

School: SOE	Level: BE	Invigilator's Sign:
Program: BCE	Year/Part: III/I	Superintendent's Sign:
Subject: Theory of Structure II (EG603CE)		Code No.

- i. Answers should be given by filling the Multiple-Choice Questions' Answer Sheet.
ii. The main answer sheet can be used for rough work.

Code No.

GROUP A (Multiple-Choice Questions)	[10x1=10]	Time: 20 Minutes
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- 1) The number of independent equations to be satisfied for static equilibrium of a plane structure is
 - a. 1
 - b. 2
 - c. 3
 - d. 6
- 2) If there are m unknown member forces, r unknown reaction components and j number of joints, then the degree of static indeterminacy of a pin-jointed plane frame is given by
 - a. $m+r-2j$
 - b. $m-r+2j$
 - c. $m+r-3j$
 - d. $m+r+3j$
- 3) The deflection at any point of a perfect frame can be obtained by applying a unit load at the joint in
 - a. vertical direction
 - b. horizontal direction
 - c. inclined direction
 - d. the direction in which the deflection is required
- 4) 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
- 5) For a two-hinged arch, if one of the supports settles down vertically, then the horizontal thrust
 - a. is increased
 - b. is decreased
 - c. remains unchanged
 - d. becomes zero
 - e. For a symmetrical two hinged
- 6) 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
- 7) Which of the following methods of structural analysis is a force method?
 - a. Slope deflection method
 - b. Column analogy method
 - c. Moment distribution method
 - d. None of the above
- 8) A single rolling load of 8 kN rolls along a girder of 15 m span. The absolute maximum bending moment will be
 - a. 8 kN.m
 - b. 15 kN.m
 - c. 30 kN.m
 - d. 60 kN.m
- 9) In a simply supported beam of span L and flexural rigidity EI the total deflection under a concentrated load W acting at the centre of the beam is
 - a. $\frac{WL^3}{6EI}$
 - b. $\frac{WL^3}{48EI}$
 - c. $\frac{48EI}{WL^3}$
 - d. $\frac{384EI}{16EI}$
- 10) The yield moment of a cross section is defined as the moment that will just produce the yield stress in,
 - a. the outermost fibre of the section
 - b. the innermost fibre of the section
 - c. neutral fibre of the section
 - d. the fibres everywhere

Multiple Choice Questions' Answer Sheet

Marks Secured: _____

In Words: _____

Examiner's Sign: _____ Date: _____

Scrutinizer's Marks: _____

In Words: _____

Scrutinizer's Sign: _____ Date: _____

Corrected Fill

(A) ● (C) (D)

Incorrected Fill

(A) ✗ (B) ● (C) (D) ✓

1. (A) (B) (C) (D)	6. (A) (B) (C) (D)
2. (A) (B) (C) (D)	7. (A) (B) (C) (D)
3. (A) (B) (C) (D)	8. (A) (B) (C) (D)
4. (A) (B) (C) (D)	9. (A) (B) (C) (D)
5. (A) (B) (C) (D)	10. (A) (B) (C) (D)

Manmohan Technical University
Office of the Controller of Examinations
Exam Year: 2081, Mangsir

School: SOE	Level: BE	Time: 3 Hours
Program: BCE	Year/Part: III/I	Full Marks: 50
Subject: Theory of Structure II (EG603CE)		

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

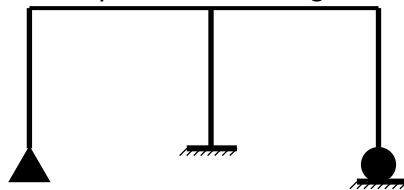
GROUP A (Multiple-Choice Questions in separate paper) **[10×1=10]**

GROUP B (Short Answer Questions - **Attempt Any Eight**) **[8×2=16]**

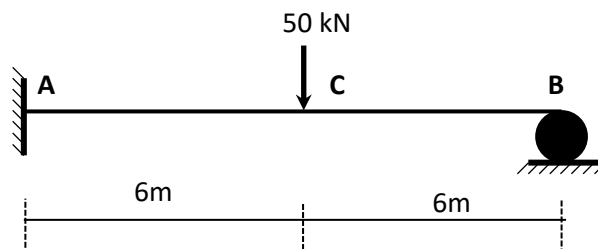
1. Explain statically indeterminate structures along their advantages and disadvantages.
2. Define strain energy. Also derive strain energy due to bending.
3. State and prove Maxwell reciprocal theorem.
4. Define and explain the following terms:
 - a. Primary Structure
 - b. Redundant Force
 - c. Flexibility Coefficient
 - d. Degree of Kinematic Indeterminacy.
5. Explain the principle of moment distribution method with an example.
6. Define plastic hinge? Also compare plastic and elastic hinges of a structural system.
7. State Muller Breslau principle for influence line diagram with an example.
8. Show that there is no bending moment at any section in parabolic arch(three hinged arch) subjected to uniformly distributed load over entire span.
9. Explain local and global coordinate systems.

