SUBJECT NAME: Fundamental of Machine Design   **SUBJECT CODE: 3141907**
Date: 01/06 /2023   **Time: 11:00 to 12:30**

Q.1 a) Explain the following terms:	**3**	**CO1**	**R**

      1. Mass Moment of Inertia 2. Section modules

b) Explain the Parallel axis theorems for moment of inertia.	**3**	**CO1**	**U**
c) Determine the moment of inertia of following section about X-X and Y-Y axes.	**4**	**CO1**	**A**
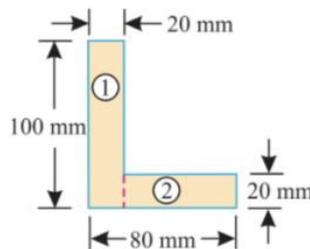
Q.2 Explain stress and strain relationship with graph.	**5**	**CO1**	**U**

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OR

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Q.2 Derive the equation for simple (or pure) bending. Also state the assumptions in this derivation.	**5**	**CO1**	**U**
Q.3 Explain maximum principal stress theory in detail. The load on a bolt consists of an axial pull of 10 kN together with a transverse shear force of 5 kN. Find the diameter of bolt required according to (1). Maximum principal stress theory; (2). Maximum shear stress theory	**8**	**CO2/ CO3**	**A**

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OR

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Q.3 Why taper is provided on cotter? What is its normal value? State its applications. Design a knuckle joint to transmit load of 100 kN. The design stresses may be taken as 75 MPa in tension, 60 MPa in shear and 150 MPa in compression.	**8**	**CO2/ CO3**	**A**
Q.4 Find the diameter of a solid steel shaft to transmit 20 kW at 200 r.p.m. The ultimate shear stress for the steel may be taken as 360 MPa and a factor of safety as 8. If a hollow shaft is to be used in place of the solid shaft, find the inside and outside diameter when the ratio of inside to outside diameters is 0.5.	**7**	**CO2 & CO3**	**A**

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OR

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Q.4 A solid shaft is transmitting 1 MW at 240 r.p.m. Determine the diameter of the shaft if the maximum torque transmitted exceeds the mean torque by 20%. Take the maximum allowable shear stress as 60 MPa.	**7**	**CO2 & CO3**	**A**

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ALL THE BEST

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