

Seat No. **OCT-NOV 2025 WINTER EXAMINATION****1154 B.Tech. CBCS****Sub. Name: Structural Mechanics****Sub. Code: 79112****Day and Date: Saturday ,06-12-2025****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
 3. Use of Scientific calculator is allowed

Special Inst.: Questions One and Five are compulsory and solve any two questions from each Section. Section -I consists of Q.1 to Q.4 and Section -II consists of Q.5 to Q.8

- Q1)** A) Explain Obliquity and its formula 3 marks [9]
 B) Find the core or Kernel of Sections in Rectangle and Circular section 3 marks
 C) Draw Influence line diagram for Reaction of Simply supported Beam. 3 marks
- 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 masonry dam is 4.5 m, 1 m wide at the top and 3.5 m wide at the base retains water to the full height. The water face of the dam is vertical .Determine the extreme pressure intensities at the base. Take Wt. of water and masonry 9,810 N/m³ and 22,500 N/m³ respectively. Find also the extreme intensities at the base, when the dam is empty. [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)** A) Explain the different types of end conditions 3 marks [9]
 B) Explain Moment Area Method 3 marks
 C) Derive the formula of Power transmitted through shaft. 3 marks
- Q6)** A hollow column 200mm external diameter and 25 mm internal diameter 8 m long has both ends fixed. It is subjected to an axial compressive load. Taking Factor of safety as 6. $\sigma_c = 560\text{N/mm}^2$ and $a = 1/1600$. Determine the safe Rankine's load. [13]
- Q7)** A simply supported beam ACB of 6 m long is loaded with a point load of 300 KN and Clockwise moment of 150 KN.m at a distance of 4 m from left simple support A. Find deflection at point C at a distance of 4m from left simple support A. Take [13]

$EI = 8 \times 10^4 \text{ KN.m}^2$

- Q8)** Calculate the diameter of the shaft required to transmit 100 KW at 190 r.p.m, if the [13] maximum torque is likely to exceed the mean by 40% for maximum permissible shear stress of 75 MPa

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