726 Register No.:

April 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. Define the term slope.
2. Define the term prop.
3. Mention any four advantages of fixed beams.
4. State the Clapeyron's theorem of three moments.
5. Define carry over factor.
6. Define portal frames.
7. Draw the deflected shape of the column with fixed at one end and hinged at other end. Also write the effective length of the column.
8. Define angle of repose of soil.

PART – B

9. State and prove Mohr's theorem-I.
10. State the prop reaction value of a propped cantilever beam subjected to a point load at mid span.
11. Show that the resultant area of BMD in fixed beam is zero.
12. A fixed beam of length 5m subjected to a point load of 'W' acts at centre. The net BM at centre is 20kNm. Determine the value of 'W'.
13. Define Stiffness factor and relative stiffness.
14. What do you mean by sway and non-sway frames?
15. Define active earth pressure and passive earth pressure.
16. Distinguish between short column and long column.

[Turn over.....

PART – C

17. (a) A simply supported beam 6m long, 150mm X 300mm size carries a central point load of 40kN. Determine the maximum slope and deflection by area moment method. Take $E = 1.5 \times 10^5 N/mm^2$.

(Or)

(b) A propped cantilever beam 4m long carries a central point load of 20kN. Determine the prop reaction and draw SFD and BMD.

18. (a) A fixed beam of 8m span carries an udl of 20kN/m on its full length and a point load of 40kN at 2m from its left support. Draw the SF and BM diagrams.

(Or)

(b) A two span beam ABC of length 9m is fixed at 'A' and simply supported at 'C'. The span AB is 6m long caries a point load 40kN at 2m from A. The span BC is 3m long carries an udl of 20kN/m. Find the support moments using theorem of three moments method and draw SFD and BMD.

19. (a) Analyse the continuous beam shown in figure 1 by moment distribution method. Find the support moments and draw the BMD. Assume EI as constant.

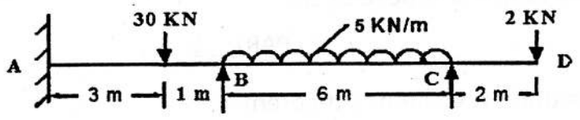

Figure 1

(Or)

(b) For the portal frame shown in figure 2 compute the bending moments by moment distribution and draw BMD.

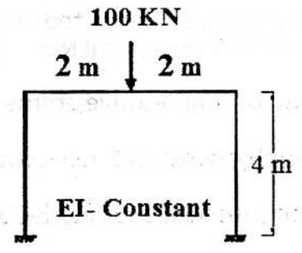

Figure 2

20. (a) A hollow CI column whose outside diameter is 200mm has a thickness of 25mm. It is 4.5m long and is fixed at both the ends. Calculate the safe load by Rankine's formula using a factor of safety 3, if a = 1/7500 and yield stress is 330N/mm².

(Or)

(b) A chimney has external and internal dimensions of 2m X 2m and 1m x 1m respectively and 20m high. It is subjected to horizontal wind pressure of intensity of 1.5kN/m². Find the maximum and minimum intensity of stress at the base of chimney and draw stress distribution diagram. Take unit weight of masonry as 23kN/m³.

21. (a) A trapezoidal masonry dam 3m wide at top, 12m wide at the base is 18m high. It retains water upto a depth of 17m on its vertical face. Check the stability of the dam for tension and sliding, if μ=0.6 and FOS=1.5. Take the weight of masonry as 20kN/m³ and that of water as 10kN/m³.

(Or)

(b) A trapezoidal retaining wall of 6m height is 2m wide at top 4m wide at its bottom. It retains earth on its vertical face to its full height. The bottom layer of soil of 1.5m height is fully submerged in water. Find the total horizontal pressure and its position. If the unit weights of dry soil, wet soil and masonry are 16kN/m³, 19kN/m³ and 23kN/m³ respectively and angle of repose of soil is 30°. Take unit weight of water as 10kN/m³.
