

University of Mumbai
Civil Engineering Examination

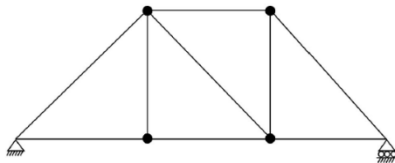
Sub: CEC501/ Structural Analysis-II
Max. Marks: 80

Year/Sem:- TE/ V Sem
Duration: - 2Hrs

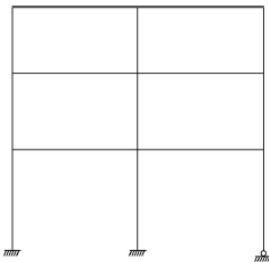
Q1. Attempt all the MCQS

(20 X 2 mark= 40 marks)

1. Which of the following method of structural analysis is a force method
(A) Slope-Deflection method
(B) Moment distribution method
(C) Clapeyrons theorem method
(D) Stiffness method
2. End *A* of beam *AB* is hinged and end *B* is on roller. The degree of kinematic indeterminacy is
(A) 3
(B) 2
(C) 1
(D) 0
3. Degree of kinematic indeterminacy of the truss shown is



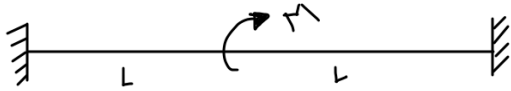
- (A) **9**
 - (B) 6
 - (C) 3
 - (D) 0
4. The degree of freedom of the frame shown is



- (A) 18
- (B) 24
- (C) 29**

(D) 36

5. Fixed end moment M_{FAB} for the given beam is,

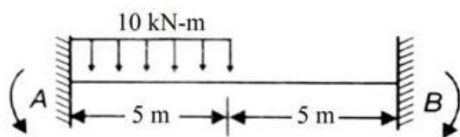


- (A) 0
(B) $M/2$
(C) **$M/4$**
(D) $M/8$
6. Which of the following statement is correct for flexibility method of analysis:-
- (A) The method is used to analyse determinate structures
(B) The method is used only for manual analysis of indeterminate structures
(C) **The method is used for analysis of indeterminate structures with lesser degree of static indeterminacy**
(D) The method is used to analyse flexible structures.

7. In flexibility method, the unknown quantities are _____, in stiffness method the unknown quantities are _____ respectively

- (A) Displacement, Force
(B) **Force, Displacement**
(C) Angle, Moment
(D) Moment, Angle

8. What is the $(FEM)_{AB}$ of the given beam?



- (A) 26.04 kNm
(B) 41.67 kNm
(C) **57.29 kNm**
(D) 71.25 kNm
9. The ratio of the stiffness of a beam at the near end when the far end is hinged to stiffness of the beam at the near end when the far end is fixed is
- (A) $1/2$
(B) **$3/4$**
(C) 1
(D) $4/3$

10. Moment required to rotate near end of prismatic beam through unit angle, the far end being fixed, will be

- (A) EI/L
- (B) $2EI/L$
- (C) $3EI/L$
- (D) $4EI/L$**

11. The moment which makes all the fibers at the section to yield is known as

- (A) Flexural Rigidity
- (B) Moment of resistance
- (C) Plastic moment capacity**
- (D) Yield moment

12. The shape factor of a rectangular section is

- (A) 1.0
- (B) 1.5**
- (C) 2.0
- (D) 1.2

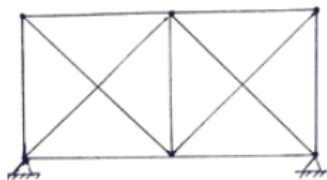
13. The point in the cross section of beam through which if load acts there will not be any twisting of the beam but there will be only bending is known as

- (A) Center of gravity
- (B) Centroid
- (C) Shear center**
- (D) Zero shear point

14. In a linear elastic structural element

- (A) Stiffness is directly proportional to flexibility
- (B) Stiffness is inversely proportional to flexibility**
- (C) Stiffness is equal to flexibility
- (D) Stiffness and flexibility are not related

