5E5061

Roll No. _____ Total No of Pages: 7

5E5061

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Civil Engineering
5CE1A Theory of Structures-I

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main: 26
Min. Passing Marks Back: 24

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

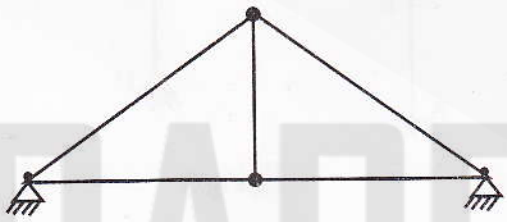
1. NIL 2. NIL

UNIT-I

Q.1 (a) Define kinematic indeterminacy. Determine kinematic degree of indeterminacy for the following structures shown in Fig 1 [4]

(i)

(ii)



(iii)

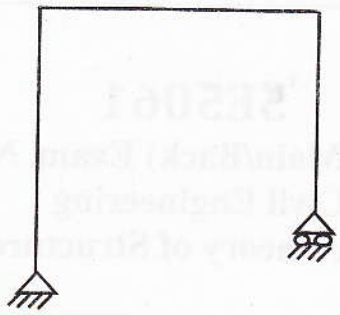


Fig – 1

(b) Solve the continuous team using slope – deflection method (Fig 2) and draw B. M. D. [12]

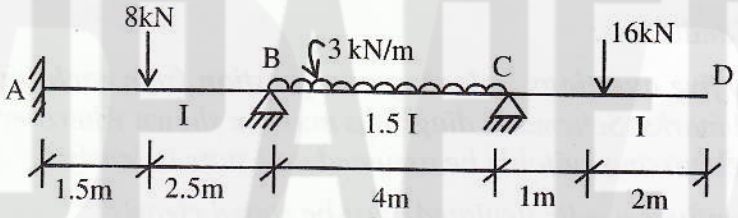


Fig.2

OR

Q.1 (a) Write Maxwell – Betli's generalized theorem. A vertical downward load of 40 KN acting at F in the portal frame shown in Fig 3 produces a horizontal deflection at E of 2mm towards left and a clockwise rotation of 0.1 radian at D. Determine the vertical deflection at F due to a horizontal load of 20KN at E towards right and an anti clockwise moment of 1.6KN – m acting at D. [4]

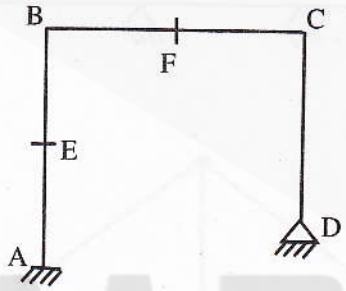


Fig.3

(b) Solve using slope deflection method (Fig 4) and draw the bending moment diagram. Also draw the deflected shape for the from PQRS. [12]

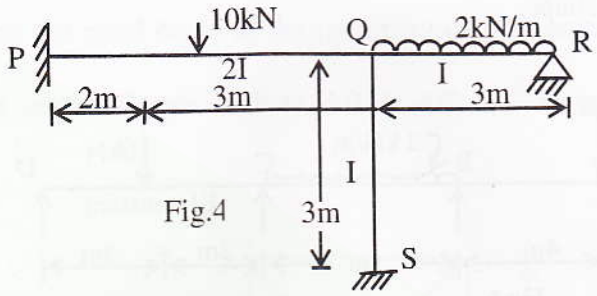


Fig.4

UNIT-II

Q.2 Analyses the rigid frame shown in Fig 5 using moment distribution method. Draw BMD & deflected shape. [16]

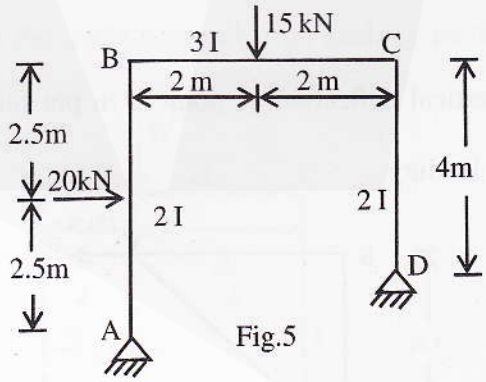


Fig.5

OR

Q.2 A Beam ABCD, 16m long is continuous over three spans and is loaded as shown in Fig 6. The support B sinks by 5mm downwards. I for the beam is $93 \times 10^4 mm^4$ throughout. Take $E = 2.1 \times 10^5 N/mm^2$. Calculate the moments and draw the BMD. Also draw deflected shape. [16]

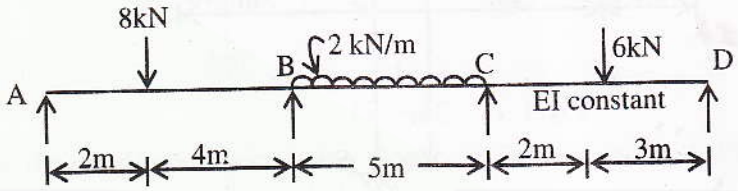


Fig.6

UNIT-III

Q.3 (a) Define strain energy. Calculate the strain energy due to bending for the beam given in Fig 7 having span of 5m. [4]

