GALGOTIAS UNIVERSITY

ADMISSION NUMBER

School of University Polytechnic

Diploma in Mechanical Engineering
Semester End Examination - Aug 2024

Duration : 180 Minutes
Max Marks : 100

Sem IV - N1DL403B - Mechanics of Solid

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1)	Define brittleness and ductility.	K1(2)
2)	Explain principal stress and principal plane.	K2(4)
3)	Explain the stress strain diagram for brittle material.	K2(6)
4)	Explain the following terms; 1) moment 2) couple 3) torque	K3(9)
5)	A rod of length 1.5 m and diameter 30 mm is centrally bored for 500 mm length, the bore diameter being 10 mm. Under a load of 30 kN, if the extension of rod is 0.2 mm, find the modulus of elasticity.	K3(9)
6)	A simply supported beam of span length 3m and 60mm diameter carries a point load of 1.5 kN. Compute the maximum value of bending moment.	K5(10)
7)	A copper tube 30 mm bore and 3 mm thick is plugged at its ends. It is just filled with water at atmospheric pressure. If an axial compressive load of 8 kN is applied to the plugs, find by how much the water pressure will increase? The plugs are assumed to be rigid and fixed to the tube. Take: E= 100 GN/m2 ; Bulk modulus= 2.2 GN/m2 ; Poisson's ratio= 0.33	K4(12)
8)	A tensile test was conducted on a mild steel bar. The following data was obtained from the test: (i) Diameter of the steel bar = 4 cm. (ii) Gauge length of the bar = 22 cm (iii) Load at elastic limit = 250 kN (iv) Extension at a load of 160 kN = 0.235 mm (v) Maximum load = 390 kN (vi) Total extension = 70 mm (vii) Diameter of rod at failure = 2.35 cm Determine the Young's modulus, the stress at elastic limit, the percentage of elongation & the percentage decrease in area.	K5(15)
9)	Obtain the relationship between slope, deflection and radius of curvature.	K5(15)
10)	A solid circular shaft of 60 mm diameter transmits a torque of 1600 N.m. Determine the value of maximum shear stress developed.	K6(18)