15. The internal and external indeterminacy of the following structure are respectively



- (A) 1 and 1
- (B) 2 and 2
- (C) 2 and 1**
- (D) 1 and 2

16. The Castigliano's second theorem can be used to compute deflections

(A) In statically determinate structures only

(B) For any type of structure

(C) At the point under the load only

(D) For beams and frames only

17. If in a rigid-jointed space frame, $(6m + r) < 6j$, then the frame is

(A) **Unstable**

(B) Stable and statically determinate

(C) Stable and statically indeterminate

(D) STABLE

18. For a symmetrical two hinged parabolic arch, if one of the supports settles horizontally, then the horizontal thrust

(A) Is increased

(B) Is decreased

(C) Remains unchanged

(D) Becomes zero

19. The shape factor of a I section is

(A) 1.2

(B) 1.5

(C) 2.0

(D) 1.12- 1.15

20.) Given that J is number of joints, B and R are no of members. If $B=5$, $R=4$ and $J=4$, then the Truss is

A) statically determinate

B) statically indeterminate

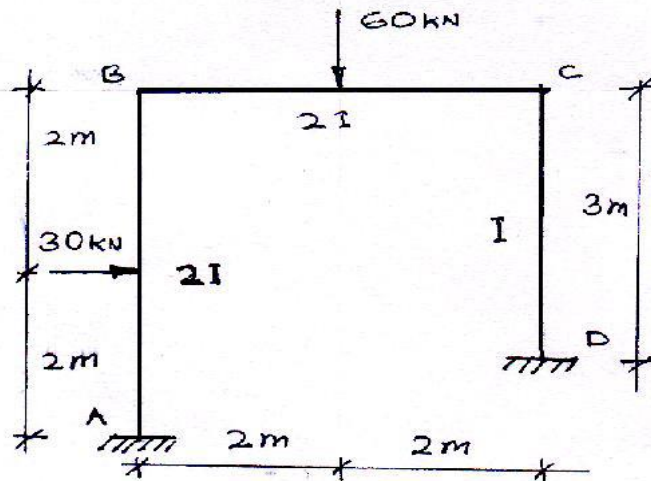
C) stable

D) unstable

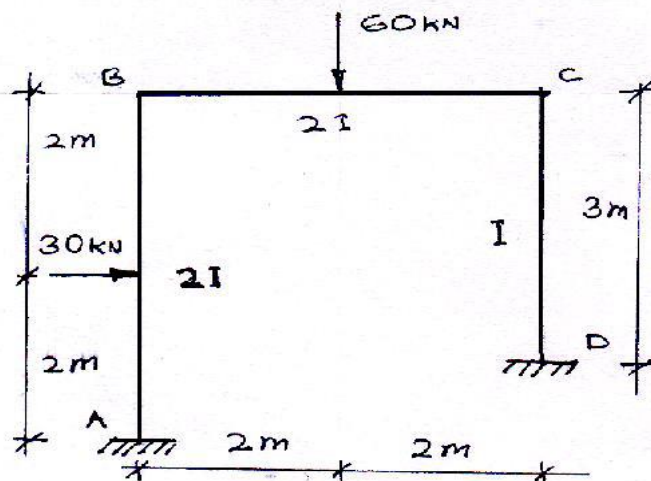
Q2. Attempt any ONE

(1 X 20 marks= 20 marks)

1. How would you determine support moment of Frame shown in fig. by slope deflection method, also draw BMD.



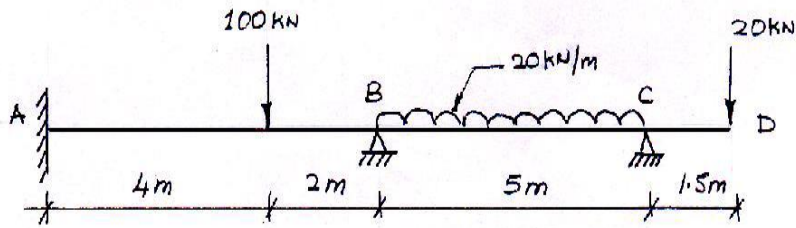
2. How would you determine support moment of Frame shown in fig. by Moment Distribution Method, also draw BMD.



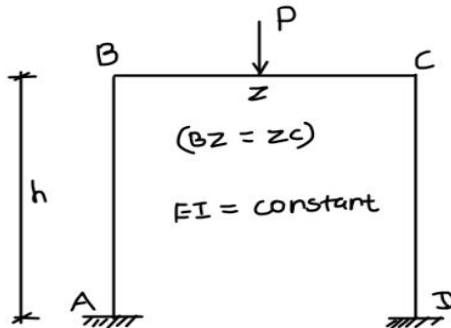
Q3. Attempt any TWO

(02 X 10 marks= 20 marks)

1. Analyse the beam by using Three Moment Theorem



2. Analyse the frame by using Flexibility Method



3. Analyse the beam by using Flexibility Method

