

212

Register No.:

October 2023

Time - Three hours
(Maximum Marks: 100)

- [N.B.]**
1. Answer all questions under Part-A. Each question carries 3 marks.
 2. Answer all the questions either (A) or (B) in Part-B. Each question carries 14 marks.]

PART - A

1. What is Elastic curve? Draw elastic curve of any one type of beam.
2. Write the methods available for analyzing statically indeterminate structures.
3. List the advantages of fixed beam.
4. What is the degree of indeterminacy of two span continuous beam with one end fixed and other end simply supported?
5. How do you analyze a continuous beam by moment distribution method?
6. Sketch the deflected shape of any two types of portal frame.
7. Define short column and long column.
8. Sketch the kern of section for rectangle, square and circular sections.
9. State the types of stresses developed at the base.
10. What are the factors affecting the stability of a Retaining wall?

[Turn over.....

PART - B

11. (a) A cantilever beam of 5m length carries two point loads 5 kN and 15 kN at free end and 2m from fixed end respectively. Find the maximum slope and deflection at the free end. Take $E=210 \text{ kN/mm}^2$ and $I=6 \times 10^8 \text{ mm}^4$.

(Or)

- (b) A cantilever beam AB of length 5m is fixed at one end and rigid prop at the other end. The beam carries an UDL of 20 kN/m for length of 2m and a point load of 10 kN at 4m from the fixed end respectively. Determine the prop reaction. Draw SFD and BMD.

12. (a) A fixed beam AB of length 6m carries an uniformly distributed load of 40 kN/m over its entire span. In addition to udl a point load of 100 kN is acting at its mid span. Determine the fixed end moments. Draw SFD and BMD.

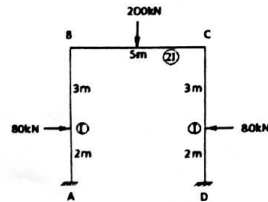
(Or)

- (b) A two span continuous beam AB=5m and BC=6m, the support A is fixed and support C is simply supported. The span AB carries an udl of 30 kN/m over its entire length. The span BC carries a point load of 60 kN at 2m from support B. Draw SFD and BMD. Use Theorem of three moments method.

13. (a) A continuous beam ABC of 12m length has two equal spans. The supports A and C are simply supported. The span AB carries udl of 30 kN/m in its length. The span BC carries udl of 50 kN/m in its length. Draw SFD and BMD. Use Hardy cross method. EI is assumed as constant.

(Or)

- (b) Analyze the Portal frame loaded as shown in figure by Moment distribution method. Draw BMD.



14. (a) A 'T' section 150mm x 120mm x 20mm is used as a strut of 3.2m length fixed at one end hinged at other end. Calculate the safe load by Euler's formula. Take $E=2 \times 10^5 \text{ N/mm}^2$ and Factor of safety = 4.

(Or)

- (b) (i) A steel flat 150mm wide and 30mm thick is subjected to a pull of 20 kN acting at an eccentricity of 5mm from the centroid in the plane bisecting the thickness. Find the maximum and minimum stresses developed in the section.(7)
- (ii) A hollow circular column 250mm diameter and 25mm thick carries an axial compressive vertical load of 150 kN acting at the outer edge of the column. Determine the maximum and minimum stresses developed in the section.(7)

15. (a) A masonry trapezoidal dam 20m high, 5m wide at top and 15m wide at bottom retains water on its vertical face to a height of 18m with a free board of 2m. Determine the maximum and minimum intensities of stresses at the base. The relative density of masonry is 2.4. Sketch the stress distribution diagram at the base of the dam.

(Or)

- (b) A masonry retaining wall 9m high with a vertical face retaining filling level with the top of wall. The weight of filling is 20 kN/m^3 and its angle of repose is 30° . At 3m below ground level, the foundations of a structure transmits a load of 120 kN/m^2 . Calculate the magnitude and position of lateral thrust on retaining wall.