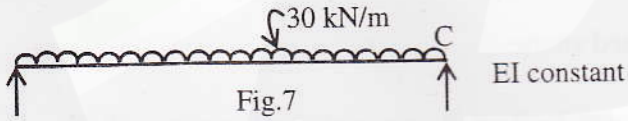


Fig.7

(b) Calculate the vertical deflection of point B in pin fainted truss shown in Fig 8 under the given loading. [12]

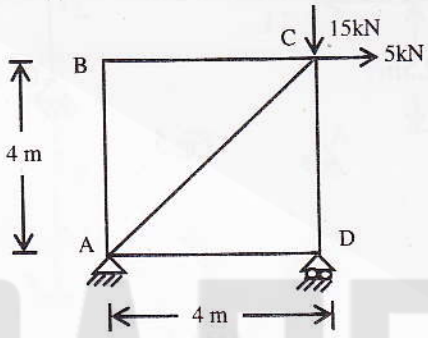


Fig.8

OR

Q.3 (a) Write Castiglione's theorems. [4]

(b) Determine the axial faces in the members of pin jointed frame shown in Fig 9. The cron sectional area of bars AB & AC is '2a' and that of other members is 'a' [12]

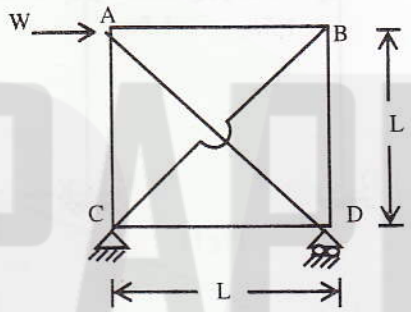


Fig.9

UNIT-IV

Q.4 A portal frame ABCD is fixed at A and D, has rigid joints at B and C. It is loaded as shown in Fig 10. Solve the frame using column analogy method and plot the B. M. D. [16]

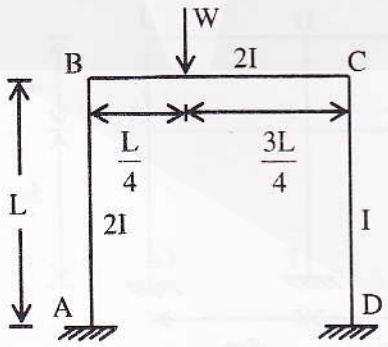


Fig 10

OR

Q.4 Solve the frame using Kani's method (Fig 11). Sketch the B. M. D. for the frame. [16]

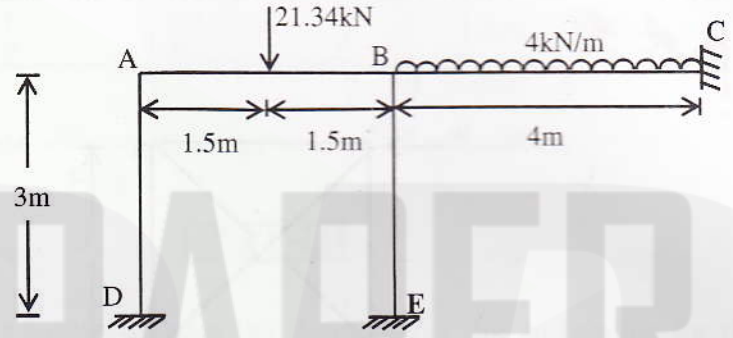


Fig 11

UNIT-V

Q.5 Solve the building frame shown in Fig 12 using portal method. [16]

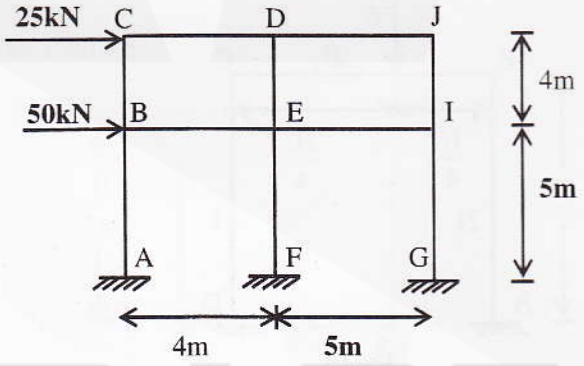


Fig 12

OR

Q.5 Fig 13 shows plan of a Tripod. The feet A, B and C being in the same plane and the open D being 3.75m above the plane. Horizontal loads of 100 KN and 150 KN are applied at D in the directions shown. Find the forces in the members assuming that all joints are pin – joints [16]

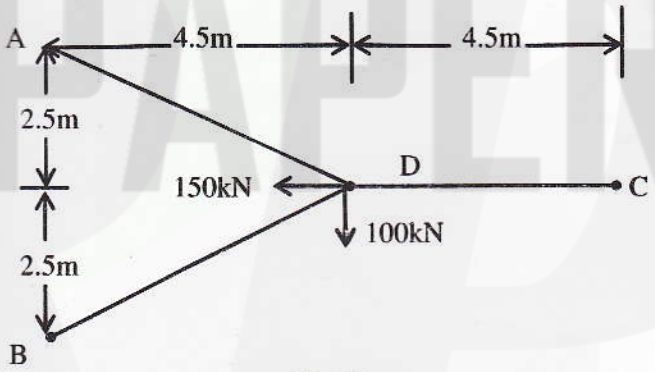


Fig 13