GROUP C (Long Answer Questions - **Attempt Any six questions**) **[6×4=24]**

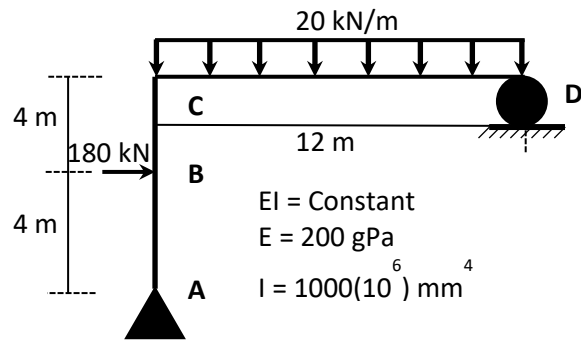
10. Determine the external and internal degree of static indeterminacy and also the kinematic indeterminacy of the structure give below. **[4]**



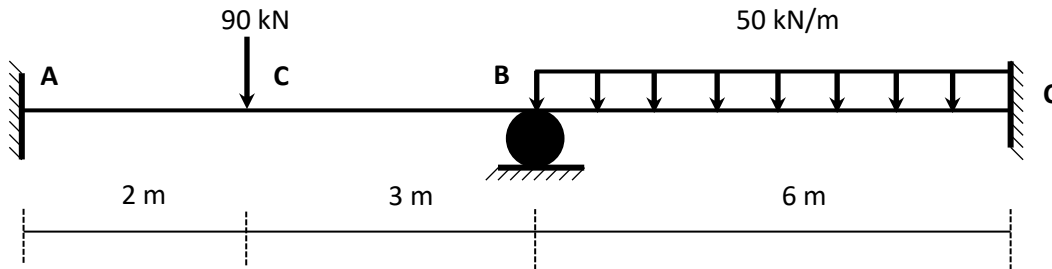
11. Determine the reaction at the roller support B of the beam shown below by using consistent force method, EI is constant **[4]**



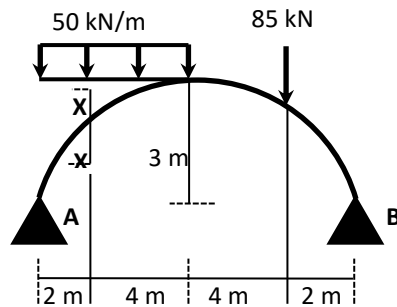
12. Determine the rotation at C using Castigliano's second theorem. **[4]**



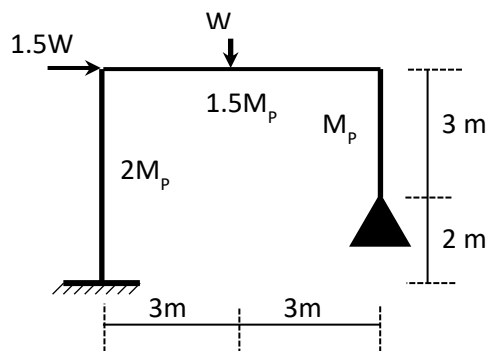
13. Determine the member end moments for the continuous beam shown below by using moment distribution method. [4]



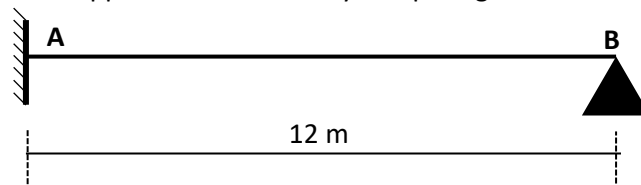
14. Find the bending moment at a given section x-x of the following loaded two hinged parabolic arch due to give loading. Take $EI = 10000 \text{ kNm}^2$ [4]



15. Determine the collapse load in the portal frame shown below. [4]



16. Draw ILD for the support moment at A by computing the ordinates at 3 meter intervals. [4]



∞∞ The End ∞∞