Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– I & II (SPFU) EXAMINATION – WINTER 2019

Subject Code: ENG004 **Date: 02/01/2020**

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 Force and classify the force system with neat sketch.	**07**
	(b)	Draw bending moment diagram and shear force diagram for a simply supported beam of length 'L', subjected to udl of 'w' kN/m throughout the length and 'W' at the center of a beam.	**07**
Q.2	**(a)**	i) Define : Angle of Repose. ii) State and explain the Laws of Static friction.	**07**
	(b)	Derive the relation between shear force and bending moment.	**07**
Q.3	**(a)**	Define: (i) Vector quantities (ii) Resolution of force (iii) Couple	**07**
	(b)	An M. S. bar of 25 mm diameter and change in length is 0.1 m acted upon by a tensile force of 100 kN. If the length of bar is 1.2 m and modulus of elasticity is 2.0×10^5 N/mm^2. Find stress, strain and elongation of the bar.	**07**
Q.4	**(a)**	For a bar shown in figure.1 find the diameter of the middle portion, if the stress at that location is to be limited to 140 N/mm^2. Also find the total change in the length of the bar. $E = 2 \times 10^5$N/mm^2	**07**
	(b)	Determine the support reactions of a cantilever beam having length 'L' subjected to point load 'W' at tip and 'W/2' at the center of a beam.	**07**
Q.5	**(a)**	Determine the horizontal force required to cause the motion of the block weighing 550N as shown in fig.2. Take $\mu = 0.55$. a. To impend the motion downward. b. To impend up the plane.	**07**
	(b)	State the condition of equilibrium for Co-planner force system.	**07**
Q.6	**(a)**	Find out centroid of thin homogeneous wire as shown in figure 3.	**07**
	(b)	Derive relation between bulk modulus (K), Poisson's ratio (1/m), and modulus of elasticity (E).	**07**
Q.7	**(a)**	Draw the Shear force and Bending Moment diagram of Beam given in Fig. 4	**07**
	(b)	i) Define: Coefficient of Static Friction and state the Laws of Friction. ii) Define: 1]Point of Contra flexure, 2] Shear force	**07**

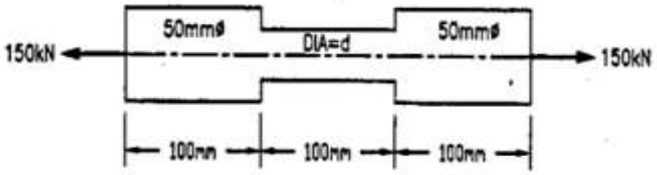

Fig. 1

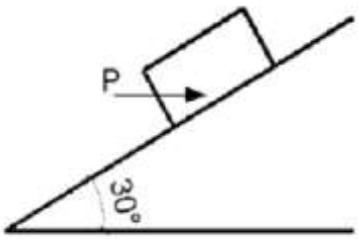

Fig. 2

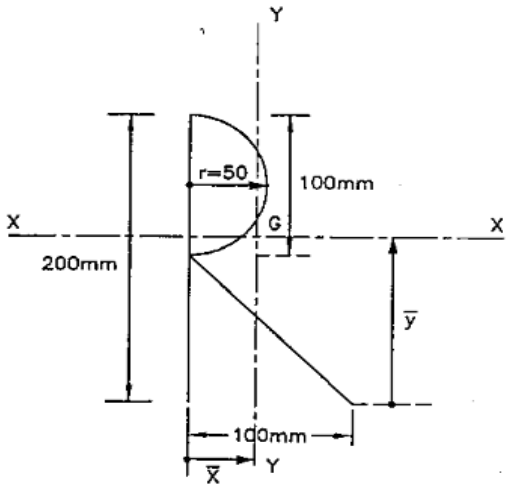

Fig. 3

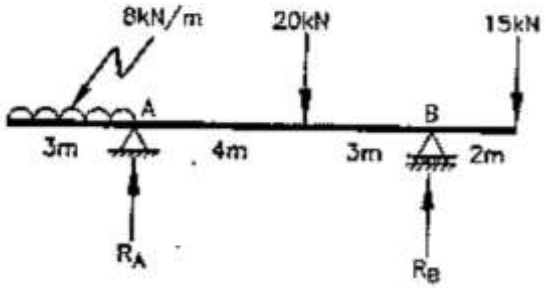

Fig. 4

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