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C09–C–303

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BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2018

DCE - THIRD SEMESTER EXAMINATION

STRENGTH OF MATERIALS AND THEORY OF STRUCTURES

Time : 3 hours] [*Total Marks* : 80

PART—A 3×10=30

Instructions : (1) Answer **all** questions.
(2) Each question carries **three** marks.
(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Define the following terms (a) Neutral Axis (b) Modulus of Section (c) Moment of Resistance.

2. A steel strip of 20 mm thick is bent in to an arc of 3 m diameter. Calculate the maximum stress due to bending. E = 200 kN/mm2.

3. Draw the deflected shapes of the following beams subjected to u.d.l over the entire length.

(a) Fixed beam (b) Two span continuous beam with both ends simply supported.

4. A cantilever of 3 m long carries a point load of 300kN at its free end. Find the deflection at the free end if E= 200GN/m2 and moment of inertia I = 200×10^6 mm^4.

5. State the relation between curvature, slope and deflection of a loaded beam and explain the terms.

6. If the actual length of the column is 6 m, determine the effective lengths with the following end conditions. (a) Both ends hinged (b) both ends fixed (c) one end fixed and the other end free.

7. State any three assumptions made by Euler in developing the theory of long columns.

8. State any three conditions of stability of masonry dams.

9. Define : (a) Statically determinate frame (b) Statically indeterminate frame.

10. Determine the polar moment of inertia of a hollow circular shaft of external Diameter 50 mm and internal diameter 30 mm.

PART–B 10×5=50

Instructions : (1) Answer *any* **five** questions.
(2) Each questions carries **ten** marks.
(3) Answers should be comprehensive and the criteria for valuation are the content but not the length of the answer.

11. A Rectangular beam 300×450 mm is Simply Supported over a span of 5 m. and carries an u.d.l. of 25 kN/m over the entire span. Calculate the maximum bending stress and maximum shear stress.

12. A rectangular beam of bresdth 300 mm and depth 500 mm is simply supported over a span of 5 m. Fnd the maximum u.d.l. the beam can carry if the bending stress is limited to 18N/mm^2.

13. A simply supported beam of 3 m span carries two point loads of 80 kN and 120 kN at a distance of 1m and 2m respectively from RHS. Find the deflection under the loads by Macaulay's methods. Take moment of inertia I=16 x 10^4 and E=210kN/mm^2.

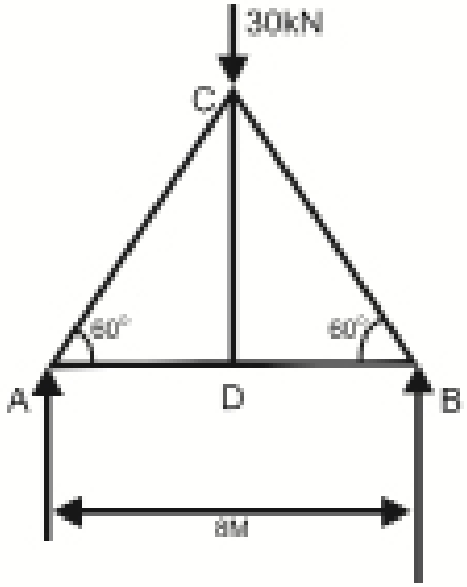
14. Determine the maximum deflection for a simply supported beam of span 5m subjected to a.u.d.l. of 12kN/m over the entire span and a central point load of 15 kN. Take E = 210kN/mm^2 and moment of inertia I = 75×10^6 mm^4.

15. A hollow circular column of 300 mm external diameter and 25 mm thick is 6 m long with one end fixed and the other end hinged. Find the safe load carrid by the column with a factor of safety of 3. Take f_c = 0.56 kN/mm^2 and a = 1/1600.

16. A hollow cylindrical cast iron column is 3.5 m long both ends being fixed. Design the column to carry an axial load of 300kN. Use Rankine's Formula and adopt a factor of safety of 3. The internal diameter may be taken as 0.80 times the external diameter. Take f_c = 500 N/mm^2 and a = 1/1600.

17. A masonry dam 6 meters high, 1.5 meter wide at top and 3.5 meter wide at bottom retains water on its vertical face. What are the maximum and minimum intensities of stresses at the base when the reservoir is full? Masonry weighs 20kN/m^3.

18. Find the magnitude and nature of the forces in each of the members of the truss shown figure by the method of joints.



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