



KERALA AGRICULTURAL UNIVERSITY

B.Tech.(Food Engg) 2017 Admission

IV Semester Final Examination- June 2019

Cien.2204

Mechanics and Strength of Materials (2+1)

Marks: 50

Time: 2 hours

(10x1=10)

1 Fill up the blanks

- 1 The product of either force of couple with the arm of the couple is called \_\_\_\_\_.
- 2 The algebraic sum of moments of the forces forming couple about any point in their plane is \_\_\_\_\_.
- 3 The center of gravity of a triangle lies at the point of \_\_\_\_\_.
- 4 The ratio of limiting friction and normal reaction is known as \_\_\_\_\_.
- 5 Ties are load carrying members of a frame, which are subjected to \_\_\_\_\_.

State whether the following statements are true or false

- 6 The value of Poisson's ratio always remains less than one.
- 7 A simply supported beam of span L carries a concentrated load W at its mid-span. The maximum bending moment M is  $WL/8$ .
- 8 For structural analysis of forces, the method refers to Moment-area- theorem.
- 9 The shape of the bending moment diagram over the length of a beam, having no external load, is always Linear.
- 10 The ratio of the effective length of a column and minimum radius of gyration of its cross-sectional area is known as Slenderness ratio.

2. Write short notes on ANY FIVE

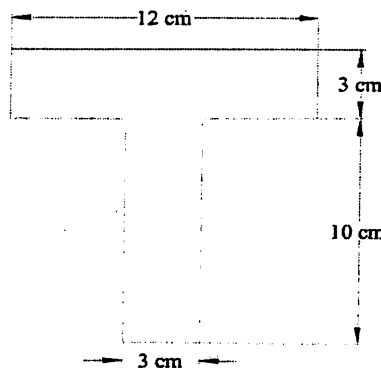
(5x2=10)

- 1 Poisson's Ratio.
- 2 Centre of Gravity and Centroid
- 3 Assumptions made in finding out the forces in a frame.
- 4 State Hooke's law.
- 5 Different types of beams.
- 6 Shear force.
- 7 'Strength of a Shaft'

III Answer any FIVE of the following.

(5x4=20)

- 1 Theorem of perpendicular axis.
- 2 Different methods of analyzing (or finding out the forces) a perfect frame.
- 3 Find the Centre of gravity of the T-section shown in fig.



P.T.O

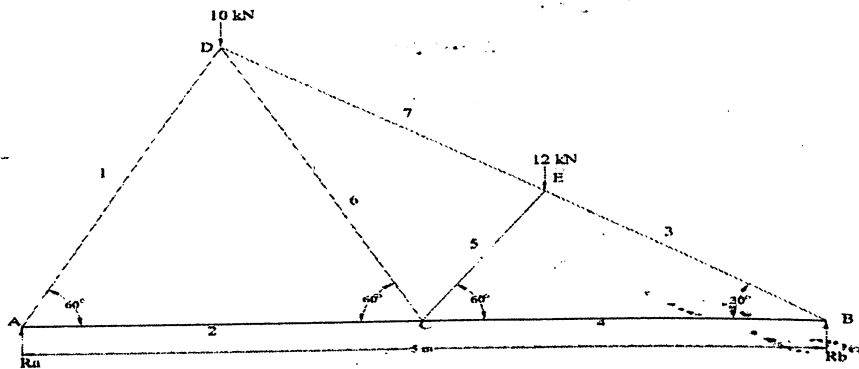
- 4 Draw the S.F and B.M diagrams for a cantilever of length L carrying a UDL throughout the span.
- 5 A wooden beam 100 mm wide and 150 mm deep is simply supported over a span of 4 meters. If shear force at a section of the beam is 450 N, find the shear stress at a distance of 25mm above the N.A.
- 6 Sign convention for shear force and bending moment in general
- 7 Difference between a long column and short column?

IV

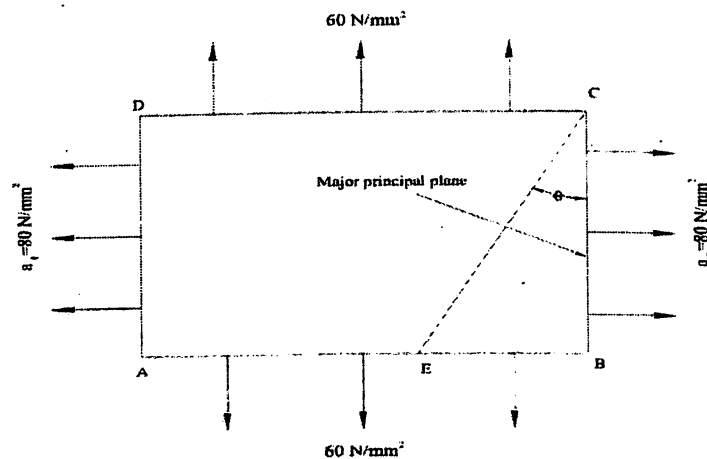
Answer any ONE of the following

(1x10=10)

- 1 A truss of span 5m is loaded as shown in the fig. Find the reactions and forces in the members of the truss.



- 2 At a point in a strained material the principal tensile stresses across two perpendicular planes, are  $80 \text{ N/mm}^2$  and  $40 \text{ N/mm}^2$ . Determine normal stress, shear stress and the resultant stress on a plane inclined at  $20^\circ$  with the major principal plane. Determine also the obliquity. What will be the intensity of stress, which acting alone will produce the same maximum strain if Poisson's ratio =  $1/4$ .



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