PVP 14

Code: CE4T3

II B.Tech - II Semester–Regular/Supplementary Examinations–April 2018

MECHANICS OF SOLIDS-II
(CIVIL ENGINEERING)

Duration: 3 hours Max. Marks: 70

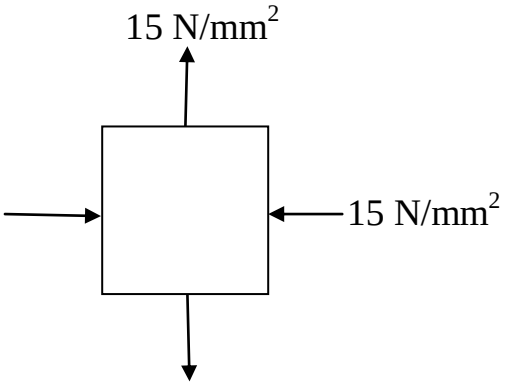
PART – A

Answer ***all*** the questions. All questions carry equal marks

11 x 2 = 22

1. a) State about Double integration method.
   b) Using double integration method, find the deflection at free end of cantilever with span L and udl w/unit length acting throughout the beam. Assume EI as a flexural rigidity.
   c) What do you understand by Principal planes and principal stresses?
   d) What is Mohr's circle, how is it used?
   e) What is the maximum shear stress at any point in a thin cylinder, subjected to internal fluid pressure?
   f) Explain Maximum principal stress theory?
   g) Explain about failure of a long column?
   h) What do you understand by slenderness ratio?
   i) What do you understand by shear centre?
   j) Define and explain the term unsymmetrical bending?

k) Draw the Mohr circle for the following state of stress at a point and find the principal stresses?



PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

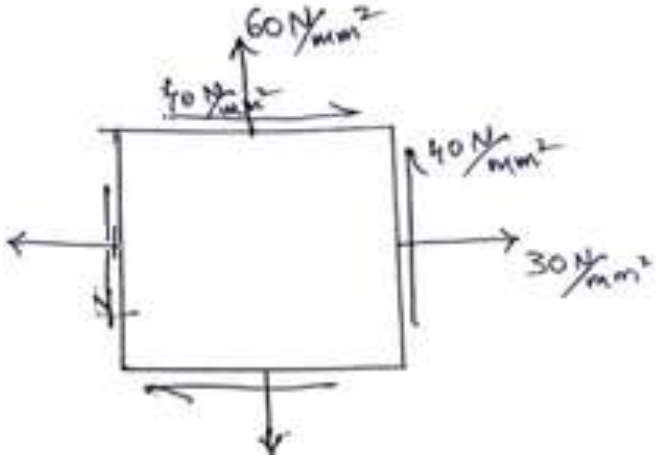
3 x 16 = 48 M

2. a) A beam 4 meters long, simply supported at its ends, carries a point load W at its centre. If the slope at the ends of the beam is not exceeding 1^0,find the deflection at the centre of the beam. 8 M

b) Determine (i) slope at the left support ,(ii) deflection under the load and (iii)maximum deflection of a simply supported beam of length 5m,which is carrying a point load of 5 KN at a distance of 3m from the left end .Take $E=2x10^5 N/mm^2$ and $I=1x10^8$ mm^4. 8 M

3. a) At a point within a body subjected to two mutually perpendicular directions ,the stresses are 60 N/mm^2 tensile and 30 N/mm^2 tensile. Each of the above stresses is accompanied by a shear stress of 40 N/mm^2. Determine normal stress and shear stress. 8 M

b) Resultant stress on an oblique plane inclined at an angle of 45^0 with the axis of minor tensile stress. 8 M



4. a) Calculate (i) the change in diameter (ii) change in length and (iii) change in volume of a thin cylindrical shell of 100cm diameter ,1cm thick and 5m long when subjected to internal pressure of 3 N/mm^2. Take the value of $E=2x10^5$ $N/mm^2$and Poisson's ratio $\upsilon=0.3$. 12 M

b) Explain minimum principal stress theory. 4 M

5. a) A column of timber section 15cm x 20cm is 6m long with both ends being fixed. If the Young's modulus for timber =17.5KN/mm^2,determine:

(i) Crippling load and 4 M

(ii) Safe load for the column if factor of safety=3. 4 M

b) What are the assumptions and limitations of Euler's theory? Derive an expression for Eulers theory when both ends are fixed. 8 M

6. Find the stress distribution at section ABCD as shown in the figure. If p=64KN. Locate line of zero stress. 16 M