* 4420 *

C14–C–402

4420

BOARD DIPLOMA EXAMINATION, (C–14)

MARCH/APRIL—2018

DCE—FOURTH SEMESTER EXAMINATION

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. State Euler's and Rankine's formulae for crippling load on column with usual notations.

2. Define a dam and list the forces generally acting on a dam section.

3. State three conditions for the stability of dam.

4. Define active pressure and passive pressure.

5. Define the terms *(a)* angle of surcharge and *(b)* angle of repose.

6. What is degree of static indeterminancy?

7. Draw the BM diagram of a fixed beam of span *L* having central point load *W*.

www.manaresults.co.in

8. State two merits and two demerits of continuous beam over simply supported beam.

9. Define the terms *(a)* redundant frame and *(b)* perfect frame.

10. Draw the diagram of a truss with simply supports at both ends and fixed at both ends.

PART—B

10×5=50

Instructions : (1) Answer *any* **five** questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. A hollow cast iron column of external diameter 200 mm and 4 m long with both ends hinged, supports an axial load of 850 kN. Find the thickness of metal required. Take factor of safety of 4. Use Rankine's constant f_c 320 N/mm^2 and a 1 / 6400.

12. A cast iron hollow cylindrical column 3 m in length when hinged at both ends has a critical buckling load of P kN. When the column is fixed at both the ends, its critical load rises to (P 300) kN. If the ratio of external diameter to internal diameter is 1·25 and E 100 kN/mm^2, determine the external diameter of the column.

13. A concrete dam 3 m wide at top, 8 m at bottom is 16 m high. The face of dam exposed to water is vertical and water up to the top level. Check the stability of the dam, if the coefficient of friction between dam and the soil is 0·6 and concrete weighs 24 kN/m^3.

14. A retaining wall is 3 m wide at top and 8 m wide at bottom is 18 m high is subjected to earth pressure on its vertical back. The weight of masonry is 24 kN/m^3 and that of earth is 16 kN/m^3. The angle of repose of earth 30° and the top of earth level is up to top of the wall. Find the maximum and minimum intensities of pressure on the base and draw the pressure distribution diagram.

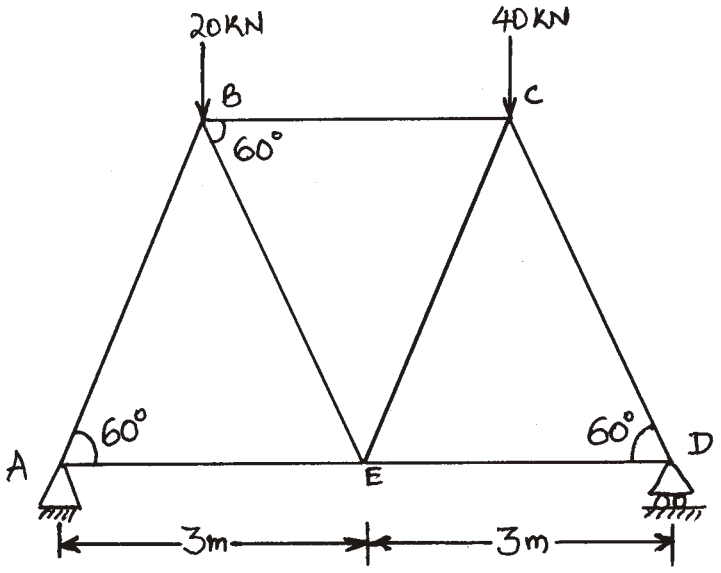
www.manaresults.co.in

15. A cantilever *AB* 6 m long carries a point load of 15 kN at the free end. This beam is propped at *C*, where there is no deflection at 4 m from the fixed end. Find the reaction of the prop and construct SF and BM diagrams. Mark the position of the point of contraflexure.

16. A beam of length 6 m fixed at both ends carries a central load of 30 kN. Determine the fixing couples at the ends and construct shear force and bending moment diagrams. Find the maximum central deflection by moment-area method, if flexural rigidity of the beam is 50 10^9 kN/mm^2.

17. A continuous beam *ABC* 8 m long rests on the three supports *A*, *B* and *C* such that *AB* 5 m and *BC* 3 m all supports being at the same level. The beam carries a UDL of 8 kN/m and 16 kN/m over the spans *AB* and *BC*. Construct SF and BM diagrams, indicating the values at all salient points. Flexural rigidity is same for both the spans.

18. Find the magnitude and nature of forces in all the members of the truss shown in the figure below by the method of sections :



★ ★ ★

www.manaresults.co.in