(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 4007 Roll No. | | | | | | | | | | |

B.Tech.

THIRD SEMESTER EXAMINATION, 2004-2005

STRENGTH OF MATERIALS

Time : 2 Hours *Total Marks : 50*

Note : *(i) Attempt **ALL** questions.*

(ii) Missing data, if any, may be suitably assumed.

1. Answer ***any two*** of the following : **(6x2=12)**

(a) While testing on a metallic rod, it is observed that the diameter of rod is reduced by 0.0025 mm under an axial pull of 20 KN. The original diameter of the rod is 15 mm. If rigidity modulus for the rod metal be 50 KN/mm^2. Find the Young's modulus and Bulk modulus.

(b) What is the necessity of a Theory of Failure ? Explain briefly theories of Failure.

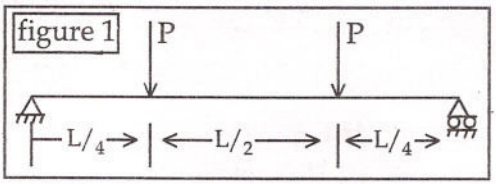
(c) Draw the Shear Force and Bending moment diagram for a cantilever of Length L carrying a point Load W at the free end.

2. Answer *any two* of the following : **(6x2 = 12)**

(a) Deduce a formula for the shear stress at the junction of flange and web in the I-Section of a beam.

(b) A simply supported beam of length L carries two concentrated forces of equal magnitude P as shown in figure 1 below. Find the deflection at the centre of the beam.

figure 1



(c) Name various methods of determining slope and deflection of beams. Derive the moment curvature equation.

3. Answer *any two* of the following : **(6.5x2 = 13)**

(a) How will you justify that Rankine's formula is applicable for all lengths of columns, ranging from short to long columns.

(b) In a column of square section, the length of the column is 40 times the length of each side of the square section. If both ends of the column are pinned and $E = 2 \times 10^4$ KN/cm^2, determine the critical stress set up in the column.

(c) Define thin cylinders. Derive an expression for circumferential stress and Longitudinal stress for a thin shell subjected to an internal pressure.

4. Answer *any two* of the following : **(6.5x2 = 13)**

(a) A thick spherical shell having internal radius of 75 mm is subjected to an internal pressure of 25 N/mm^2. If the maximum hoop stress is 100 N/mm^2. Find the thickness of the shell.

(b) What do you mean by Lame's equations ? How will you derive these equations ?

(c) Explain *any two* of the following :

(i) What is compound cylinder ? What is its advantage over a single cylinder ?

(ii) Shrinkage allowance

(iii) State assumptions made in Lame's Theory.

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