fig. Q5 (c). Determine magnitude, direction and the point of application of the resultant. (08 Marks)

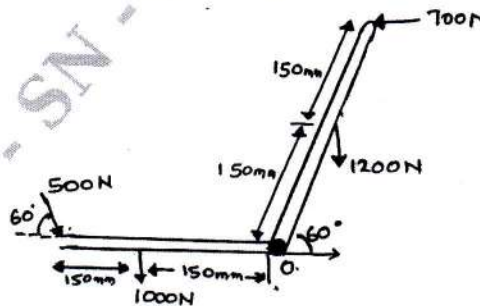


Fig. Q5 (c)

OR

- 6 a. Define different types of beams with neat sketches and explain the same. (10 Marks)
 b. Find the reactions developed at supports A and B of the loaded beam shown in Fig. Q6 (b). (07 Marks)

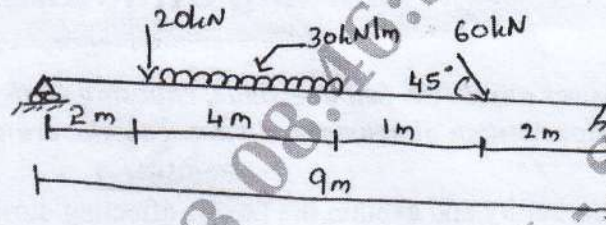


Fig. Q6 (b)

- c. Define the following: (03 Marks)
 (i) Concentrated load.
 (ii) Uniformly distributed load.
 (iii) Uniformly varying load.

Module-4

- 7 a. State and prove parallel axis theorem. (06 Marks)
 b. Define the following: (04 Marks)
 (i) Centre of gravity.
 (ii) Moment of inertia.
 (iii) Centroid.
 (iv) Radius of gyration.
 c. Determine the centroid of the section of concrete dam shown in Fig. Q7 (c).

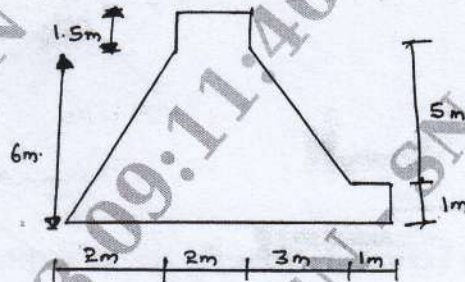


Fig. Q7 (c)

(10 Marks)

OR

- 8 a. State and prove perpendicular axis theorem. (05 Marks)
 b. Determine the moment of inertia of the built up section shown in Fig. Q8 (b) about its centroidal axes and x-x and y-y. (15 Marks)

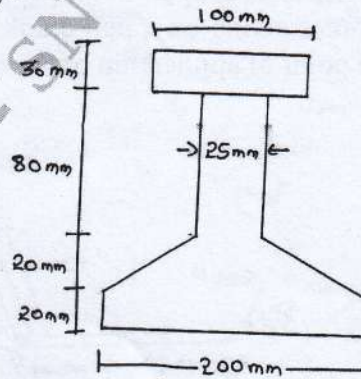


Fig. Q8 (b)

Module-5

- 9 Analyze the truss shown in Fig. Q9. All members are 3 m long and show the reaction and force in members with neat diagram. (20 Marks)

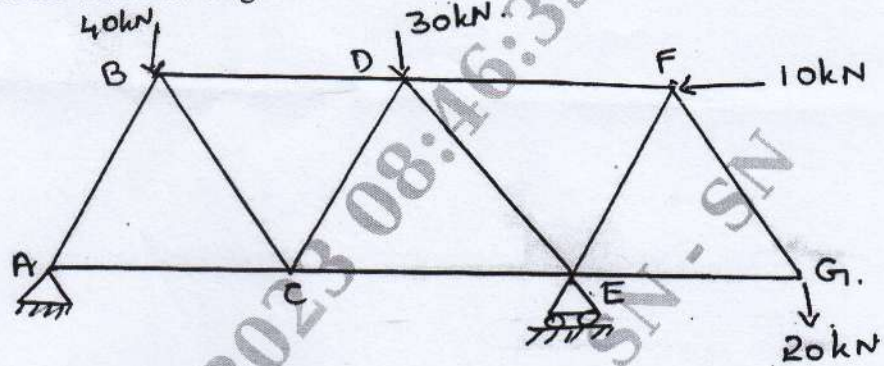


Fig. Q9

OR

- 10 a. Explain perfect, deficient and redundant frame with neat sketches. (06 Marks)
 b. Write the assumptions made in analysis of truss. (04 Marks)
 c. Analyze the truss shown in Fig. Q10 (c) to find out the support reaction. (10 Marks)

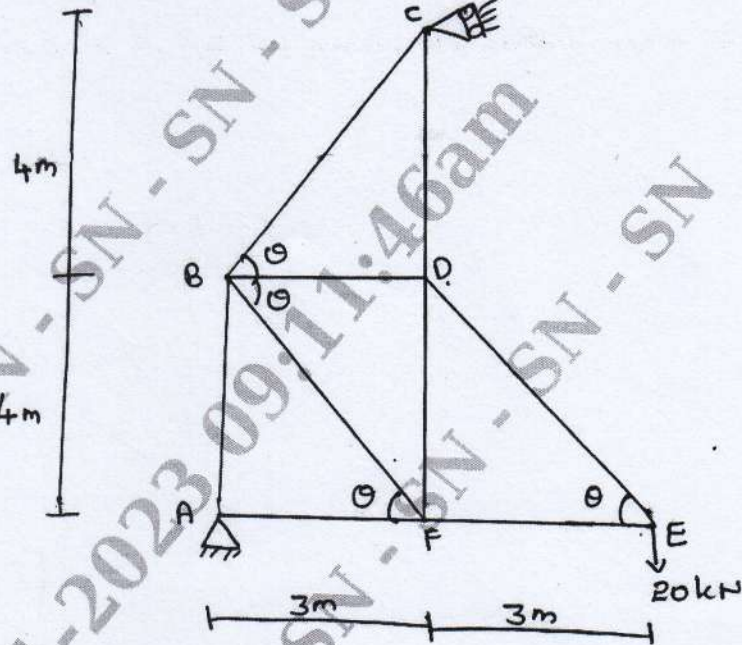


Fig. Q10 (c)
