CBCS SCHEME

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

15CT42

Fourth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Structural Analysis

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Define statically determinate and indeterminate structure with example. **(04 Marks)**

b. Analyse the truss shown in Fig.Q1(b) using method of joints. Indicate all member forces.

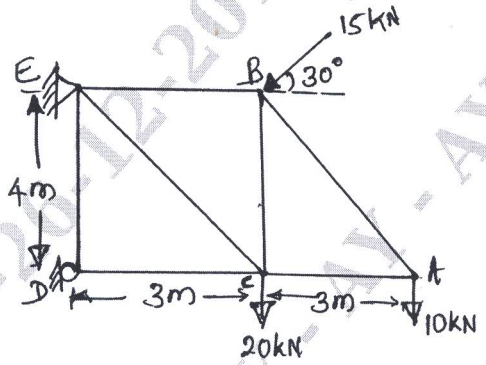

Fig.Q1(b) **(12 Marks)**

OR

2 a. Obtain the degree of static indeterminacy and degree of kinematic indeterminacy for the structure shown in Fig.Q2(a).

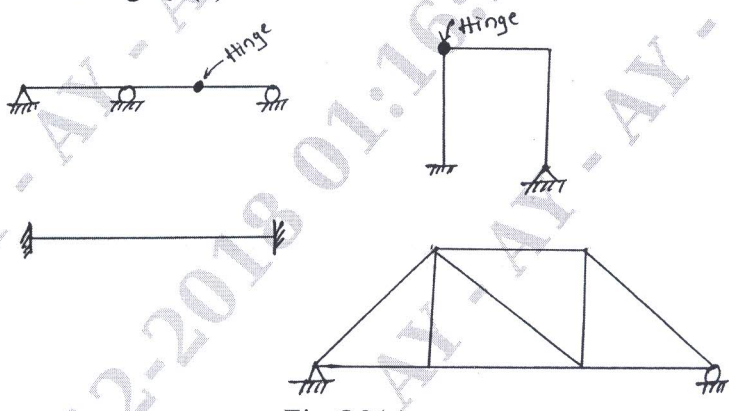

Fig.Q2(a) **(08 Marks)**

b. Determine the forces in AB, EF and CD by method of section, as shown in Fig.Q2(b).

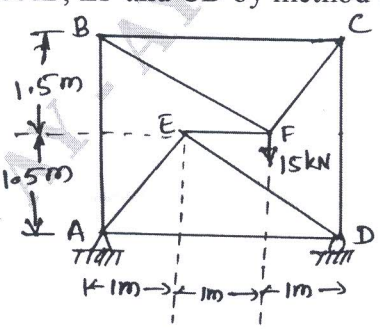

Fig.Q2(b) **(08 Marks)**

Module-2

3 a. What is strain energy? Derive the expression for strain energy due to bending. **(06 Marks)**

b. Determine the deflection under point load of given beam shown in Fig.Q3(b) by strain energy method. EI constant.

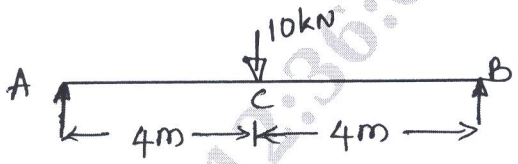

Fig.Q3(b) **(10 Marks)**

OR

4 a. Find the vertical deflection at 'c' for the bent as shown in Fig.Q4(a) by strain energy method. Take EI constant.

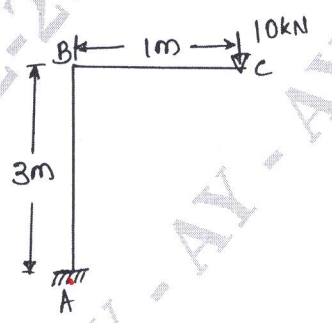

Fig.Q4(a) **(10 Marks)**

b. Determine the maximum deflection at free end of cantilever beam by Castigliano's method. Take EI constant. As shown in Fig.Q4(b).

