

5E5061

Roll No. \_\_\_\_\_

Total No of Pages: 7

5E5061

B. Tech. V Sem. (Main/Back) Exam., Nov.-Dec.-2016

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.  
(Mentioned in form No. 205)

1. NIL \_\_\_\_\_

2. NIL \_\_\_\_\_

### UNIT – I

Q.1 (a) Define static and kinematic indeterminacy. Calculate static indeterminacy for the following shown in fig1 (a) & fig1 (b) [4]

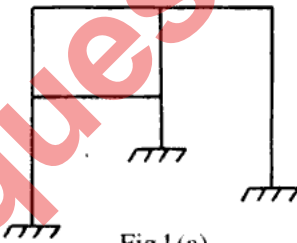


Fig 1(a)

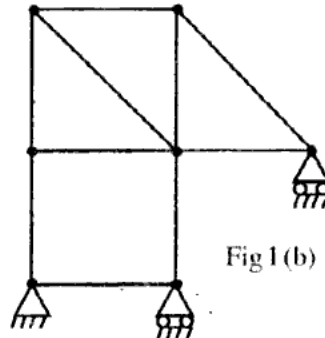


Fig 1(b)

- (b) Determine the moments at supports for the beam shown in fig2 if the support B sinks by 10mm use  $I = 13160 \times 10^4 \text{ mm}^4$  and  $E = 2 \times 10^5 \text{ N/mm}^2$ . Also draw the BMD. [12]

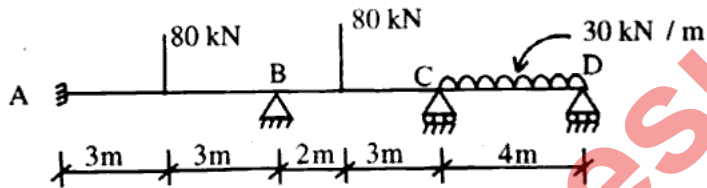


Fig.2

**OR**

- Q.1 (a) Write Maxwell's reciprocal theorem. [2]
- (b) Determine the end moments for the portal frame shown in Fig.3. Draw BMD and deflected shape. [14]

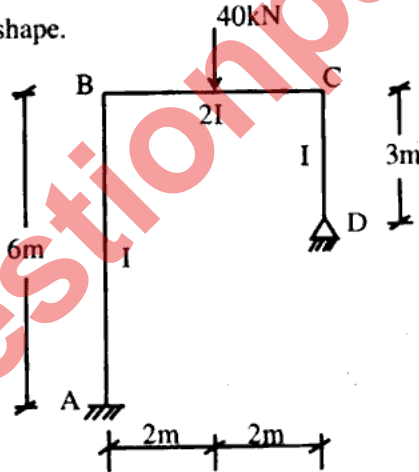


Fig.3

## UNIT - II

Q.2 (a) Define distribution factor and carry over factor. [2]

(b) Using moment distribution method, analyse the continuous beam shown in Fig.4.

Assume  $E = 200 \text{ KN/mm}^2$  and  $I = 6 \times 10^6 \text{ mm}^4$ . Support B sinks by 30mm. Draw

BMD and deflected shape. [14]

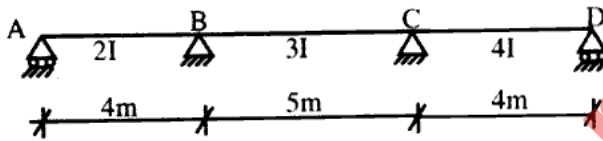


Fig.4

**OR**

Q.2 (a) Analyse the rigid frame shown in fig 5. Draw BMD and deflected shape. [16]

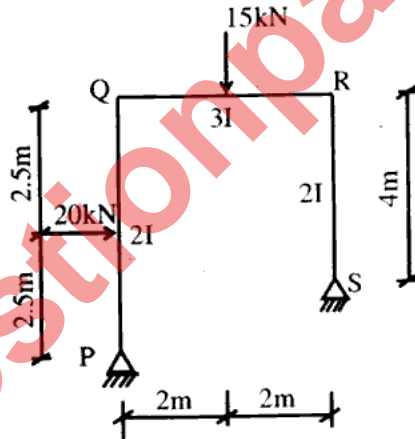


Fig.5

### UNIT – III

Q.3 Find out the horizontal deflection of point C of pin jointed truss shown in fig6. The cross sectioned area of members CD and DE are each  $2500\text{mm}^2$  for all other members area is  $1250\text{mm}^2$ .

Take  $E = 200 \text{ KN/mm}^2$

[16]

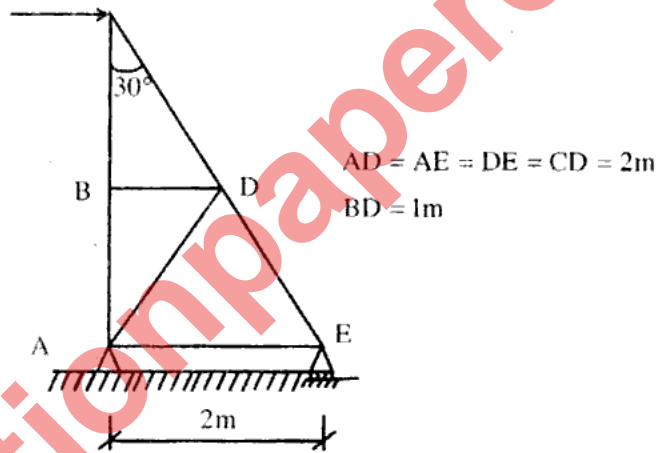


Fig.6

**OR**

Q.3 Find the force in the member BE of the truss shown in fig7. Area of cross section is same for all members. [16]

