CBCS SCHEME

USN | | | | | | | | | | |

18CV42

Fourth Semester B.E. Degree Examination, June/July 2025
Analysis of Determinate Structures

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Explain with examples, statically determinate and indeterminate structures. **(10 Marks)**

b. What do you mean by Influence line diagram and state its applications. **(06 Marks)**

c. Find the static and kinematic indeterminacy for the following structures : **(04 Marks)**

Fig. Q1(c)

OR

2 a. Draw Influence line diagrams for a simply supported beam carrying a unit load. **(10 Marks)**

b. Draw Influence line diagrams for a cantilever beam carrying unit load. **(10 Marks)**

Module-2

3 Four point loads 8 , 15 , 15 and 10 KN have centre to centre spacing of 2m between consecutive loads and they traverse a girder of 30m span from left to right with 10 KN load tending. Calculate the maximum bending moment and shear force at 8m from left support. **(20 Marks)**

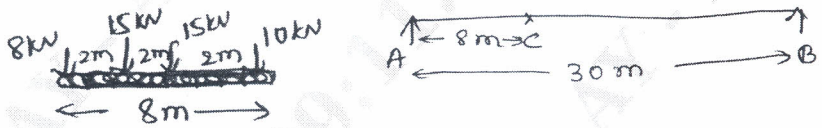


Fig. Q3

OR

4 A simply supported beam has a span of 15m. Uniformly distributed load of 40 KN/m and 5m long crosses the girder from left to right. Draw the influence line diagram for shear force and bending moment @ section 6m from left end. Calculate maximum shear force and bending moment at point C. **(20 Marks)**

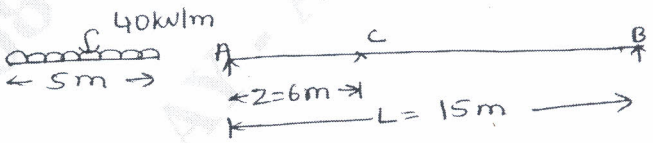


Fig. Q4

Module-3

5 a. Find the rotation and deflection at the free end in the cantilever beam as shown in Fig. Q5(a) by moment area method. **(10 Marks)**

i)

Fig. Q5(i a)

ii)

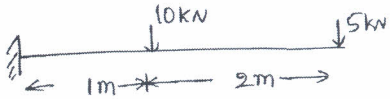
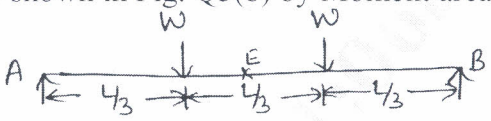


Fig. Q5(ii a)

b. Determine the rotation @ supports and deflection at mid span and under the loads in the simply supported beam as shown in Fig. Q5(b) by Moment area method. **(10 Marks)**

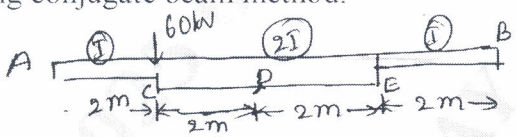
Fig. Q5(b)



OR

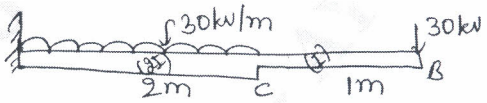
6 a. Determine the rotation at A, B, C , D and deflection at C, D and E in the beams as shown in Fig. Q6(a) below by using conjugate beam method. **(10 Marks)**

Fig. Q6(a)



b. Determine the slope and deflection at B and C in the cantilever beam shown below using conjugate beam method. **(10 Marks)**

Fig. Q6(b)



Module-4

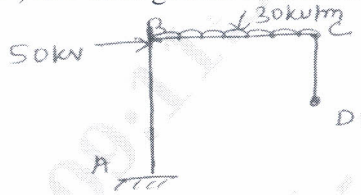
7 a. Prove that Total strain energy is equal to complementary energy. **(10 Marks)**

b. Using strain energy method determine the deflection of the free end cantilever beam of length 3 m subjected to cone load 10 KN at free end. **(10 Marks)**

OR

8 Determine the vertical and horizontal displacement at the free end 'D' in the frame as shown in Fig. Q8. Take EI = 12×10^3 N-mm^2, use Castigliano's theorem. **(20 Marks)**

Fig. Q8



Module-5

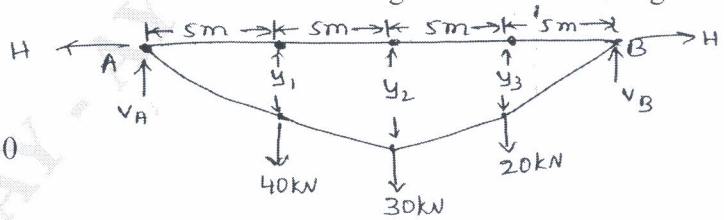
9 a. A three hinged semicircular arch of radius 'R' carries a uniformly distributed load of intensity w/m over its entire horizontal span. Determine the reactions at supports and maximum bending moment in the arch. **(10 Marks)**

b. Show that the parabolic shape is a funicular shape for a three hinged arch subjected to uniformly distributed load over to its entire span. **(10 Marks)**

OR

10 A light cable is supported at two points 20 m apart which are at the same level. The cable supports three concentrated loads as shown in Fig. Q.10. The deflection at first point is found to be 0.8 m. Determine the tension in the different segments and total length of the cable.

Fig. Q10



(20 Marks)

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