



Strength of Materials

PYQ

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Jharkhand University of Technology, Ranchi

3rd Semester Diploma Engineering Examination, December 2019

Subject : Strength of Material

Subject Code : MEC-306

Time : 3 Hours

Full Marks : 80

Pass Marks : 26

Answer in your own words.

*Answer five questions in which Question No. 1 is compulsory
and answer any four from rest questions.*

All questions carry equal marks.

1. Choose the correct answer:

2×8=16

- (i) Which of the following is the statically determinate beam?
(a) cantilevers (b) simply supported beam
(c) overhanging beam (d) All of these
- (ii) In a cantilever with uniformly distributed load the shearing force follow a
(a) linear law (b) parabolic law
(c) either of the above (d) None of these
- (iii) If the close-coiled helical spring is subjected to load w and the deflection produced is δ , then stiffness of the spring is given by
(a) w/δ (b) $w \cdot \delta$
(c) δ/w (d) $w^2 \cdot \delta$
- (iv) _____ are called cantilever laminated springs.
(a) semi-elliptical spring (b) quarter elliptical springs
(c) Both (a) and (b) (d) None of these
- (v) A member of structure or bar which carries an axial compressive load is called
(a) Strut (b) Tie
(c) Shaft (d) None of these
- (vi) The ratio between buckling load and safe load is known as
(a) slenderness ratio (b) buckling factor
(c) factor of safety (d) None of these

(vii) Euler's formula is applicable to

- (a) short columns
- (b) medium columns
- (c) long columns
- (d) None of these

(viii) The amount of deflection of a beam subjected to same type of loading depends upon

- (a) cross-section
- (b) bending moment
- (c) either (a) or (b)
- (d) Both (a) and (b)

2. (a) Define centre of gravity.

6

(b) A cantilever 3 m long is loaded with a uniformly distributed load of 15 kN/m over a length of 2 m from the fixed end. Determine the slope and deflection at the free end of the cantilever.

10

$$\text{Take } E = 2.1 \times 10^8 \text{ kN/m}^2$$

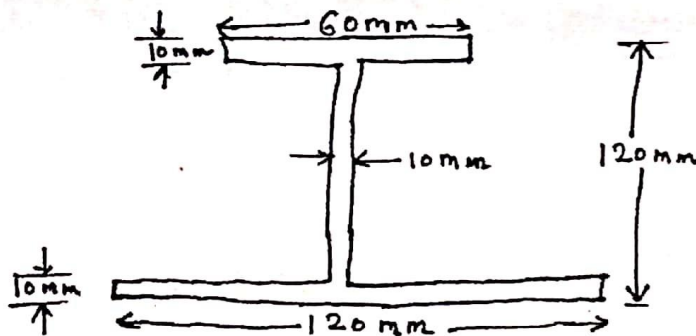
$$I = 0.000095 \text{ m}^4$$

3. (a) Define Hook's law.

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(b) Find the moment of inertia about the horizontal axis through the c.g. of the section shown in fig.

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4. (a) Explain Stress and Strain.

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(b) A symmetrical section 200 mm deep has a moment of inertia of $2.26 \times 10^{-5} \text{ m}^4$ about its neutral axis. Determine the longest span over which, when simply supported, the beam would carry a uniformly distributed load of 4 kN/m run without the stress due to bending exceeding 125 MN/m^2 .

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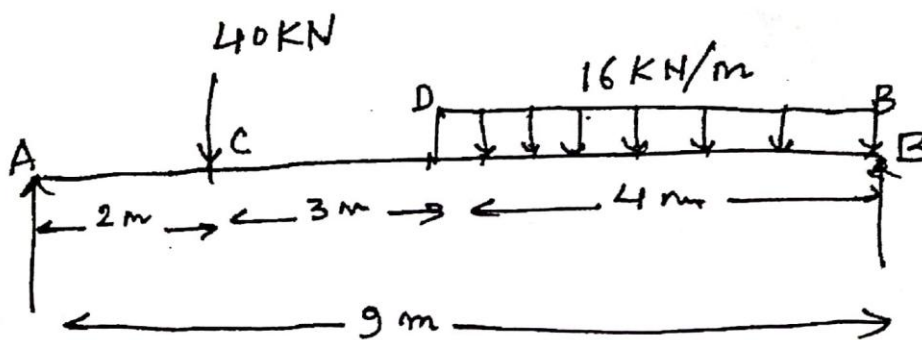
5. (a) Define classification of Beam.

6

(b) A square steel rod 20 mm \times 20 mm in section to carry an axial load of 100 kN. Calculate the shortening in a length of 50 mm, $E = 2.14 \times 10^8 \text{ kN/m}^2$.

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6. A simply supported beam of 9 m span is loaded as in fig. Draw the 13 MD and SFD indicating principle values.



7. Find the prop reaction and fixing moment for a propped cantilever loaded as shown in fig.

