



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:

$2 \times 8 = 16$

- (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

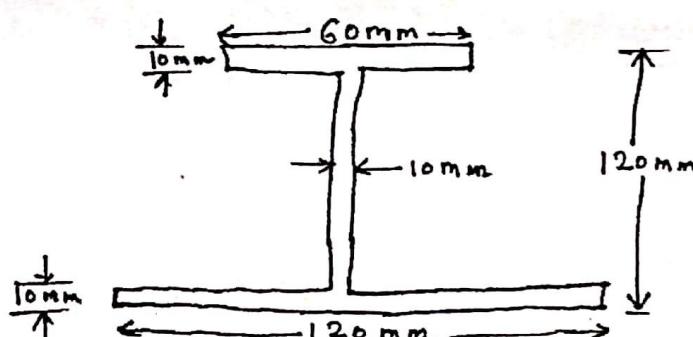
(b) A cantilever 3 m long is loaded with a uniformly distributed load of 15 KN/m over a length of 2 m from the fixed end. Determine the slope and deflection at the free end of the cantilever. 10

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

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

3. (a) Define Hook's law. 6

(b) Find the moment of inertia about the horizontal axis through the c.g. of the section shown in fig. 10



4. (a) Explain Stress and Strain. 6

(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/M². 10

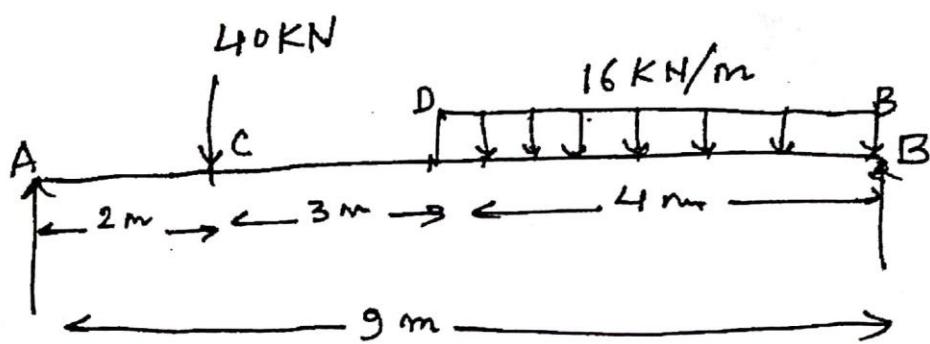
5. (a) Define classification of Beam. 6

(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, $E = 2.14 \times 10^8 \text{ kN/m}^2$. 10

(3)

306

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.

