Exam Seat No: _____   Enrollment No: _____

C. U. SHAH UNIVERSITY
WADHWAN CITY
University (Summer) Examination - May 2015

Course Name : B.Tech. Civil Sem-IV   Marks : 70
Subject Name : Structural Analysis-II   Date : 23/05/2015
Subject Code: 4TE04STA1   Time:2:30 To 5:30

Instructions:
(1) Attempt all questions of both sections in separate answer book/supplementary.
(2) Use of programmable calculator & any other electronic instrument is prohibited.
(3) Instructions written on main answer book are strictly to be obeyed.
(4) Draw neat diagrams & figures (If necessary) at right places.
(5) Assume suitable & perfect data if needed.

Section - I

Q-1 (a) What is Explain Maxwell's reciprocal theorem?   2
     (b) Explain stability of structures.   2
     (c) Differentiate between frame and truss.   2
     (d) What is mean by indeterminate structure?   1

Q-2 (a) Find slope and deflection at point B for a cantilever beam shown in figure   5
          using. Castiglione's first theorem. Take EI = 10 x 10^{13} N.mm^2.
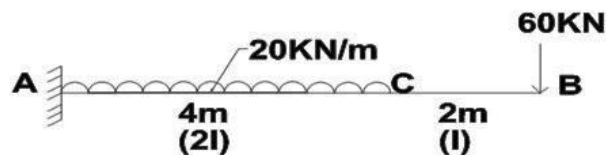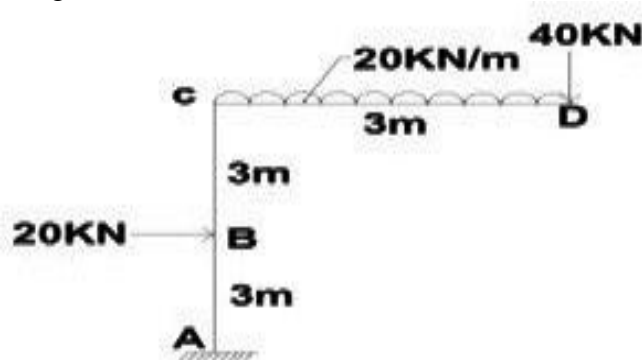

     (b) Calculate θ_B and δ_B for a beam shown in figure, Take E = 2 x 10^5 N/mm^2, I =   5
          5 x 10^8 mm^4.

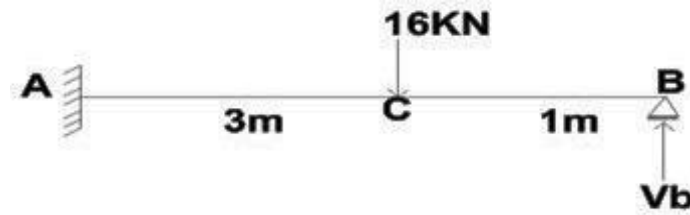   (c) Derive Castiglione's first theorem.   4

                              OR

Q-2 (a) Calculate vertical and horizontal displacement of point D for a rigid cantilever   5
   frame shown in figure. Take EI = 6 x 10^4 KN.m^2.

     (b) Determine reaction at the supports and draw S.F and B.M diagram for a beam   5
          shown in figure.

16KN

A ⊏ ─── 3m ─── C ─── 1m ─── B △

Vb

(c) State Castiglione's second theorem and write formula for the member in banding and in axial loading.   4

Q-3 (a) A continuous beam ABC is loaded as shown in figure. If support B sink by 40 mm and C rotates by $\frac{1}{100}$ radian clockwise. Analyse the beam.   5

90kN

30KN/m

A ⊏ ~~~~~ 4m ~~~~~ B △ ── 2m ── ↓ ── 4 m ── C ⊐
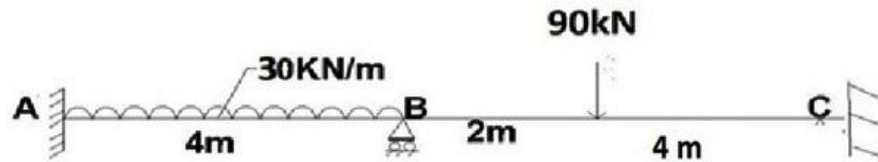
(b) Draw S.F and B.M diagram for a frame shown in figure using slope deflection method.   5

20KN/m

B ~~~~ 2m ~~~~ C

20KN/m | 3m

A ▦
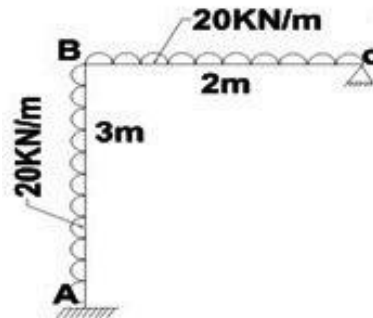
(c) Define the following terms.   4
(i) Stiffness, (ii) Carry over moment, (iii) Unbalanced moments, (iv) Distribution moment.

