Seat No.

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MAR_APR 2026 SUMMER EXAMINATION

1154 B.Tech. CBCS

Sub. Name: Structural Mechanics

Sub. Code: 79112

Day and Date: Thursday ,21-05-2026 **Total Marks: 70**

Time: 10:30 AM To 01:00 PM

Instructions: **1. Assume suitable data wherever necessary and mention it boldly**
2. Figures to the right indicate full marks

Special Inst.: **Question no 1 and 5 are compulsory and solve any two out of remaining from each section.**

Q1) Solve following questions **[9]**

a. Explain Obliquity and its formula. **[3]**

b. Establish the condition of no tension for solid circular section. **[3]**

c. State uses of Influence line diagram. **[3]**

Q2) An element in a stressed material has a tensile stress of 500 MPa and compressive stress of 350 Mpa acting on two mutually perpendicular planes and equal shear stress of 100 MPa on these planes .Find principal stresses and the position of the principal planes. Find also maximum shear stresses. **[13]**

Q3) A retaining wall of trapezoidal section is 15 m high and retains earth which is level up to the top. The width at the top 3 m and at the bottom 10m and the exposed face is vertical. Find the maximum and minimum intensities of normal stress at the base. Take Density of earth = 16 KN/m3, Density of masonry =24 KN/m3 Angle of Repose = 30 **[13]**

Q4) The overhang beam ABC, AB= 4m and BC=1 m simply supported at A and B. Draw ILD for RA, RB, S.F and B.M. at a point 2m From A. **[13]**

Q5) Solve following questions. **[9]**

a. Write assumptions made in Euler's theory. **[3]**

b. Explain Moment Area Method. **[3]**

c. Define Torque and Torsional rigidity. **[3]**

Q6) A hollow column 200mm external diameter and 25 mm thick 8 m long has both ends fixed. It is subjected to an axial compressive load. Taking Factor of safety as 6.Take σc = 560N/mm2 and a = 1/1600. Determine the safe Rankine's load. **[13]**

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Q7) A beam of span 8 m is simply supported at the ends. It carries a U.D.L of 30 kN/m over its entire length and a concentrated load of 60 kN at 3 m from the support A. Determine the maximum deflection in the beam and the location where the deflection occurs by Macaulay's Method. Take E = 200 X10^6 kN/m^2 I= 80 x 10^2 m^4 **[13]**

Q8) Calculate the diameter of the shaft required to transmit 60 KW at 160 r.p.m, if the maximum torque is likely to exceed the mean by 30% for maximum permissible shear stress of 55 MPa. **[13]**

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 (79112) Structural Mechanics Part 2 SEM 4

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