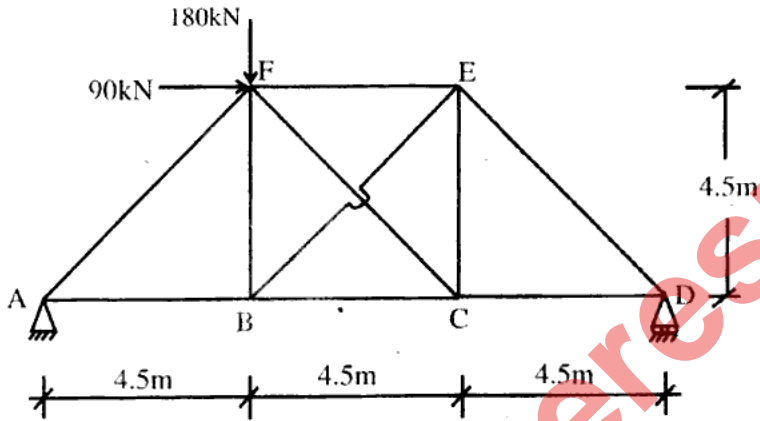


Fig.7

**UNIT - IV**

Q.4 Solve the portal frame P Q R S by column analogy method. EI is constant. [16]

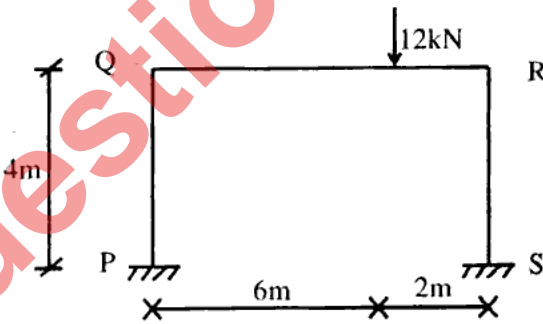


Fig.8

**OR**

- Q.4 (a) Determine the fixed end moment for the beam shown in fig.9 using column and analogy. [8]

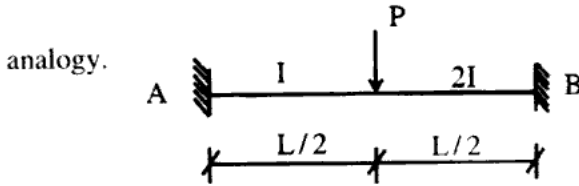


Fig.9

- (b) Determine the support moments at A, B, C, and D for the continuous beam shown in fig 10 using Kane's method. [8]

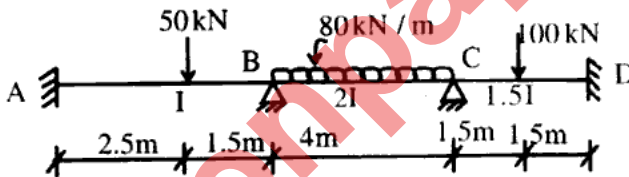


Fig.10

**UNIT - V**

- Q.5 Write the assumptions made in the portal method. Find out the member forces of building frame shown in fig 11 using portal method. [16]

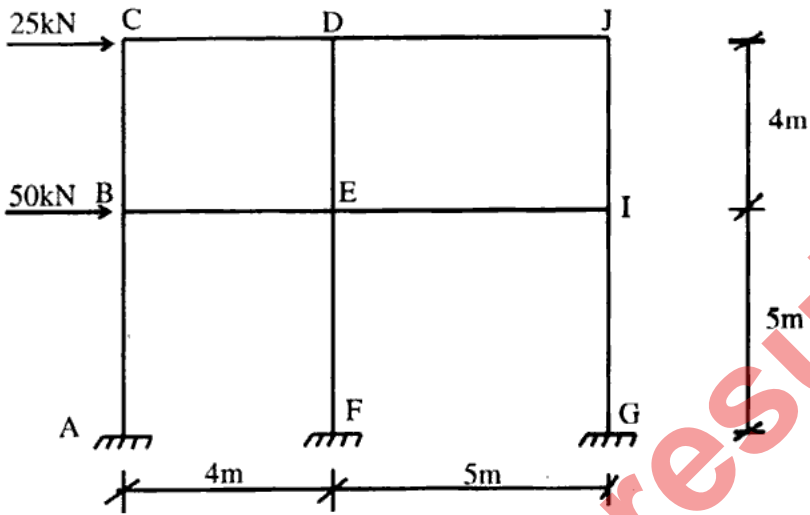


Fig.11

**OR**

Q.5 Fig 12 shows two views of a tripod bracket. All connections are pinned. Find the forces in three members due to a vertical load of 100 kN at O. [16]

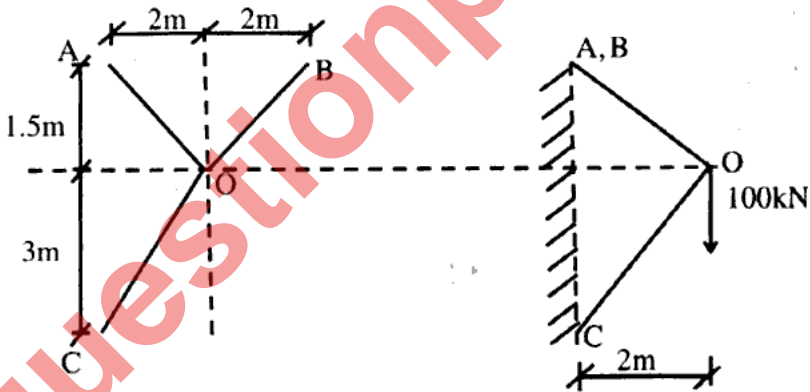


Fig.12