ANNAMALAI UNIVERSITY

FACULTY OF ENGINEERING AND TECHNOLOGY

MID-TERM TEST – I (2019-20) – RE TEST

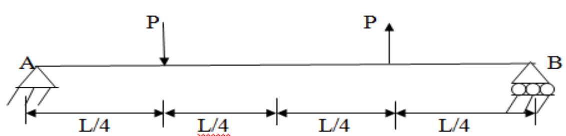
BRANCH: B.E. (CIVIL & STRUCTURAL ENGINEERING)

SEMESTER: FOURTH

COURSE CODE & TITLE: CZES-402 **INTRODUCTION TO SOLID MECHANICS**

Time: 90 minutes Max. Marks: 40

PART- A (8x 1 = 8 Marks) (Multiple Choice Questions) Answer ALL Questions			Marks	CO	BTL	PO	PSO
1		Define: Stress		1	K1	1,2,3,4,7	1,2
2		State Hooke's Law		1	K1	1,2,3,4,7	1,2
3		Define Poisson's ratio		1	K1	1,2,3,4,7	1,2
4		Write the expression for Young's Modulus in terms of Shear Modulus and Bulk Modulus		1	K1	1,2,3,4,7	1,2
5		Define: SF at a section		2	K1	1,2,3,4,5,7,9	1,2
6		Give the Reactions and displacement of Hinged support		2	K1	1,2,3,4,5,7,9	1,2
7		Write down the list of stress resultants available in a beam		2	K1	1,2,3,4,5,7,9	1,2
8		For a simply supported beam subjected to UDL, maximum BM occurs a)At Support b)At Quarter span point c)At Mid span d)None of the above		2	K1	1,2,3,4,5,7,9	1,2
PART- B (4 x 3 = 12 Marks) Answer either (a) or (b) in each Question							
9	(a)	State and explain Saint Venant's Principle		1	K1	1,2,3,4,7	1,2
		OR					
	(b)	Explain Hoop's Stress		1	K1	1,2,3,4,7	1,2
10	(a)	Draw the stress-strain curve for mild steel (qualitatively) and explain the salient features		1	K2	1,2,3,4,7	1,2
		OR					
	(b)	What is Proof stress? Explain		1	K2	1,2,3,4,7	1,2
11	(a)	Differentiate Sagging and Hogging bending		2	K2	1,2,3,4,5,7,9	1,2
		OR					
	(b)	Explain the significance of Point of contraflexure		2	K2	1,2,3,4,5,7,9	1,2

12	(a)	Draw the BMD for a simply supported beam of span L subjected to two point loads of intensity W at a distance ‘a’ from supports		2	K2	1,2,3,4,5,7,9	1,2
		OR					
	(b)	Discuss the relationship between the load, SF and BM in a determinate beam		2	K2	1,2,3,4,5,7,9	1,2
PART- C (2 x 10 = 20 Marks) **Answer either (a) or (b) in each Question**							
13	(a)	A steel tube of 30mm external diameter and 20mm internal diameter encloses a copper rod of 15mm diameter to which it is rigidly joined at each end. If at a temperature of 10°C there is no longitudinal stresses, calculate the stresses in the rod and tube when the temperature is raised to 200°C. Take E for steel and copper as 2.1×10^{5} MPa and 1.5×10^{5} MPa respectively. Value of coefficient of linear expansion for steel and copper is given as 11×10^{-6}/°C and 16×10^{-6}/°C respectively.		1	K3	1,2,3,4,7	1,2
		OR					
	(b)	An element in a stressed material has tensile stress of 500 N/mm^2 and compressive stress of 350N/mm^2 acting on two mutually perpendicular planes and equal shear stress of 100 N/mm^2 on these planes. Find the principal stresses and its planes. Find the maximum shear stress and its plane.		1	K3	1,2,3,4,7	1,2
14	(a)	Draw the S.F.D and B.M.D for the beam shown in fig: 1  **Fig-1**		2	K3	1,2,3,4,5,7,9	1,2
		OR					
	(b)	A Cantilever beam 1.8m long carries a UDL of 2kN/m over 1.2m from free end and a concentrated load of 1.5kN at the centre of the beam. Construct the SF and BM diagrams.		2	K3	1,2,3,4,5,7,9	1,2