Registration No:

M.TECH

Total Number of Pages :2

M.TECH 1ST SEMESTER REGULAR EXAMINATIONS, DECEMBER 2018
ADVANCED MECHANICS OF SOLIDS
Branch: MD, Subject Code: MMDPE1044
(Regulations 2018)

Time: 3 Hours   **Max Marks : 70**   **Question Code:RD18002095**

PART-A (10 X 2=20 Marks)

1. Answer the following questions.
    a. State the reasons for unsymmetrical bending.
    b. Write down Winkler-Bach formula. Name each term. Where it is used?
    c. Which two types of failure of slender columns are possible?
    d. Write the assumption made in deriving the Winkler batch formula for curved beam?
    e. Explain how a membrane is different from plate?
    f. Differentiate between Homogeneous and sandwich plate?
    g. What type of stress will be generated when a thin plate is subjected to bending?
    h. How Euler's beam is differing from Timoshenko beam?
    i. Explain the concept of Unsymmetrical Bending. What are the conditions that should be satisfied for a beam to bend without twisting?
    j. What is resilience?

PART-B (5 X 10=50 Marks)
Answer any five questions from the following.

2 a)Derive an equation of radial stress for thick cylinder subjected to internal pressure P1 and external pressure P2?   [5]

   b) Derive an equation of circumferential stress for thick cylinder subjected to internal pressure P1   and external pressure P2?   [5]

3. A cantilever of T-section (flange: 120mm x20mm; web: 130mm x20mm) is 2.8 m long and carries concentrated load W at is free end but inclined at an angle 45° to the vertical. If E=200GN/m^2 and the deflection at free end is not to exceed 2 mm, determine: [5] [5]
   a) The maximum value of W
   b) Deflection of neutral axis with respect to vertical axis.

4.a) Find out the stresses at point A and B.

          [6]
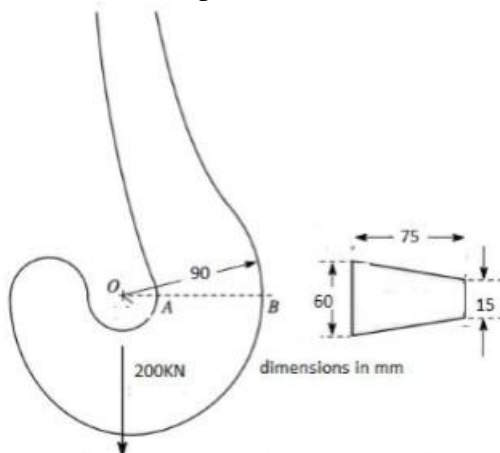
b. Why the trapezoidal cross-section of a crane hook is preferred over a rectangular cross-section?   [4]

5 a) A beam of equal-leg angle section, shown in figure below, is subjected to its own weight.   [6]
   Determine the stress at point A near the built-in section. It is given that the beam weighs
   1.48N/cm. Given:.,Izz=180cm4Izy=106.57cm4
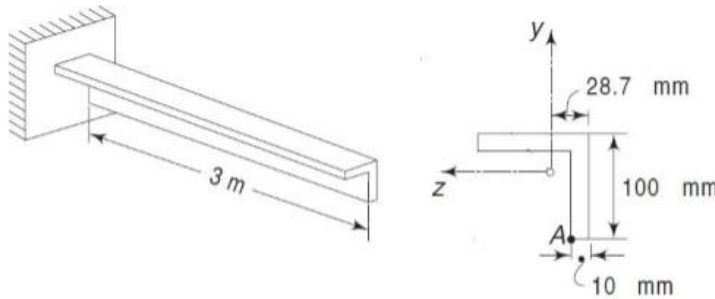
   b) Briefly discuss the theorem of virtual work.   [4]

6 a) Find the deflection, bending moments and maximum stresses for a simply supported circular   [5]
   plate of radius R carrying a uniform load of intensity w, which is constant.
 b) A steel disc of uniform thickness and of diameter 400 mm is rotating about its axis at 2000   [5]
   r.p.m. The density of the material is 7700 kg/m3 and Poisson's ratio is 0.3. Determine the
   variations of circumferential and radial stresses.

7.a) Write the assumption made in deriving the Winkler batch formula for curved beam?   [4]
  b) Find the shear center for unequal I section and the thickness of both the flanges and webs   [6]
   are 8mm
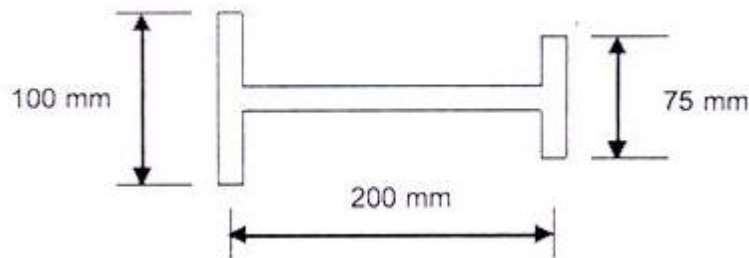
8. Write short notes on
  a) Airy's stress function   [5]
  b) Unsymmetrical bending.   [5]

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