OR

Q-3 (a) Write the step by step procedure for moment distribution method.   5
(b) Analyse the beam shown in figure by moment distribution method and draw SFD and BMD.   5

20kN   **5kN**

20kN.m

A ▦ ── 1m ── ↓ ── 3m ── B ── 1m ── ↺ ── 2m ── C ── 1m ── ↓ D
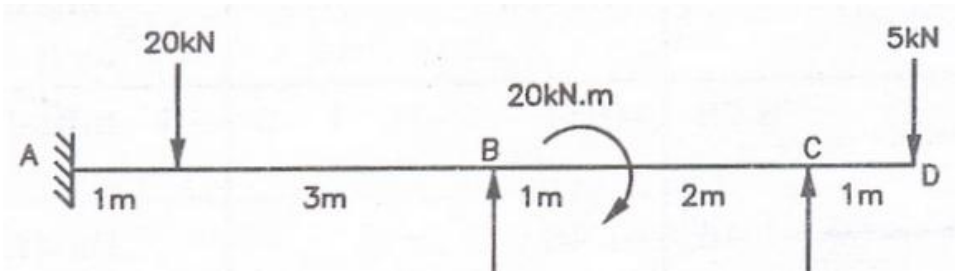
(c) A simply supported beam AB has span 8m. draw influence for R_A, R_B, V_X and M_X for a section X at 3m from left hand support.   4

Section - II

Q-4 (a) Explain the distribution factor (D.F.). 2
(b) Define Carry over factor and Relative stiffness. 2
(c) Discuss three hinged parabolic arch. 2
(d) State Eddy's theorem. 1

Q-5 (a) Explain causes of side sway in portal frame and derive shear equation for slope deflection method 5
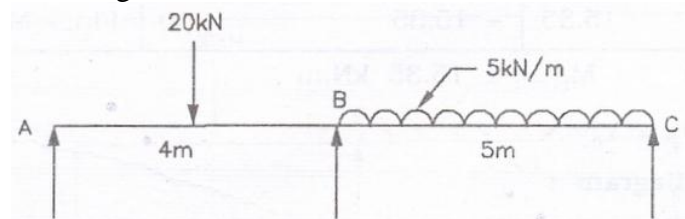(b) Find support moments and draw BMD for a non-sway portal frame shown in figure. EI = constant. 5
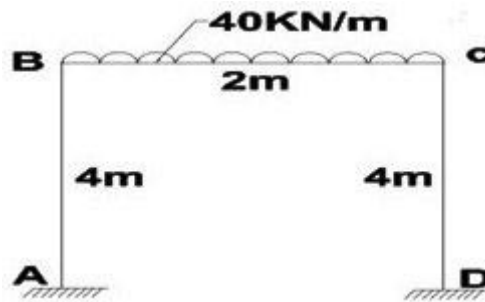
(c) What is slope deflection method? Discuss its importance. 4

OR

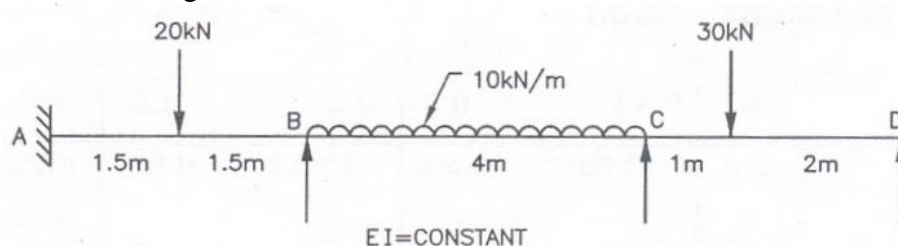Q-5 (a) Analysis the beam shown in figure by moment distribution method and draw bending moment diagram. 5
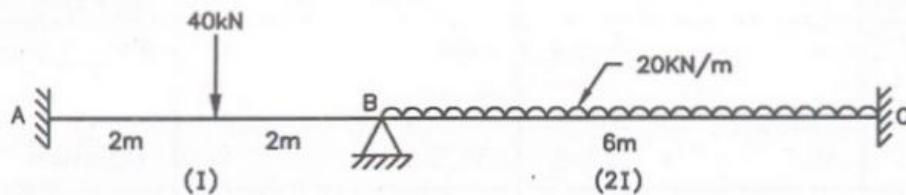
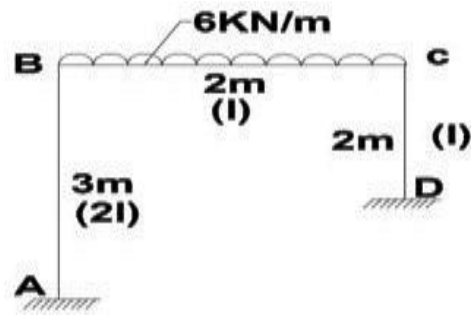(b) Analysis the beam shown in figure by moment distribution method and draw bending moment diagram. 5

(c) Draw the fixed end moment for various load cases. 4

Q-6 (a) Analysis the beam shown in figure by moment distribution method and draw B.M. and S.F. diagram. 5

(b) Analyse the portal frame ABCD shown in figure and draw BM diagram. Also draw deflected shape of the frame. 5

(c) Explain Sign conventions for (i) Support moments: (end moments), (ii) Rotation (slope) : θ, (iii) Sinking (settlement) : δ.   4

OR

Q-6 (a) A three hinged parabolic arch has a span 20m and central rise 3m. it carries a point load of 10KN at 7.5m from the left hinge. Calculate normal thrust, shear and B.M at section 7.5m from right end hinge. And calculate maximum positive and negative bending moments and their position.   5

(b) Define arches. Explain types of arches.   5

(c) Discuss influence line and its important in line diagram?   4

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