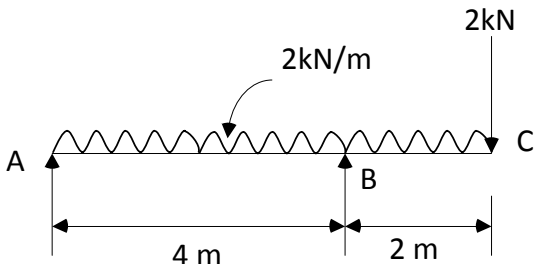




Code : 09CE245/12CE202/12CE264/CE203	Semester : 2016-17 ODD
Sub. Name : MECHANICS OF SOLIDS	Duration : 3 hrs
	Max. marks : 100

PART C(5 X 15= 75 MARKS)			
16.	a.	A compound tube consists of steel of 140mm internal diameter, 160 mm external diameter and an outer brass tube of 160mm internal diameter, 180mm external diameter. Two tubes are of same length and carry an axial load of 900KN. Calculate the stresses and the load carried by each of the tubes and length it shortens. Take length of each tube as 140 mm. Take $E_s = 2 \times 10^5 \text{ N/mm}^2$, and $E_b = 1 \times 10^5 \text{ N/mm}^2$.	(15)
(OR)			
17.	a.	<p>The following data relate to a bar subjected to a tensile test:</p> <p>Diameter of the bar =30mm Tensile load =54kN Gauge length =300mm Extension of the bar =0.112mm Change in diameter =0.00366mm Calculate: a. Poisson's ratio b. the value of three moduli.</p>	(15)
18.	a.	An element in a stressed material has tensile stress of 500 MPa and a compressive stress of 350 MPa acting on two mutually perpendicular planes and shear stresses of 100 MPa	(15)

		on these planes. Determine the principal stresses, the position of the principal planes and the maximum shear stress.	
(OR)			
19.	a.	A cylindrical shell 3m long which is closed at the ends has an internal diameter of 1m and a wall thickness of 15mm. Calculate the circumferential and longitudinal stresses induced and also change in the dimensions of the shell if it is subjected to an internal pressure of 1.5MN/mm^2 .	(15)
20.	a.	Draw the shear force and bending moment diagram for the beam given below.	(15)
			
(OR)			
21.	a.	Draw the shear force and bending moment diagram for a simply supported beam of span 8m subjected to a uniformly distributed load of 10kN/m .	(15)
22.	a.	A flitched timber beam consists of two joists 100 mm wide and 300 mm deep with a steel plate 200 mm deep and 15 mm thick placed symmetrically between and clamped firmly to them. Determine the moment of resistance of the section if the allowable stress in the joint is 9 N/mm^2 . Assume the Young's Modulus of steel is 20 times that of timber	(15)
(OR)			
23.	a.	An I section, with rectangular ends has the following dimensions: 1. Flanges: 150mm x 20mm 2. Web: 300mm x 10mm Find the maximum shearing stress developed in the beam for a shearing force of 10kN	(15)
24.	a.	A solid circular shaft transmits power of 75 kW at a speed of 200 r.p.m. Determine the diameter of the shaft if the twist in the shaft is not to exceed 1° in 2 m length of the shaft and shear stress is limited to 50 MPa. Assume Modulus of Rigidity $G = 1 \times 10^5\text{ N/mm}^2$	(15)
(OR)			
25.	a.	A hollow steel shaft 4m long is to transmit 150 kW power at 150 rpm. The total angle of twist in this length is not to exceed 2.5° and the allowable shear stress is 60 N/mm^2 . Determine the inside and outside diameters, if $C = 0.082 \times 10^6\text{ N/mm}^2$.	(15)

ALL THE BEST