BHARATI VIDYAPEETH INSTITUTE OF TECHNOLOGY
Question Bank (I-Scheme)

Name of subject: Theory of Structure **Unit Test: I**
Subject code: 22402 **Course: CE**
Semester: IV

Unit 1 (Direct & Bending Stress)

2 Marks

1. Define core of a section with sketch.
2. Draw stress distribution diagram for
   $\sigma_0 = \sigma_b$, $\sigma_0 > \sigma_b$
3. Define "Eccentric load with neat sketch".
4. State middle third rule with sketch.

4 Marks

1. Calculate core of section for circular section having diameter 400mm & draw sketch of it.
2. Find maximum & minimum stress intensities induced on the base of masonry wall 6m high, 4m wide & 1.5 m thick subjected to a horizontal wind pressure 1.5 kN/m^2 acting on 4m side. The density of masonry material is 24 kN/m^3.
3. A hallow circular colum having external diameter 500 mm & internal diameter 300mm carries a vertical load of 200kN at an eccentricity of 60mm from C.G. calculate maximum & minimum stresses developed.
4. A solid circular column of diameter 250 mm carries an axial load 'W' kN and a load of 200 kN at an eccentricity of 150mm. Calculate minimum value of 'W' so as to avoid the tensile stresses at base.
5. A rectangular column 300 mm wide and 200 mm thick carries an axial load of 250 kN and a clockwise moment of 5 kN m in plane bisecting 200 mm side, calculate resultant stresses induced at the base.
6. A masonry wall 10 m high, 3 m wide and 1.5m thick is subjected to a wind pressure of 1.2 kN/m^2. Find maximum and minimum intensity induced on the base if the unit weight of masonry is 22kN/m^3.
7. A wooden cantilever beam of span 2.5 m has a cross section 130 mm wide and 240 mm deep. A load of 6 kN is acting at free end, calculate the deflection and slope at free end take E = 1 x 10^5 N/mm^2.
8. A circular chimney has external diameter 60% more than internal diameter. The height of chimney is 32 m and is subjected to a horizontal wind pressure of 1.75 kN/m^2. Find out the diameter of the chimney so as to avoid tension at the base of chimney and also draw stress distribution diagram. Unit wt. of chimney material is 18 kN/m^3 and C = 0.6.

Unit II (Slope & Deflection)

2 Marks

1. Give relationship between slope, deflection & radius of curvature.
2. Write the values of maximum slope & deflection in case of simply supported beam carrying UDL over the entire span in terms of EI.

3. State the values of maximum slope & deflection for cantilever beam of span L carries a point load at free end with meaning of each term.
4. Define slope & deflection of beam.
5. A cantilever beam of span 'L' carries a point load at free end state the slope & deflection at free end in terms of EI.
6. State the situations where Macaulay's method is used.

4 Marks

1. A simply supported beam carries of UDL of 4 kN/m. find the deflection at mid span.
2. A cantilever of span 3.5m carries a point load at free end, if the maximum slope at free end is 1 degree. Determine maximum deflection in mm.
3. A simply supported beam of span 6m carrying 'W' kN at 4m from left. Find the value of 'W' if deflection at centre is 20mm. Take EI=2000 $kN.m^2$. Use macaulay's method.
4. A simply supported beam of span 4 m carries a central point load of 20 kN and u.d.L. of 10 kN/m over entire span. Find maximum slope and maximum deflection of the beam $I_{xx}=2 \times 10^8 mm^4$ $E= 2 \times 10^5 N/mm^2$.
5. A simply supported beam of span 9 m carries two point loads of equal magnitude 36 kN at 3 m from both ends. Calculate values of integration constant and write Macaulay's slope and deflection equation.
6. A simply supported beam of 6 m span carries a point load of 60 kN at 2m from left support. Calculate deflection below point load in terms of EI use Macaulay's method.
7. A simply supported beam of 6 m span carries an u.d.l. of 20 kN/m over entire beam and a point load of 60 kN at 2 m from right hand support using Macaulay's method, locate the point of maximum deflection and find its value in terms of El.

Unit III (Fixed Beam)

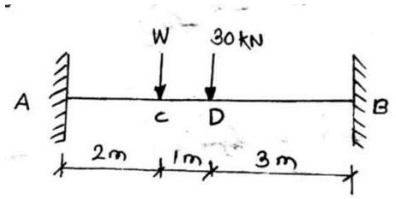
2 Marks

1. State any two disadvantage of fixed beam.
2. Define fixed beam with sketch.

4 Marks

1. Calculate value of 'W' for a fixed beam as shown in fig.

a.



2. Using first principle find fixed end moment for a fixed beam carrying point load at mid.
3. A fixed beam of span 8 m carries 5 kN/m udl over entire length along with a point load of 40 kN at 2m from left hand support. Find net BM at point load and draw BMD and SFD.

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