

S.B. Roll No.....

STRENGTH OF MATERIALS

4th/Mech/RAC/Prod/T&DM/Aeronautical/Auto/Aerospace/5309/2353/May'16

Duration: 3 Hrs.

M. Marks=75

SECTION A

Q1(A): Fill in the blanks: -

10x1=10

- Pascal is the unit of..... in system.
- Point of contra flexure occurs inBeams.
- Isotropic material meansin all directions.
- Moment of inertia of a section is minimum about an axis passing through.....
-Springs can carry compressive as well as tensile loads.
- Euler,s formula is applicable only for
- The shear force diagram for a cantilever with U.D.L. over the whole span will be.....
- The torque transmitted by a hollow shaft is given by
- Stress due to suddenly applied load isto that of gradually applied loads.
- are the elastic bodies which absorb energy due to resilience.

(B): State True or False

5x1=5

- A brittle material has no plastic zone.
- The springs used in mechanical toys are spiral spring.
- Boilers are usually considered as thin cylinders.
- The criterion for the design of the shaft is the stress at the external surface.
- Bending moment at the supports in case of a simply supported beam is always positive.

SECTION B

Q2: Attempt any FIVE questions.

5x6=30

- Distinguish between Circumferential and Longitudinal stress in a thin cylindrical shell.
- Explain briefly the mechanical properties of materials.
- Explain about the failure of Columns.
- State the theorem of Perpendicular and Parallel axis.
- What assumptions are made while deriving the Torsion equation?
- What are the different loads acting on a beam? Differentiate between Point load and U.D.L.
- Define the terms: Spring Index, Helix angle and Solid length of a spring.

SECTION C

Q3: Attempt any THREE questions.

3x10=30

- A hollow C.I. column 200 mm outside diameter and 150mm inside diameter, 8 m long has both the ends Fixed. It is subjected to an axial compressive load. Calculate the safe load by Rankine,s formula using a factor of safety as 6.
Take $\sigma_c = 550 \text{ N/mm}^2$ and $a = 1/1600$.
- A solid shaft has to transmit 112.5 KW at 250 r.p.m. Taking allowable shear stress as 70 N/mm^2 find suitable diameter for the shaft ,if the maximum torque transmitted at each revolution exceeds the mean by 20% .
- Find the moment of Inertia of a T-Section 20 cm x15cm x5 cm about centroidal axis.
- A beam AB 10 m long has supports at its ends A and B. It carries a point load of 5KN at 3 m from A and a point load of 5KN at 7 m from A and a U.D.L. of 1KN/m between the point loads. Draw the S.F. and B.M.diagrams.