Register Number: **8605**

Name of the Candidate:

B.E. DEGREE EXAMINATION, 2011

(CIVIL, CIVIL AND STRUCTURAL ENGINEEERING)

(FOURTH SEMESTER)

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

(Old Regulation)

(For the students joined during 2006-2007 and before)

May) (Time: 3 Hours

Maximum: 60 Marks

Common with Part –Time structural engineering –Second Semester

Answer any ONE FULL question from each unit

All questions carry equal marks

UNIT-I

1. A truss of span 5m is loaded as shown in fig-1. Find the reactions and forces in the members of the truss.

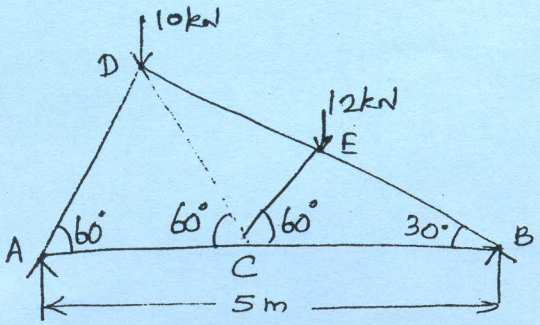

Figure-1

2. The steel truss shown in fig-2 is anchored at A and supported on rollers at B. If the truss is so designed that, under the given loading, all tension members are stressed to 100N/mm^2 and all compression members are stressed to 80N/mm^2, find the vertical deflection of the point C. Take E= 2×10^5N/mm^2.

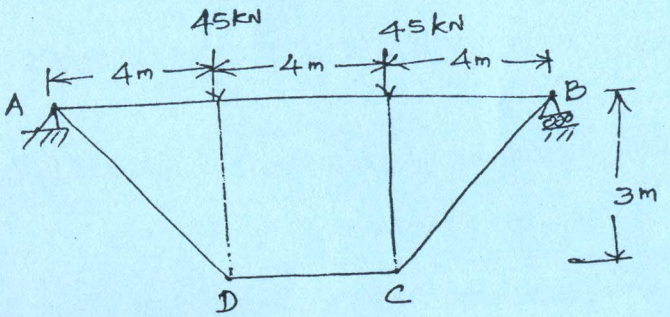

Figure-2

UNIT-II

3. Determine the principal moment of inertia about its centroid for the given section shown in fig-3

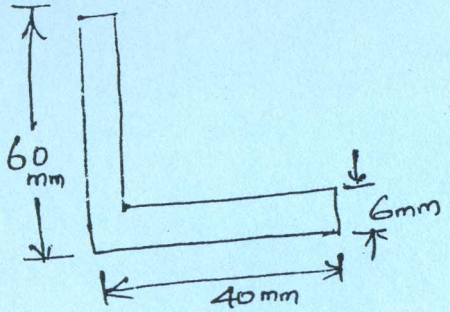

Figure-3

4. The cantilever beam shown in fig-4 is subjected to a load of 1000N which is inclined at an angle of 30° to the vertical. What is the stress due to bending at the four corners of the beam?

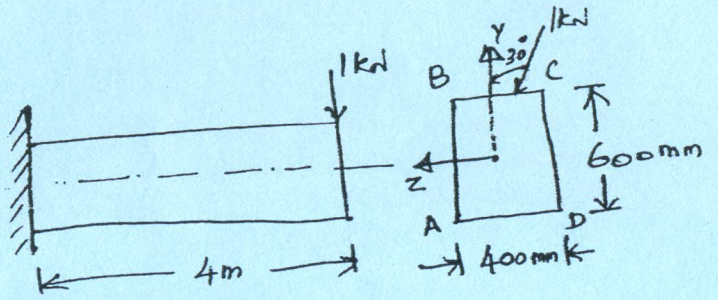

Figure-4

UNIT-III

5. A Masomy dam of rectangular section 10m high and 5m wide has water upto the top on its one side. If the weight density of masomy is 22kN/m^3, find
   i) Pressure force due to water per meter length of the dam
   ii) Resultant force and the point at which it cuts the base of the dam.

6. Find the Euler crushing load for a hollow cylindrical cash iron column 200mm external diameter and 25mm thick if it is 6m long and is hinged at both ends. Take E=1.2×10 ^{6}N/mm^2. Compare the load with the crushing load as given by the Rankine's formula taking $\sigma_c = 550N/mm^2$ and $\alpha = \frac{1}{1600}$, for what length of the column would these two formulae give the same crushing load?

UNIT-IV

7. A cylindrical shell 3m long which is closed as the ends have an internal diameter of 1m and a wall thickness of 15mm. Calculate the circumferential and longitudinal stress induced and also changes in the dimensions of the shell, if it is subjected to an internal pressure of $1.5N/mm^2$. Take $E= 2\times10^5 N/mm^2$ and $\mu=0.3$.

8. A thick spherical shell of 200mm internal diameter is subjected to an internal fluid pressure of $7N/mm^2$.If the permissible tensile stress in the shell material is 8 N/mm^2 , find the thickness of the shell.

UNIT-V

9. A closely -coiled helical spring of round steel wire 8mm in diameter having 10 complete turns with a mean diameter of 100mm is subjected to an axial load of 250N. Determine
   i) the deflection of the spring
   ii) maximum shear stress in the wire.
   iii) Stiffness of the spring. Take $C=8\times10^4 N/mm^2$

10. Determine the natural frequency of transverse vibrations for following sections
    i) Concentrated load on a beam fixed at the ends
    ii) Simply supported beam with uniformly distributed load w/ unit length for a span of 'L' m.

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