

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE – NOVEMBER -2020.

THEORY OF STRUCTURES -II

(Maximum Marks: 75)

[Time: 2.15 hours]

PART–A

Marks

I. Answer **any three** questions in one or two sentences. Each question carries 2 marks.

1. Differentiate short column and long column.
2. Define angle of repose.
3. Write down the advantages of a fixed beam.
4. Define the term Mohr's theorem I.
5. Define carry over factors in moment distribution method.

(3x2=6)

PART - B

II Answer **any four** of the following questions. Each question carries 6 marks.

1. A solid rectangular column of length 5 m is having a cross section of 200 mm x 100 mm. Find the Euler's crippling load of two ends of members are hinged. Take $E=200$ GPa.
2. Find the crippling load by Rankine's formula for a hollow cylindrical column with 400 mm external diameter and 50 mm thickness. Length of column is 4 m and hinged at both ends.
Take $f_c=550\text{N/mm}^2$, $a=1/1600$ and F.O.S=4.
3. State the condition for the stability of a dam.
4. Show the core of a hollow circular section.
5. Derive the relation between curvature, slope and deflection.
6. Find the slope and deflection at the free end of a cantilever beam 2m long carrying udl of 30kN/m^2 on entire span. Take $E=200\text{kN/m}^2$, $I=160\times 10^6\text{mm}^4$.
7. Explain Hardy cross method of moment distribution for the analysis of indeterminate structure.

[4x6 =24]

PART - C

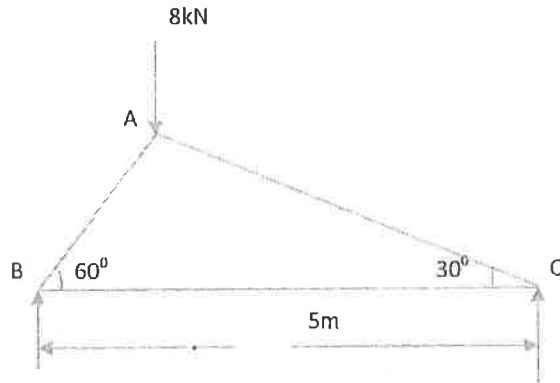
(Answer any of the three units from the following. Each full question carries 15 marks)

UNIT I

III (a) Find the dimensions of a strut 1.50m long fixed at one end and free at other end. Euler's collapse load is 15 kN. Cross section is hollow circular with internal diameter $\frac{3}{4}$ th of the external diameter. (7)

(b) The truss ABC shown in fig. has a span of 5m it carries a load of 8kN.

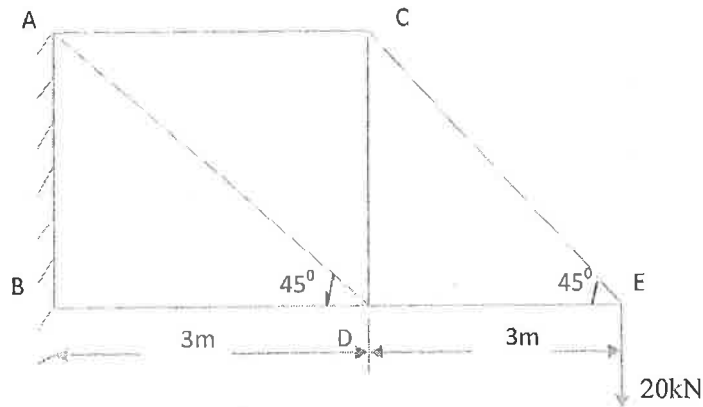
Find the forces in the members AB, AC and BC.



(8)

OR

IV Determine the magnitude and nature of forces in all the members of a truss shown in figure by method of joints.



(15)

UNIT- II

V (a) A hollow circular column having external diameter of 350mm and wall thickness 25mm, it carries a vertical load of 80kN at the outer edge of column. Calculate the maximum and minimum intensities of the stresses at the section. (8)

(b) Draw the S.F and B.M of a fixed beam carrying udl of 20kN/m over the entire length of 4m. (7)

OR

- VI (a) Explain middle third rule. (6)
- (b) A dam 5m high and 1m top width has a vertical water face. Find the bottom width of trapezoidal dam if no tension is to develop at the base density of masonry is 20kN/m. (9)

UNIT- III

- VII (a) Determine the slope and deflection of a cantilever beam of span 1 carrying Uniformly distributed load over a distance 1, from fixed end. (8)
- (b) A cantilever beam carries a point load of 20kN at the free end. Find the Slope and deflection at free end. (7)

OR

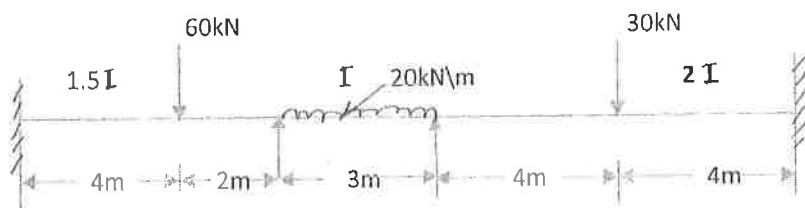
- VIII (a) A simply supported beam span 1, carries a point load W at centre. Find the maximum slope and deflection by moment area method. (8)
- (b) A cantilever 3m long carries a concentrated load of 25kN at a distance 1.5m from the fixed end. $E=200\text{kN/m}^2$ and $I = 100 \times 10^6 \text{ mm}^4$. Find
- (i) Slope and deflection at 1.5m from the fixed end.
- (ii) Slope and deflection at the free end. (7)

UNIT – IV

- IX (a) A continuous beam ABC, simply supported at A, B and C. Span AB 3m long and carries a point load of 120kN at centre. Span BC 3m long and carries uniformly distributed load of 40kN/m at entire span. Draw SF and BM diagrams. (10)
- (b) Explain Stiffness Factor. (5)

OR

- X Analyse continuous beam using moment distribution method as shown in the figure. Draw BM diagram.



(15)
