Seat No.

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MAR_APR 2026 SUMMER EXAMINATION

11731 Bachelor of Technology (NEP-2.0)

Sub. Name: Structural Mechanics

Sub. Code: 119640/115967

Day and Date: Saturday ,23-05-2026 **Total Marks: 60**

Time: 10:30 AM To 01:00 PM

Instructions:
1. **All questions are compulsory**
2. **Assume suitable data wherever necessary and mention it boldly**
3. **Figures to the right indicate full marks**
4. **Use of Scientific calculator is allowed**

Q1) Solve Any THREE. **[15]**

a. Explain theories of failure. **[5]**

b. What are the assumptions made in torsion formula? **[5]**

c. Explain Influence line diagram. **[5]**

d. Explain the concept of normal stress, shear stress, resultant stress and obliquity of stress on a certain plane. **[5]**

Q2) Solve Any THREE. **[15]**

a. Define the term column and strut. Explain the different types of the column. **[5]**

b. Enlist the salient features of Macaulay's method. **[5]**

c. Derive formula for Euler's crippling load for column with both ends hinged. **[5]**

d. What are the different stability conditions of dam under which a dam may fail? **[5]**

Q3) Solve Any THREE **[30]**

a. Calculate Euler's critical load for a strut of T-section, the flange width being 10cm, overall depth 8cm and both flange and stem 1cm thick. The strut is 3m long and is built in at both ends. Take $E = 2 \times 10^5 \text{ N/mm}^2$ **[10]**

b. Find the magnitude of slope at A and deflection at D for the beam shown below by Macaulay's method. Take $EI = 4 \times 10^3 \text{ kN} \cdot \text{m}^2$ **[10]**

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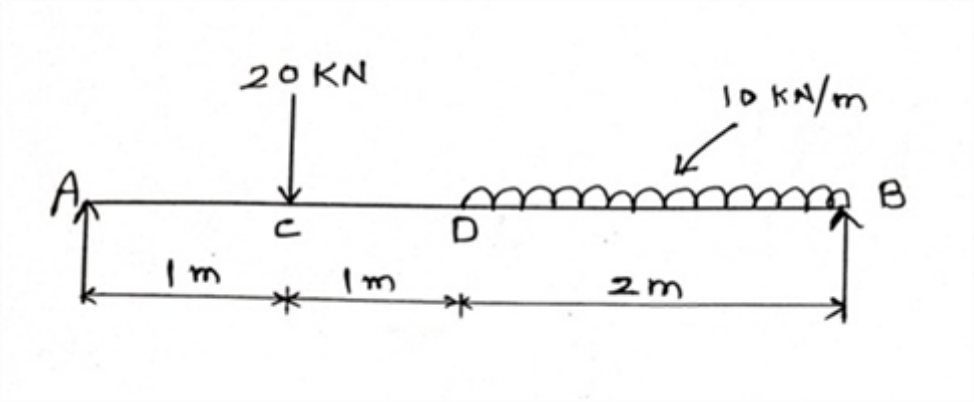

c. Calculate the slope and deflection at the free end when the cantilever beam is subjected to U.D.L. over the entire span. **[10]**

d. A trapezoidal masonry dam is of 18m height. The dam is having water up to a depth of 15m on its vertical side. The top and bottom width of the dam are 4m and 8m respectively. The weight density of masonry as $19.62kN/m^3$. Determine: **[10]**
i) The resultant force on the dam per meter length.
ii) The point where the resultant cuts the base, and
iii) The maximum and minimum stress intensities at the base.

End Of Question Paper

Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -
This Question Paper may be distributed for following Subjects as common code.
सदरची प्रश्नपत्रिका खालील विषयांकरिता वितरित करता येईल.

1] (1154) B.Tech. CBCS (119640) Structural Mechanics Part 2 SEM 4
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