

THAPAR POLYTECHNIC COLLEGE, PATIALA

ASSIGNMENT 2 (Session: Jan-May 2020)

STRENGTH OF MATERIALS

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Q1. Explain the different modes of failure in Columns.

Q2. Explain different types of Columns.

Q3. Define

- a. Slenderness ratio
- b. Buckling Load
- c. Crushing Load
- d. Safe load
- e. Equivalent length

Q4. Explain the different end conditions of column and state their respective effective length.

Q5. Explain different types of Springs with neat sketch.

Q6. List various functions of springs.

Q7. A closed coil helical spring whose spring index is 8, absorbs 50 N-m of energy when compressed for 50 mm.

If the numbers of coil are 10, then calculate.

- a. Diameter of springs
- b. Wire diameter
- c. Maximum shear stress induced, Take $G=84$ GPa

Q8. Calculate buckling load by use of Euler's formula for a circular column of 18 mm diameter and 4 m length.

Take $E=2 \times 10^5$ N/mm². Both ends hinged.

Q9. A steel column of rectangular section 300 mm X 50 mm is fixed on both ends. The length of column is 4 m.

Find the buckling load with help of Rankine formula. Take $f_c = 330$ N/mm², $a = \frac{1}{7500}$, $E = 2 \times 10^5$ N/mm².