

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-I & II (OLD) EXAMINATION – SUMMER-2019****Subject Code: 110010****Date: 19/06/2019****Subject Name: Mechanics Of Solids****Time: 10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Define the term force. Explain force and forces system 07
(b) Two tensile forces 100 kN and 150 kN acting at a point with an angle 65 degree between them. Find magnitude and direction of the resultant. 07
- Q.2** (a) Determine magnitude and direction of resultant force of the force system shown in fig. 1. 07
(b) Find support reaction for the beam shown in fig. 2 07
- Q.3** (a) Draw shear force and bending moment diagram for the beam shown in fig.3. 07
(b) Locate centroid of the section shown in fig.4 07
- Q.4** (a) Explain the pappus-guldinus theorem. 07
(b) A 'T' section has flange 180mm x 20mm and web 150mm x 20mm. Determine the moment of inertia with respect to centroidal axis. 07
- Q.5** (a) A steel bar 40mm in diameter is subjected to a tensile load of 75 kN. The measured extension on a gauge length of 400mm is 0.212 mm and change in diameter is 0.0045 mm. Calculate poisson's ratio and the value of Elastic Constants. 07
(b) A cantilever beam of span 4 m and 300 mm x 600 mm rectangular section carries uniformly distributed load of 50kN/m over entire span. Find the maximum bending stress and draw bending stress distribution diagram. 07
- Q.6** (a) A Ladder 5 m long rest on horizontal ground and place against a smooth vertical at an angle 60 degree with the horizontal. It is on the point of sliding when a man weighing 1800 N stands on it at a distance 2.5 m along the ladder from foot of the ladder. Calculate the coefficient of friction. Neglect the self weight of ladder. 07
(b) Derive the equation of normal, tangential, and resultant stress on an inclined plane when body is subjected to direct stresses in two mutually perpendicular directions. 07
- Q.7** (a) Derive the equation for a volumetric strain of a rectangular body subjected to an axial force in one direction only. 07
(b) A Circular beam of 120 mm diameter is subjected to a shear force of 25 kN. Calculate the value of maximum shear stress and draw shear stress distribution diagram. 07

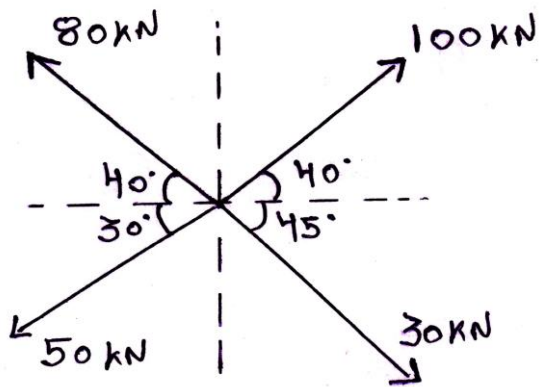


fig.(1) Q-2(a)

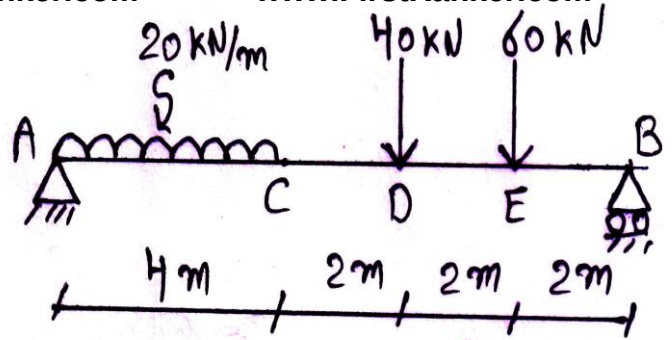


fig (2) Q-2(b)

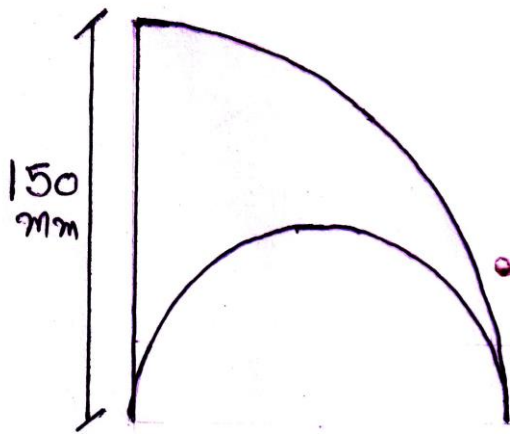


fig (4) Q.3(b)

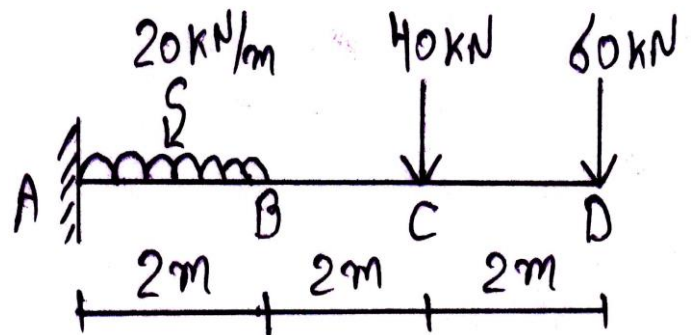


fig.(3) Q.3(a)