BHARATI VIDYAPEETH INSTITUTE OF TECHNOLOGY

Question Bank (K-Scheme)

Name of subject: Strength Of Material **Unit Test: II**

Subject code: 313308 **Course: CE/ME**

Semester: III

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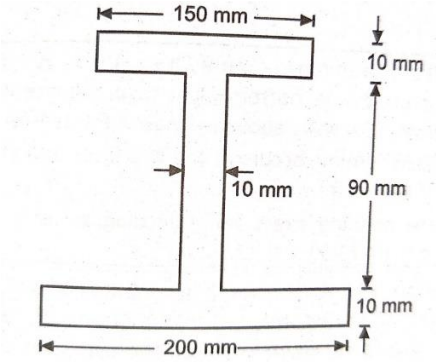
Unit 4 (Bending and shear stresses in beams)

2 Marks

1. Write down Flexural Formula with its notations.
2. Define Section Modulus with its unit.
3. Draw the Bending moment diagram for Cantilever beam in symmetrical section.
4. Write down shear stress equation and the meaning of each term.
5. State four assumption made in the theory of pure bending.

4 Marks

1. A timber beam 200mm wide and 400mm deep is simply supported over a span of 4m. It carries a full span uniformly distributed load of 19KN/m. Find the maximum bending stress induced in the section. Draw bending stress distribution diagram.
2. A simply supported beam of span 5m is subjected to downward point load of 20 KN at 2m from left end. c/s of the beam is 200mm wide and 300mm deep. Calculate maximum bending stress develop in the beam material. Also draw bending stress distribution across the section of the beam.
3. A cantilever is 2m long and is subjected to a UDL of 5 KN/m. the c/s of cantilever is a I section as shown in the fig. determine the maximum tensile and compressive stress develop and their position showing stress distribution diagram.



4. A T section having flange 180mm wide and 20mm thick and web 150mm long and 20mm thick carries UDL of 80KN/m over an effective span of 8 m. Calculate the max. Bending stress.

5. A timber beam is 100mm wide and 150mm deep. The bending stress in tension or compression is not to exceed 80N/mm$^{2.}$ Find the bending stress at a layer 25mm and 50 mm from NA.
6. A rectangular section having dimensions of 100mmX 200mm is subjected to a shear force of 50KN. Determine the shear stresses induced on a layer 50mm above NA. and at NA. Sketch the shear stress distribution diagram and calculate avg. shear stress.`
7. A circular beam has simply supported span of 5 m and subjected to a point load of 30 KN at a distance of 3 m from left hand support. The shear stress across the beam is limited to 2 N/mm^2. Design the minimum section for the beam and hence determine the magnitude of avg. shear stress.

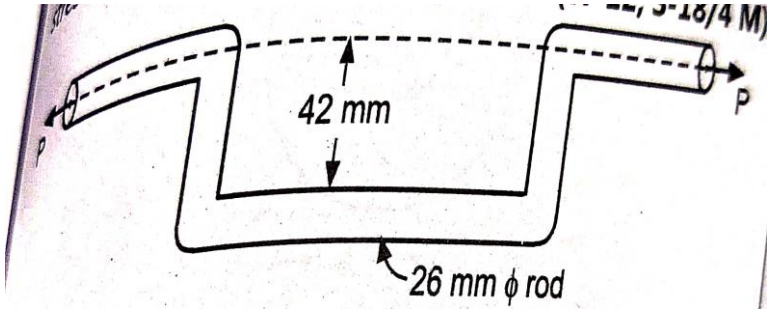
Unit 5 (Direct and Bending stress)

2 Marks

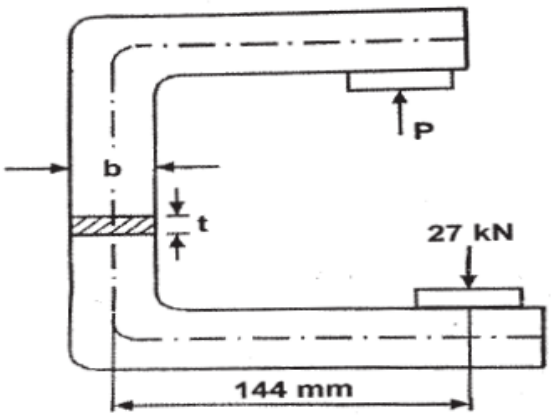
1. Define eccentric load.
2. Determine Euler's formula with its notations.
3. Determine Rankine's formula with its notations.
4. What is the effective length according to column end conditions?
5. Define effective length.
6. Define Buckling.

4 marks

1. A rectangular strut is 120mmX80mm thick. It carries a UDL of 100 KN at an eccentricity of 10mm in a plane bisecting the thickness. Find the max. and min extensities of stress in the strut section.
2. A short column 210mmX210mm is subjected to an eccentric load of 105 KN at an eccentricity of 65mm in the plane bisecting the opposite faces. Find the max. and min. intensities of stress at the base.
3. A 26mm diameter rod is bent up to form an offset link as shown in fig. If permissible tensile stress is 90N/mm^2, Calculate maximum value of P.



4. Calculate the diameter of core for a hollow circular section having external diameter twice that of internal diameter.
5. Figure No. shows a C - clamp carries a load P = 27 kN. Section of clamp is rectangular having width equal to twice the thickness. Assuming that the clamp is made up of steel casting with an allowable stress of 100 N/mm^2. Find the dimensions of the clamp section.



6. A mild steel tube 50 mm external dia and 10 mm thickness is bent in the form of hook as shown in Fig. No. What maximum load 'P' the hook can lift, if the stresses on the cross section 'AB' shall not exceed 90 MPa in tension and 40 MPa in compression?