CBCS SCHEME

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

15CV42

Fourth Semester B.E. Degree Examination, June/July 2019
Analysis of Determinate Structures

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. With an example define statically determinate and statically indeterminate structure. **(04 marks)**

b. Determine the force in each member of the roof truss shown in Fig.Q1(b) by method of joints. **(12 Marks)**

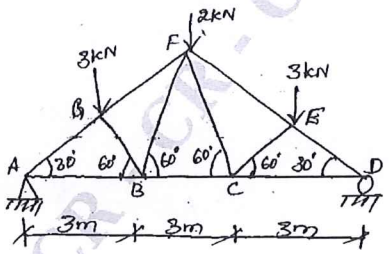

Fig.Q1(b)

OR

2 a. Define : i) Conditions of equilibrium ii) Degree of freedom iii) Assumptions in truss analysis. **(06 Marks)**

b. Determine the force in members CB and GC and state whether the members are in tension or compression Fig.Q2(b). Adopt method of section. **(10 Marks)**

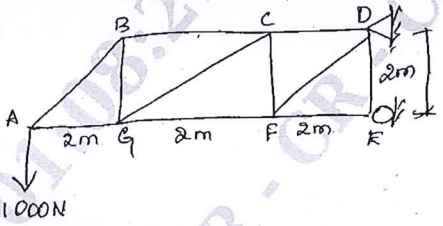

Fig.Q2(b)

Module-2

3 a. Determine the slope @ point 'C' of the beam in Fig.3(a) by moment area method. $E = 200GPa$, $I = 6(10^6)mm^4$. **(08 Marks)**

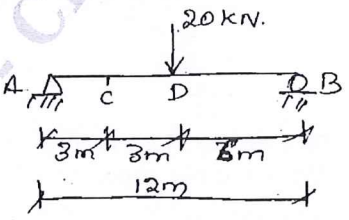

Fig.Q3(a)

b. By double integration method, determine slope and deflection at A for the beam shown in Fig.Q3(b). **(08 Marks)**

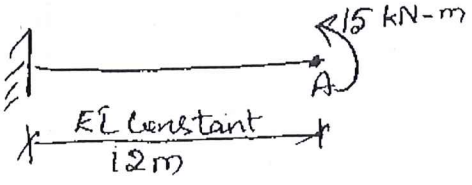

Fig.Q3(b)

OR

4 a. Using conjugate beam method, determine the slope and deflection @ point B of the beam shown in Fig. 4(a). EI is constant. **(08 Marks)**

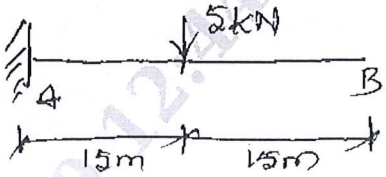

Fig.Q4(a)

b. Using Machaulay's method of deflection, calculate the deflection under two loads and maximum deflection for the beam shown in Fig.Q4(b). **(08 Marks)**

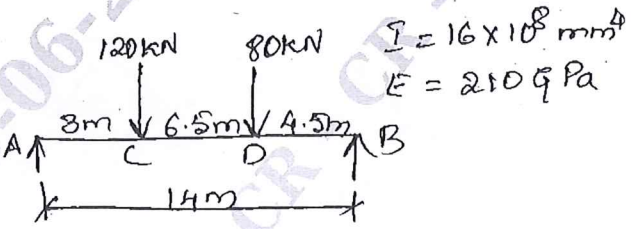

Fig.Q4(b)

Module-3

5 a. Explain the principles of virtual displacement and forces. **(06 marks)**

b. Using Castigliano's theorems, determine the vertical displacement of joint C of the truss shown in Fig.Q5(b). A = 400mm^2, E = 200GPa. **(10 Marks)**

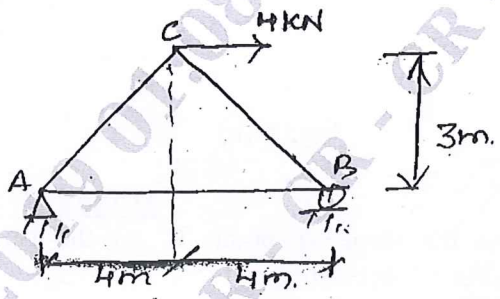

Fig.Q5(b)

OR

6 a. Derive strain energy in an axially loaded member. **(06 marks)**

b. A beam AB is simply supported over a span 5m in length. A concentrated load of 30kN is acting at a section 1.25m from left support A. Calculate the deflection under the load point using dummy unit load method. E = 200 × 10^{6}kN/m^2 I = 13 × 10^{-6}m^4. **(10 Marks)**

Module-4

7 a. A footbridge of width 3m and span 50m is carried by 2 cables of uniform section having a central dip of 5m. If the platform load is 5kN/m^2. Calculate the maximum pull in the cables. Find the necessary section area required if the allowable stress is 120N/mm^2. **(10 Marks)**

b. Derive the expression for the length of cable for supports at same levels. **(06 Marks)**

OR

8 A 3–hinged parabolic arch has span 16m and central rise 4m. It carries a point load of 100kN @ 4m from left support. Evaluate reaction components, moment, thrust and radial shear at a section 6m from left support. Take the equation of arch $y = 4h\,x(\ell - x)$ with left hand support as origin. Draw BMD. **(16 Marks)**

Module-5

9 a. a udl of 15kN/m covering a length of 3m crosses a girder of span 10m – find the max, shear force and bending moment at a section 4m from left support. **(08 Marks)**

b. Define influence line and its significance. **(08 Marks)**

OR

10 Determine maximum moment and shear force at point C shown in Fig.Q10. The loading is due to axle loads of IRC class A driving vehicle on top of the beam. Assume that the vehicle can move in either direction. **(16 Marks)**

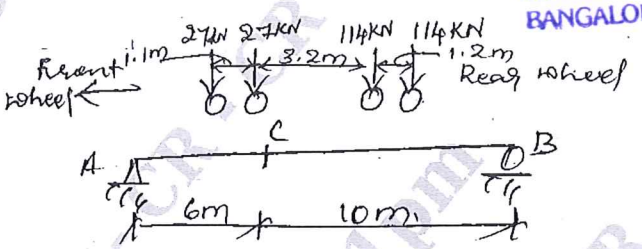

Fig.Q10

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