816 Register No.:

October 2018

Time – Three hours
(Maximum Marks: 75)

[N.B: (1) Q.No. 8 in PART – A and Q.No. 16 in PART – B are compulsory. Answer any FOUR questions from the remaining in each PART – A and PART – B

(2) Answer division (a) or division (b) of each question in PART – C.

(3) Each question carries 2 marks in PART – A, 3 marks in Part – B and 10 marks in PART – C.]

PART – A

1. Draw the deflected shapes of any two beams.
2. Give any two examples for statically indeterminate structures.
3. Mention any four methods to analyse the indeterminate structures.
4. Define continuous beam.
5. Define carry over moment.
6. What do you mean by non-sway frames?
7. State any three assumptions made in Rankin's theory of earth pressure.
8. Define: Core or Kern of a section.

PART – B

9. State and prove Mohr's theorem-II.
10. Sketch the BMD for the propped cantilever with an UDL throughout the length.
11. Show that the moment area of BMD in a fixed beam about the support is zero.
12. A fixed beam of 6m span is subjected to an UDL of w/m over its entire length. The net bending moment at centre is 30 kNm. Find the value of 'w'.
13. Define: distribution factor and distribution moment.

[Turn over.....

14. What is meant by portal frame? Sketch any two types of portal frame.

15. Define the term equivalent length. State the equivalent length for various end conditions of columns.

16. What are the conditions for the stability of the dam?

PART – C

17. (a) A cantilever beam 3m long carries an UDL of w/m over its entire span. The size of beam is 75mmX150mm. If the maximum deflection is 2.5mm, determine the load w/m. Take $E=2x10^5$ N/mm². Also find the maximum slope.

(Or)

(b) A propped cantilever beam 6m span carries a point load of 30 kN at 2m from propped end. Find prop reaction. Draw SFD and BMD.

18. (a) A fixed beam of span 6m carries point loads of 30kN and 20kN at 2m and 4m from the left end respectively. Find the support moments. Draw SFD and BMD.

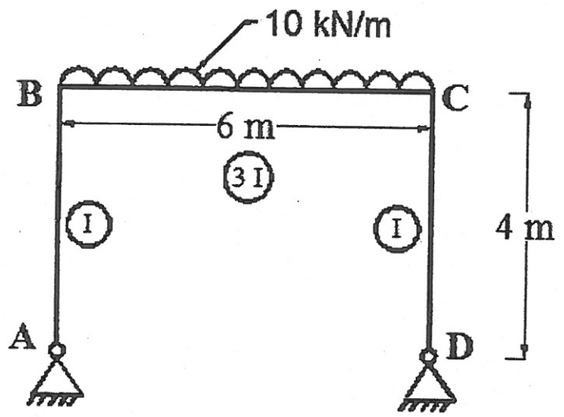
(Or)

(b) A continuous beam ABC 11m long is simply supported at A and C. Span AB is 6 m long carries an UDL of 20 kN/m over the span AB. Span BC is 5m long carries a point load of 50kN at 3m from end C. Determine the support moments by Clapyeron's theorem of three moments method and draw BMD. Take EI is constant.

19. (a) A continuous beam ABC of span 12m is fixed at A and simply supported at C. Span AB is 7m long and carries a point load of 50kN at 3m from fixed end A. Span BC is 5m long and carries and UDL of 20kN/m. Determine the support moments by moment distribution and draw BMD. Take EI is constant.

(Or)

(b) Analyze the portal frame as shown in fig. by moment distribution method and draw BMD.



20. (a) A hollow CI column whose outside diameter is 200mm has a wall thickness of 20mm. It is 4.5m long and fixed at both ends. Calculate the safe load by Rankine's formula using a factor of safety of 3. Take σ_c=550N/mm² and Rankine's constant a =1/1600.

(Or)

(b) A rectangular column 300mm wide and 250mm thick is carrying a vertical load of 100kN, acting at an eccentricity of 50mm in a plane bisecting the thickness. Determine the maximum and minimum stress developed.

21. (a) A trapezoidal dam 4m high has top width of 1m, with vertical face exposed of water, it retain water up to its top level. Find the minimum base width required to avoid tension. Take unit weight masonry as 22kN/m³ and that of water as 9.81kN/m³. Take μ = 0.6 and FS. = 1.5

(Or)

(b) A retaining wall trapezoidal in section is 6m high, 1m wide at top and 3m wide at the bottom with a vertical earth face retaining earth level with the top of the wall. If the weight of the masonry is 23kN/m³ and that of the earth is 18 kN/m³ with an angle of repose of 40°, calculate the maximum and minimum stress at the base.
