TED (10) – 3025

(REVISION — 2010)

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FOURTH SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/ TECHNOLOGY—OCTOBER, 2014

THEORY STRUCTURES – II

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

[*Time* : 3 hours

(Maximum marks : 100)

Marks

PART—A

(Maximum marks : 10)

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

1. What is meant by the term moment of resistance of a beam ?
2. What is meant by the term section modules ?
3. What is meant by the active earth pressure ?
4. Give relation to maximum deflection for a fixed beam carrying a UDL throughout the span.
5. Explain the term stiffness factor. (5x2=10)

PART—B

(Maximum marks : 30)

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

1. A timber beam 150mm wide 200mm deep is simply supported over a span of 2m. It carries a uniformly distributed load. If the bending stress is not to exceed $8N/mm^2$, calculate the maximum UDL which can be supported by the beam per metre length.
2. Prove that the limit of eccentricity at the base of the solid rectangular section under eccentric loading is b/6.
3. A short column 100mm × 100mm is subjected to an eccentric load of 60KN at an eccentricity of 40mm in the plane bisecting the two opposite faces. Find the maximum and minimum intensities of stress at the base section.
4. What are the varies advantages of a fixed beam over a simply supported beam ?
5. Obtain the relations for maximum slope and maximum deflection for a cantilever carrying a point load at the free end by double integration method.
6. A beam 3m long simply supported at the ends in carrying a point load W at its centre. If the slope at the ends is not to exceed 1°, find the deflection at the centre of the beam.
7. A continuous beam ABC, AB = 6m, BC = 6m is loaded with point loads of 10KN at the middle of each span. Calculate the support moments by theorem of three moments. A and B are simply supported. (5x6=30)

Marks

PART—C

(Maximum marks : 60)

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

UNIT – I

III (a) Explain the theory of simple bending of loaded beams. 7

(b) A timber beam 150mm wide 300mm deep is simply supported over a span of 4m. Find the maximum uniformly distributed load that the beam can carry, if the bending stress is not to exceed $8N/mm^2$. 8

OR

IV (a) Show that for a rectangular section the distribution of shear stress is parabolic. 7

(b) An I section 350mm × 200mm has a web thickness of 11.5mm and flange thickness 25mm. It carries a shearing force of 25KN at a section. Sketch the shear stress distribution across the section. 8

UNIT – II

V (a) Sketch and explain the shapes of stress distribution diagram for eccentric loaded column. 6

(b) A masonry retaining wall trepizoidal in cross section in 9m high, 1.5m width at top and 4.5m width at bottom with a vertical face retaining earth upto its top/weight of masonry is $22KN/m^3$ and that of the earth is $18KN/m^3$. Angle of repose of the soil is 40°. Check the stability of the wall if the allowable pressure on soil is $300KN/m^2$. Co-efficient of friction between soil and masonry is 0.6. 9

OR

VI (a) A rectangular column 200mm width, 150mm thickness is carrying a vertical load of 100KN at an eccentricity of 50mm in a plane bisecting the thickness. Determine the maximum and minimum intensities of stress at the base of the section. 6

(b) A masonry trapezoidal Dam 4m height, lm wide at top, 3m wide at bottom retaining water on its vertical face. Determine the lateral thrust of water, the maximum and minimum stress at the base when the reservoir is full. Weight of Masonry is $20KN/m^3$. 9

UNIT – III

VII (a) Derive expressions for maximum slope and deflection of a simply supported beam of span L carrying a point load W at the centre by Mohr's Theorem. 8

(b) A beam of span 3m simply supported at its ends is carrying a point load W at the centre. If the slope at the ends of the beam is not to exceed 1°. Find the deflection at the centre. 7

OR

Marks

VIII (a) Derive expressions for maximum slope and maximum deflection for a cantilever of span L carrying a UDL of w/unit length throughout the span by double integration method. 8

(b) A cantilever 4m long carries a point load 100/KN at a distance of 3m from the fixed end. Determine the slope and deflection at the free end. Take E = 200KN/mm^2, I = 400 × 10^{6}mm^4. 7

UNIT – IV

IX A continuous beam ABC 10m long rests on three supports A, B and C at the same level. AB = 6m, BC = 4m, span AB is carrying a point load of 3KN at a distance of 2m from A. Span BC is carrying a UDL of 1KN/m throughout the span. Determine the moments over the beam using theorem of three moments. Draw bending moment diagram and shear force diagram. 15

OR

X A continuous beam ABC fixed at A and C. AB = 6m, AC = 6m, span AB carries a UDL of 2KN/m over the entire span. BC carries a point load 12KN at the centre. Draw the bending moment diagram and shear force diagram using moment distribution method. 15