PVP 14

Code: CE4T3

II B.Tech - II Semester – Regular/Supplementary Examinations – April 2017

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 Mohrs II theorem.
b) Write an expression for the deflection under load for a simply supported beam of length *l* carrying a U.D.L .
c) Explain about Principal stresses and strains.
d) Give the expression for major principal stress in a two dimensional system.
e) What are the types of stresses developed in thin cylinders subjected to internal pressure?
f) List out the theories of failures.
g) Define slenderness ratio.
h) Write the Eulers critical load formula when a member is subjected to one end hinged and other end fixed.
i) Explain the theorem of conjugate beam method.
j) Explain how unsymmetrical bending is developed in a beam?

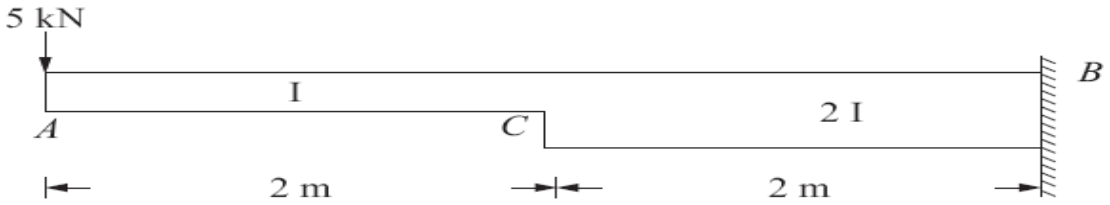
k) What is unsymmetrical bending?

PART – B

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

3 x 16 = 48 M

2. a) Find the slope and deflection at the free end for the beam shown in Figure using Moment-Area method. Take $E = 2.2\times10^5$ MPa and $I = 97 \times 10^6$ mm^4. 10 M



b) A beam of length 6 m is simply supported at its ends and carries two point loads of 48 kN and 40 kN at a distance of 1 m and 3 m respectively from the left support. Find

i) Deflection under each load

ii) Maximum deflection, Take $I=85\times10^6$ mm^4 $E = 2\times10^5$ N/mm^2

6 M

3. a) Derive the expression for bending stress and inclination of neutral axis for a beam subjected to unsymmetrical bending . 6 M

b) 100*100*12 mm equal angle section cantilever beam 1.2m long with one of the legs vertically upward is subjected to a vertically down ward concentrated force of 8kN at its free end. Determine the max. stress at a section of 0.75m from the applied force. 10 M

4. a) Explain about maximum principal stress theory. 6 M

b) A shell 4 m long, 1.5 m in diameter is subjected to an internal pressure of 1.2 MPa. If the thickness of the shell is 12 mm, find the circumferential and longitudinal stresses. Find also maximum shear stress and the changes in the dimensions of the shell. Take E = 205 kN/mm^2 and Poisson's ratio = 0.3 10 M

5. a) Derive the expression for SECANT formula. 6 M

b) A solid round bar 4m long and 5cm in diameter was found to extend 4.6mm under a Tensile load of 50KN. This bar is used as a strut with both ends hinged. Determine the buckling load for the bar, also find the safe load taking factor of safety as 4.0. 10 M

6. a) The principal stresses at a point in a strained material are σx,σy. Find the normal and tangential stresses. 6 M

b) At a point in a stressed body the principal stresses are $70MN/m^2$(tensile) $400MN/m^2$ (compressive). Determine the normal and shear stress on a plane inclined at 30° to the axis of major principal stress, Cal.max shear stress by using of mohrs circle method. 10 M