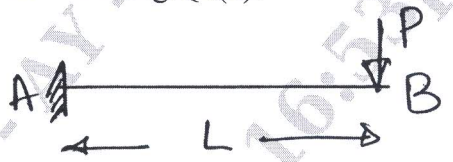

Fig.Q4(b) **(06 Marks)**

Module-3

5 a. A three hinged symmetrical parabolic arch has a span of 30m and center rise of 6m. The arch carries uniformly distributed load of intensity 30 kN/m over left half portion and a concentrated load of 60 kN at 9m from right hand support. Compute bending moment, normal thrust and radial shear at 9m from left hand support. **(10 Marks)**

b. A three hinged symmetrical arch of span 'ℓ' rise 'h; subjected to UDL 'w'/unit length throughout of span. Prove that 'bending moment' is zero all the points. **(06 Marks)**

OR

6 A suspension bridge of 120 m span has a central dip of 12 m and supports a UDL of 15 kN/m of entire span. Evaluate :

i) The maximum and minimum tension in the cable

ii) The size of the cable if permissible stress = 200 N/mm^2

iii) The length of the cable

iv) If cable passes over a smooth pulley, what are horizontal force, vertical force and bending moment at base of tower? Anchor cable inclination with horizontal is $\theta_A = 25°$. Height of tower = 20 m. **(16 Marks)**

Module-4

7 a. Determine the reaction components of propped cantilever, subjected to uniformly distributed load by consistent deformation method. **(06 Marks)**

b. Determine the reaction components in the beam as shown in Fig.Q7(b). EI is constant throughout by consistent deformation method.

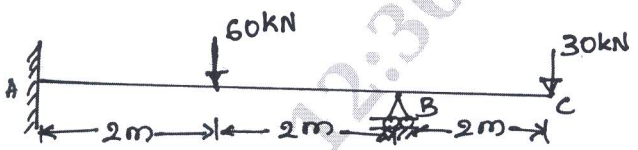

Fig.Q7(b) **(10 Marks)**

OR

8 Analyze the continuous beam shown in Fig.Q8 by theorem of three moments. Draw BMD and SFD.

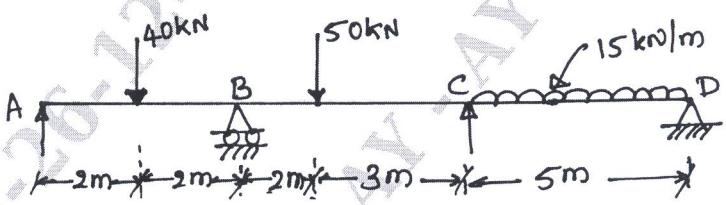

Fig.Q8 **(16 Marks)**

Module-5

9 Analyse the frame shown in Fig.Q9 by slope deflection method.

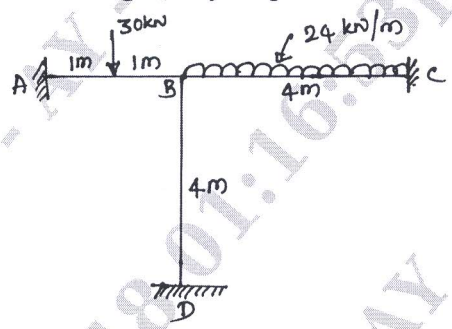

Fig.Q9 **(16 Marks)**

OR

10 Find support moments. Draw SFD and BMD for continuous beam shown in Fig.Q10 by moment distribution method.

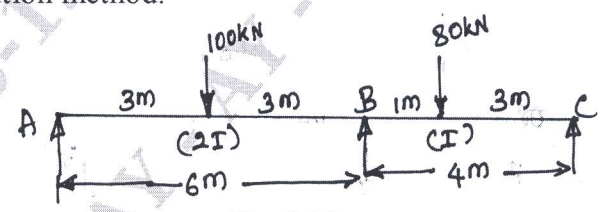

Fig.Q10 **(16 Marks)**

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