4226

C14–C–302

4226

BOARD DIPLOMA EXAMINATION, (C–14)
OCT/NOV—2018
DCE - THIRD SEMESTER EXAMINATION

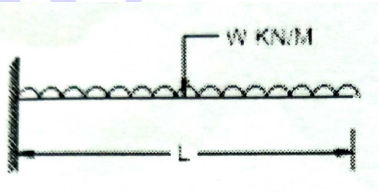
MECHANICS OF SOLIDS

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

PART—A 3×10=30

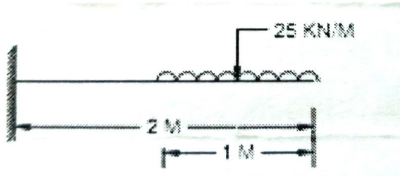
Instructions : (1) Answer **all** questions.
(2) Each question carries **three** marks.
(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Draw the Shear Force and Bending Moment Diagrams for a cantilever beam subjected to Uniformly distributed load 'w' for the entier span of length 'l'.



2. Name any three types of beams, according to the support conditions.

3. A Cantilever beam of span 2m carries a Uniformly distributed load of 25kN/m actine at a distance of 1m form the fixed end. Draw the Shear force and Bending moment diagrams.



4. Define (a) Neutral Axis

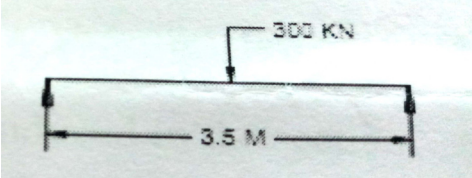
(b) Radius of curvature

5. Define Simple Bending and state the assumptions made in the theory of simple bending.

6. A strip of steel 40mm thick is bent around a circular drum of 4.96m in diameter.

Claculate the maximum stress due to the bending. Assume $E=200kN/mm^2$.

7. A simply supproted beam of 3.5m span cerries a central point load of 300kN. If the value of EI is $4\times10^{13}N/mm^2$, find the maximum deflection at the centre.



8. List any three advantages of Macualay's methods.

9. Write shor notes on (a) Slope (b) Deflection in beams.

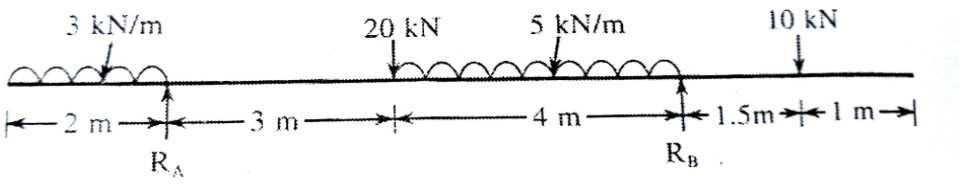
10. Write short notes on Elastic Curve of a beam.

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. Draw Shear Force and Bending Moment diagrams for an Overhanging beam shown in the figure.



12. A beam of 8m Length is Simply Supported at its ends and carries point load of 10kN, 30kN and 20kN at 2m, 5m and 7m from its left end. The beam also caries an Uniformly distributed load of 5kN/m over its entire length. The weight of the beam is 20kN. Draw Shear Force and Bending Moment diagrams for the beam giving the location and magnitude of maximum Bending Moment.

13. The dimentions of flanges of an I-section are 80×15mm and its web is 100×15mm. If this section is subjected to a shearing force of 10kN, find the values of Maximum and Average Shear Stresses inducted in the section.

14. A 300×150mm Rolled steel Joist of I-Section, with flanges 15mm thick, web 10mm thick is used as a Simply Supported beam over a span of 4m. Find the safe Uniformly Distributed load the beam can carry without exceeding the shear stress of $40N/mm^2$.

15. A simple supported beam of span 8m carries two point loods of each 30kN placed at a distance of 2m from either support, Determine the maximum slope and deffection using moment area methods -
$EI = 50000kN/n^2$.

16. Derive ralation between Slope, Deflection and Radius of Curvature.

17. A Cylindrical shell of 250mm internal diameter and 5mm thick is subjected to an internal fluid pressure of $2N/mm^2$. In addition the shell is subjected to a longitudinal pull of 25kN. Find the Hoop and Longitudinal pull of 25kN. Find the hoop and longitudinal strains in the material. $E = 200kN/mm^2$ and $1/m = 0.3$.

18. a) List the Assumptions made in the pure Torsion.

b) A solid circular shaft of dia 5 cms and of gauge length 30cms when subjected to a torgue of 10000 kgcms in a twisting machine registers on angular twist of $0^0\ 21'\ 00''$

Find the maximum shear stress induced and the value of Shear modulus.

* * *