

GANPAT UNIVERSITY**B. Tech. Semester: III -Marine Engineering****Regular Examination November – December 2016****2MR306- Strength of Material****Time: 3 Hours****Total Marks: 60**

- Instructions:** 1) This Question paper has two sections. Attempt each section in separate answer book.
 2) Attempt all Questions.
 3) Be precise and to the point in answering the descriptive questions.
 4) Assume suitable data if necessary.
 5) Figure to the right indicates full Marks.
 6) Start new Question on New Page. .

Section - I

- Q – 1** (a) List the different types of Stresses and explain any one in detail. **5**
 (b) Explain design procedure of thin cylinder with neat sketch. **5**

OR

- Q – 1** A rolled steel joints of I section has the dimensions 90*90*10. This beam of L section **10**
 carried a point load 40 kN at the end of span of 10 m, calculate the maximum stress
 produced due to bending.

- Q – 2** (a) List assumptions made in the Euler's column theory. **5**
 (b) Differentiate tensile and shear stress with neat sketch. **5**

OR

- Q – 2** A solid round bar 3 m long and 50 mm in Diameter is used as a strut with both ends **10**
 hinged. Determine the crippling load. Take $E = 200000 \text{ N/mm}^2$.
- Q – 3** The tensile stresses at a point across two mutually perpendicular planes are 100 N/mm^2 **10**
 and 40 N/mm^2 . Determine the normal, tangential and resultant stresses on a plane
 inclined at 40° to the axis of minor stresses.

Section - II

- Q – 4** A cylinder pipe of diameter 2 m and thickness 1 cm is subjected to an internal **10**
 fluid pressure of 2 N/mm^2 . Determine:
 a) Circumferential stress b) Longitudinal stress c) Maximum shear stress.

OR

- Q – 4** (a) Find the moment of inertia of T section having $120 \times 120 \times 20 \text{ mm}$. **5**
 (b) In Hollow circular shaft of outer and inner diameter of 30 cm and 15 cm **5**
 respectively, the shear stress is not to exceed 40 N/mm^2 . Find the maximum
 torque which the shaft can safely transit.

- Q-5 A cantilever of length of 3 m is carrying a point load of 25 kN at the free end. If 10
moment of inertia of the beam $= 10^8$ and $E = 2 \times 10^5$ N/mm², find slope and deflection of the
cantilever beam at free end.

OR

- Q-5 (a) Explain stress-strain diagram with neat sketch. 5
(b) List different application of Thin and Thick cylinder 5
- Q-6 A cylinder pipe of diameter 1.5 m and thickness 1.5 cm is subjected to an internal fluid 10
pressure of 1.2 N/mm². Determine: a) Circumferential stress developed in pipe b)
Longitudinal stress developed in pipe.

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