

TED (10)–3021

(REVISION—2010)

Reg. No.

Signature

THIRD SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/
TECHNOLOGY—MARCH, 2014

THEORY OF STRUCTURES-I

(Common for CE, AR, QS, EV and WR)

[Time : 3 hours

(Maximum marks : 100)

PART—A

(Maximum marks : 10)

Marks

I Answer all questions in one or two sentences. Each question carries 2 marks.

1. Define Centroid.
2. What is radius of gyration ?
3. Write two types of kinetic friction.
4. State hooks law.
5. What is point of contraflexure ?

(5×2=10)

PART—B

(Maximum marks : 30)

II Answer *any five* of the following questions. Each question carries 6 marks.

1. Find the C.G. of a T section with flange 120 × 30 mm and web 100 × 30 mm.
2. What are the different types of support ?
3. Draw stress strain graph and briefly explain significant points.
4. A circular alloy bar 2m long uniformly tapers from 30 mm dia to 20 mm dia. Calculate the elongation of the rod under an axial force of 50kN, take E=140 Gpa.
5. Differentiate between lateral strain and longitudinal strain.
6. What are the main classifications of column according to nature of failure ?
7. State the difference between perfect frame and imperfect frame.

(5×6=30)

PART—C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each question carries 15 marks.)

UNIT—I

- III (a) Find the Center of Gravity of 80 mm × 120 mm × 20 mm L section. 7
- (b) A simply supported beam of span 9 m carries the uniformly varying load from 0 at the end A to 900N/m at the end B. Calculate the reactions at the 2 ends of supports. 8

OR

- IV (a) Derive an equation for finding moment of Inertia of a hollow rectangular section. 7
 (b) A body of weight 500N is pulled up on an inclined plane by a force of 350N. The inclination of the plane is 30° to the horizontal and the force is applied parallel to the plane. Determine the coefficient of friction. 8

UNIT—II

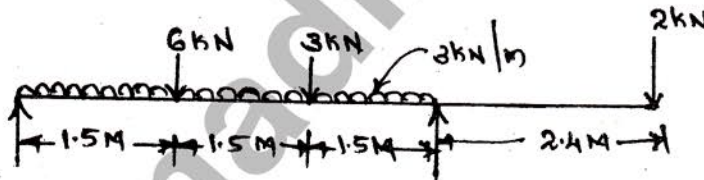
- V (a) What are the mechanical properties of solids? 7
 (b) A load of 5kN is to be raised with the help of a steel wire. Find the minimum diameter of the wire if the stress is not exceed $100 \times 10^6 \text{N/m}^2$. 8

OR

- VI (a) A bar 4m long and $100 \text{ mm} \times 200 \text{ mm}$ in section is subjected to a pull of 50kN if young's modulus of the material of the bar is 200 kN/mm^2 . Find :
 (i) The stress in the bar (ii) Strain (iii) Elongation 7
 (b) Write short notes on :
 (i) Yield stress (iii) Breaking stress
 (ii) Ultimate stress (iv) % of Elongation 8

UNIT—III

- VII Sketch the S.F. and B.M. diagram for the beam shown in figure. Also find the maximum bending moment values and points of contraflexure.



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OR

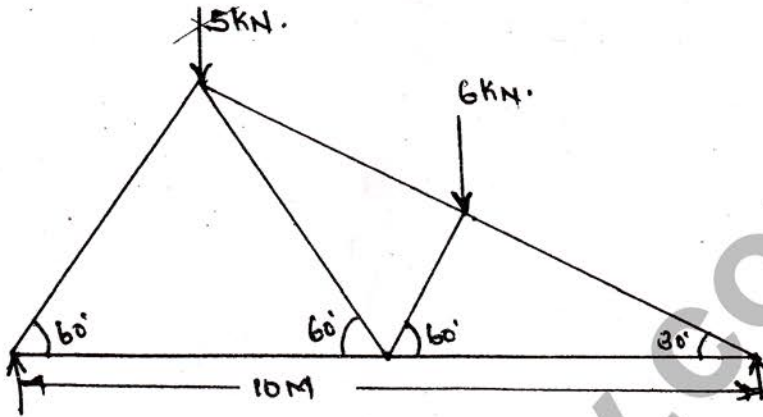
- VIII (a) A hollow metal circular shaft of 25 mm outside diameter and thickness 2.5 mm is subjected to a torque of 60Nm. Find the shear stress at the outer and inner faces of the cross section of the shaft. 7
 (b) A simply supported beam of span 6 m carries a uniformly distributed load of 1.5kN/m over a length of 3.5 m from the right support in addition to that a point load of 2kN at a distance of 1 m from the left support. Find the support reactions. 8

UNIT—IV

- IX (a) A steam boiler 3 m diameter is required to carry a net working pressure of 0.9 N/mm^2 . Stress in the metal should not exceed 85 N/mm^2 . Find the thickness of the metal if the efficiency of the joint is 80%. 7
 (b) A solid rectangular column of length 4m is having a cross section of $200 \text{ mm} \times 100 \text{ mm}$. If the ends of the member are hinged, find Euler's crippling load. Take $E = 200 \text{ kN/mm}^2$. 8

OR

- X Determine the forces in the members of a truss shown in figure by method of joints.



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