Q.P. Code: 18CE0151 **R18**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Regular Examinations Nov/Dec 2019

STRENGTH OF MATERIALS

(ME & AGE)

Time: 3 hours Max. Marks: 60

PART-A

(Answer all the Questions **5 x 2 = 10** Marks)

1	**a**	What are the practical applications of impact loads?	**2M**
	b	What is the use of SFD and BMD?	**2M**
	c	Define bending and shear stress	**2M**
	d	What causes deflection of beam?	**2M**
	e	Why is pressure vessel cylindrical?	**2M**

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2		A steel rod of 3 cm diameter is enclosed centrally in a hollow copper tube of external diameter 5cm and internal diameter of 4cm. the composite bar is then subjected to an axial pull of 45000N.if the length of each bar is equal to 15 cm, determine: i) The stresses in the rod and tube and (ii) Load carried by each bar.	**10M**

OR

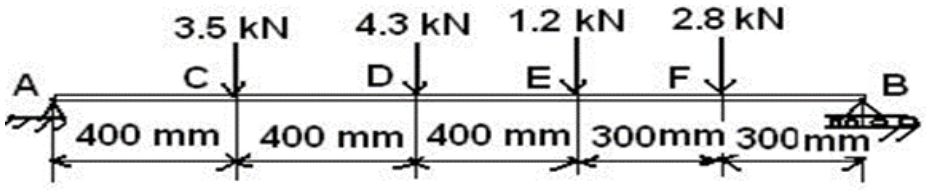
3	**a**	A steel bar 300 mm long, 50 mm wide and 40 mm thick is subjected to a pull of 300KN in the direction of its length. Determine the change in volume Take $E=2x10^5 N/mm^2$ and $\mu=0.25$.	**5M**
	b	Define the following terms (i) Elasticity & Plasticity (ii) Hooke's law & factor of safety (iii)Lateral & longitudinal strains.	**5M**

UNIT-II

4		Simply supported beam of length 6 m carries a uniformly increasing load of 600 N/m at one end to 1500 N/m run at the other end. Draw SFD and BMD for the beam. And also calculate the position and magnitude of maximum bending moment.	**10M**

OR

5	**a**	Draw the S.F and B.M diagram for a cantilever beam of span 'L'm loaded with UDL of W KN/m.	**5M**
	b	Draw the shearing force and bending moment diagrams for the beam shown in figure	**5M**



UNIT-III

6		Derive the formula for shear stress at a section.	**10M**

OR

7		A beam is simply supported and carries a uniformly distributed load of 40KN/m run over the whole span. The section of the beam is rectangular having depth as 500mm. If the maximum stress in the material of the beam is 120 N/mm^2 and moment of inertia of the section is 7 x $108mm^4$, find the span of the beam.	**10M**

UNIT-IV

8 Derive the relation between slope, deflection and radius of curvature. **10M**

OR

9 A hollow shaft of external diameter 120 mm transmits 300 kW power at 200 r.p.m. Determine the maximum internal diameter if the maximum stress in the shaft is not exceeded to 60 N/mm^2. **10M**

UNIT-V

10 A copper cylinder, 90 cm long, 40 cm external diameter and wall thickness 6 mm has its both ends closed by rigid blank flanges. It is initially full of oil at atmospheric pressure. Calculate additional volume of oil, which must be pumped into it in order to raise the oil pressure to 5 N/mm^2 above atmospheric pressure. For copper assume E= 1.0×10^5 **10M**

OR

11 Derive the expression for stresses developed in a compound thick cylinder (Lame's theorem). **10M**

END