

maam
Date: 07/12/2015.

Student Exam No. _____

GANPAT UNIVERSITY

B. Tech. Semester: III -Marine Engineering

Regular Examination November – December 2015

2MR306- Strength of Material

Time: 3 Hours

Total Marks: 60

Instructions: (1) Attempt all Questions.

(2) Assume suitable data if necessary.

(3) Figure to the right indicates full Marks.

(4) Start new Question on New Page.

Section - I

- Que. – 1 (a) List The different types of stresses and Explain any one in detail. 5
(b) Explain stress-strain diagram with neat sketch. 5

OR

- Que. – 1 A rolled steel joint of L section has the dimensions $100 \times 100 \times 20$. This beam of L section carried a u.d.l. of 50 kN/m run on a span of 8 m ; calculate the maximum stress produced due to bending. 10
Que. – 2 a) Explain design procedure of thin cylinder with neat sketch. 5
b) Define neutral axis and neutral layer. 5

OR

- Que. – 2 The tensile stresses at a point across two mutually perpendicular planes are 150 N/mm^2 and 75 N/mm^2 . Determine the normal, tangential and resultant stresses on a plane inclined at 45° to the axis of major stress. 10
Que. – 3 A solid circular shaft transmits 15 kW power at 300 r.p.m. . Calculate the shaft diameter, if solid shaft is replaced by a hollow shaft transmitting same amount of torque then find inside and outside diameter of shaft. If the ratio of inside to outside diameter is 0.4 and shear stress is limited to 50 N/mm^2 . 10

Section – II

- Que. – 4 a) List assumptions made in the Euler's column theory. 5
b) Find the moment of inertia of T section having $120 \times 120 \times 20 \text{ mm}$ 5

OR

- Que. – 4 A solid round bar 3 m long and 50 mm in Diameter is used as a strut with both ends hinged. Determine the crippling load. Take $E = 200 \text{ GPa}$ 10
Que. – 5 a) Draw a neat sketch of semi elliptical leaf spring with all notations. 5
b) A solid rectangular bar 5 m long having cross sectional area $30 \times 50 \text{ mm}$ is used as a column with both ends fixed. Determine the crippling load. Take $E = 200 \text{ GPa}$ 5

OR

- Que. – 5 A solid circular shaft transmits 16 kW power at 80 r.p.m. . Calculate the shaft diameter, shear stress is limited to 70 N/mm^2 . 10
Que. – 6 A cantilever beam of length 3 m is carrying a point load of 25 kN at the free end. 10
If the moment of inertia of the beam $= 108 \text{ mm}^4$ and value of $E = 2.1 \times 10^5 \text{ N/mm}^2$,
Find (a) slope of the cantilever at the free end and (b) Deflection at the free end.