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Total Number of Pages: 02

M.TECH
MDPC101

1st Sem M.Tech Regular/ Back Examination – 2015-16
Subject Name : ADVANCED MECHANICS OF SOLIDS
BRANCH(S):MECHANICAL SYSTEM DESIGN

Time: 3 Hours

Max marks: 70

Q.CODE:T899

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1. Answer the following question.

(2x10)

- What is the significance of shear centre.
- State the reasons for unsymmetrical bending.
- Which two types of failure of slender columns are possible?
- What do you mean by beams on elastic foundation. Give one example.
- What are the assumptions made for curved beam.
- Write the assumptions made in Kirchhoff's plate theory.
- State the locations in a rotating solid disc where the circumferential and radial stresses are maximum..
- What do you mean by lame's theory of thick cylinder. State the assumptions for lame's theory.
- What is membrane shell.
- What type of stress will be generated when a thin plate is subjected to bending?

Q2. Locate the shear centre for the channel section.

(10)

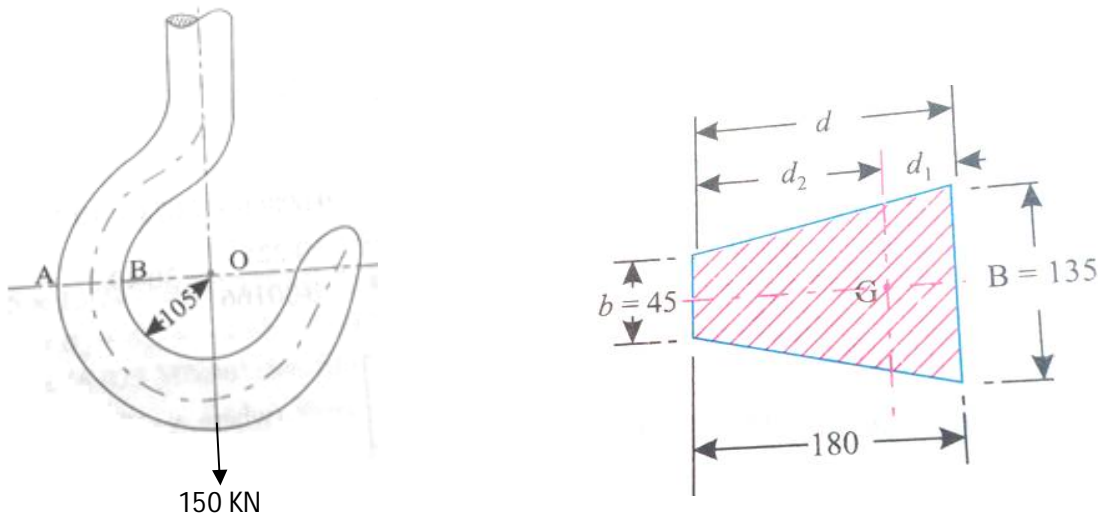
Q3. A beam of T-section (flange:150mmx25mm, web:200mmx15mm) is 2.5m in length and is simply supported at the ends. It carries a load of 3.2KN inclined at 30° to the vertical and passing through the centroid of the section (beam loaded centrally). If $E=200\text{GN/mm}^2$ determine

(a) Maximum tensile stress (b) maximum compressive stress

(c) deflection due to loaded (d) position of neutral axis

(10)

Q4. Fig shows a crane hook lifting a load of 150KN. Determine the maximum compressive and tensile stresses in the critical section of the crane hook. (10)



Q5(a) An external pressure of 10 MN/m^2 is applied to a thick cylinder of internal diameter 150mm and external diameter of 300mm. If the maximum hoop stress permitted on the inside wall is 35 MN/m^2 . Calculate

(a) The maximum internal pressure that can be applied.

(b) The change in outside diameter if cylinder has the closed ends. (8)

(b) What do you mean by shrink fit. (2)

Q6. What do you mean by columns. Derive the Euler's formula for columns with pinned ends. (10)

7. A steel disc of uniform thickness and of diameter 400 mm is rotating about its axis at 2000 r.p.m. The density of the material is 7700 kg/m^3 and Poisson's ratio is 0.3. Determine the variations of circumferential and radial stresses. (10)

8. Write short notes on any two (5x2)

(a) Hamilton's principle

(b) virtual work

(c) Unsymmetrical bending..

(d) compound cylinders