

Register Number :

Name of the Candidate :

8 6 2 0

B.E. DEGREE EXAMINATION, 2011

(CIVIL & STRUCTURAL ENGINEERING)

(FOURTH SEMESTER)

**CSEC-404. / PCSEC-202. MECHANICS OF
SOLIDS - II**

(*New Regulations*)

(*For the students joined during 2007-08
and after*)

May]

[Time : 3 Hours

Maximum : 60 Marks

UNIT - I

Answer any ONE question from each unit.

All questions carry equal marks.

Turn Over

1. Warren girder freely supported at ends is loaded as shown in figure-1. Find the forces in all the members.

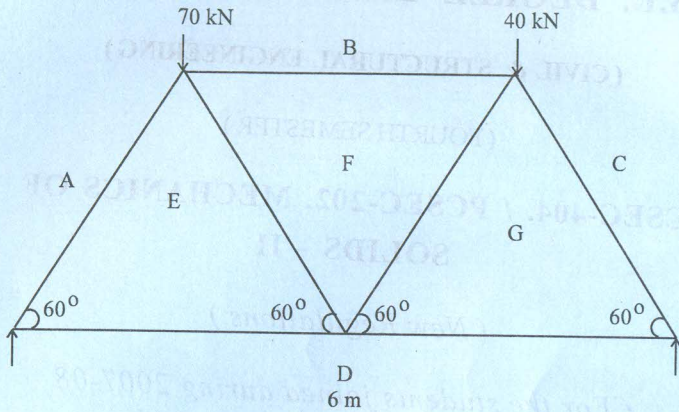


Figure-1

(OR)

2. A truss of 10 m span is loaded as shown in figure-2. Find the forces in the members of the truss.

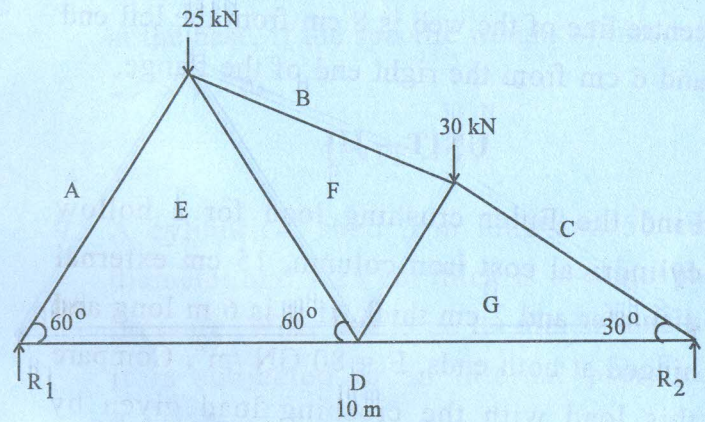


Figure-2

UNIT - II

3. A cantilever of I - section (Flange: 30 mm \times 2.5 mm: web: 45 mm \times 2.0 mm) 2.4 m long is subjected to a load of 200 N at the free end. A load $P = 600$ N is acting 20° to the vertical axis of I - section. Determine the resulting bending stresses at corners on the fixed section of the cantilever.

(OR)

Turn Over

4. Determine the position of the shear centre of the I - section of the beam: Flange : $14 \text{ cm} \times 4 \text{ cm}$: Web size : $22 \text{ cm} \times 2 \text{ cm}$: The centre line of the web is 8 cm from the left end and 6 cm from the right end of the flange.

UNIT - III

- Find the Euler crushing load for a hollow cylindrical cast iron column, 15 cm external diameter and 2 cm thick, if it is 6 m long and hinged at both ends, $E = 80 \text{ GN/m}^2$. Compare this load with the crushing load given by Rankine's formula, using $\sigma_c = 567 \text{ MN/m}^2$ and

$$a = \frac{1}{1,600}$$

For what length of column would these two formulae give the same crushing load?

(OR)

6. A masonry chimney, 25 m high of uniform circular section, 4 m external diameter and 2 m internal diameter is subjected to horizontal wind pressure of 1.2 KN/m^2 of projected area. Find the maximum & minimum stress intensities at the base, if the specific weight of masonry is 22 KN/m^3 .

UNIT - IV

7. A cylindrical shell 3 m long and 50 cm in diameter and 1.25 cm thick is at atmospheric pressure. What would be its dimensions when it is subjected to an internal pressure of 2 MN/m^2 ?

$$E = 200 \text{ GN/m}^2 \text{ and } m = 4.$$

(OR)

8. A thick cylinder of 150 mm outside radius and 100 mm inside radius is subjected to an external pressure of 30 MN/m^2 . Calculate the maximum shear stress in the material of the cylinder at the inner radius.

UNIT - V

9. A cantilever PQRS, 7 m long is fixed at P such that $PQ = QR = 2\text{ m}$ and $RS = 3\text{ m}$. It carries loads of 5, 3, 2 KN at Q, R and S respectively in addition to UDL of 1 KN/m run between P and Q and 2 KN/m run between R and S. Draw shear force and bending moment diagrams.

(OR)

10. A fixed beam of 8m span carries a UDL of 20 KN/m run over 4 m length starting from left end and a concentrated load of 40 KN at a distance of 6 m from the left hand end.

If $E = 15,000\text{ KN/m}^2$,

Find :

- (i) Moments at the supports
- (ii) Deflection at the centre of the beam.