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Code	No: 53016	R09	
J⊿	WAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDI B. Tech II Year I Semester Examinations, March - 2017 MECHANICS OF SOLIDS (Common to ME, MCT, AE, AME)	LRABAD	RE
Time	3 hours Max.	Marks: 75	
• # # # + • # # # X > X X > X Y X X • # # X + X X • # # X + X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X	Answer any five questions All questions carry equal marks		
1.a)	How to consider the self weight of the tapered for the estimation of the developed? Derive the corresponding equation.	stresses	
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	A rectangular block of size 50 mm × 100 mm × 80 mm is subje following axial loads:	ctedtothe	
	ii) 900 kN (tensile) on 500 mm × 80 mm faces;		
	iii) 1000 kN (Compressive) on 500 mm \times 100 mm faces.		
X X X X X X X X X X X X X X X X X X X	E = 200 GPa, find the modulus of rigidity and the bulk modulus.	ie block. If	
2.a)	How do you interrelate the shear force and bending moment across th the beam? Explain.	e section of	
b)	A beam of span 8.0m is rested over two simple supports at two ends. carrying U.D.L of intensity 2.0kN/m up to 4.0m length from left end. A c load of 5.0 kN at a distance of 6.0m is applied on the beam. In addition to the beam is also subjected to couples 20.0kNm anticlockwise at le 30.0kNm clockwise at right end respectively. Draw Shear force and bend diagram showing important values. Also find point of contraflexure in the	The beam is concentrated these loads of these loads of end and ing moment beam. [7+8]	
3 a) b)	What are the assumption made in deriving the bending moment ed derive the equation. Compute the distance between the channel sections of 6.5 mm uniform shown in figure 1, so that the principal Moment of Inertia of the combi- are equal.	juation and n thickness ned section [7+8]	
		RØ	

**** 600.0 mi ×**× ×** * * * * × * Î Figure: 1

A simply supported beam 4 m long has the cross section shown in Figure 2. Determine the maximum uniformly distributed load which can be applied over the entire length of the beam if the shearing stress is limited to 1.2 MPa. [15]

Code No: 53016

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD B. Tech II Year I Semester Examinations, March - 2017

MECHANICS OF SOLIDS

nmon to ME MCT AE AME)

Time: 3 hours		(Common)	to ME, MC1, AE, AF	VIE) N	Max. Marks: 75				
• *		Answe All questi	r any five questions ons carry equal ma	rks	RØ				
1.a)	How to consider the self weight of the tapered for the estimation of the stresses developed? Derive the corresponding equation.								
	A rectangular block of size 50 mm × 100 mm × 80 mm is subjected to the following axial loads:								
	iii) 1000 kN (Con Taking the poiso E = 200 GPa, find	npressive) on n's ratio as the modulus	500 mm \times 100 mm 0.3, find the chang of rigidity and the b	faces. ge in volume oulk modulus.	of the block. If $[7+8]$				
2.a)	How do you inter the beam? Explain	relate the she	ar force and bending	g moment acro	ss the section of				
b)	A beam of span 8.0m is rested over two simple supports at two ends. The beam is carrying U.D.L of intensity 2.0kN/m up to 4.0m length from left end. A concentrated load of 5.0 kN at a distance of 6.0m is applied on the beam. The addition to these foads the beam is also subjected to couples 20.0kNm anticlockwise at left end and 30.0kNm clockwise at right end respectively. Draw Shear force and bending moment diagram showing important values. Also find point of contraflexure in the beam. [7+8]								
	What are the ass derive the equatio Compute the dist shown in figure 1 are equal.	umptien: mac n. ance between , so that the p	le in deriving the t the channel section rincipal Moment of	oending mome s of 6.5 mm un Inertia of the co	nt equation and iform thickness ombined section [7+8]				
RO	RE	RØ	300.0 mm E 0.00		RO				
			Figure: 1						

A simply supported beam 4 m long has the cross section shown in Figure 2. Determine the maximum uniformly distributed load which can be applied over the entire length of the beam if the shearing stress is limited to 1:2 MPa. [15]



- 6.a) Explain the double integration method for the estimation of slope and deflection for the beam with suitable example.
- A beam 8 m long is simply supported at its ends and carries concentrated loads of 40 kN each at points 2 m from the ends. Calculate the maximum slope and deflection under each load. [7+8]

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- 7.a) Develop the expressions for stresses in a thin cylinder subjected to internal pressure. Are these expressions valid for cylinders with external pressure?
- A cylindrical shell 1.2 m long, 200 mm internal diameter and 10 mm thick is filled with a fluid at atmospheric pressure. If an additional 3×10^4 mm³ of the fluid is pumped into the cylinder, find the pressure exerted by the fluid on the wall of the cylinder. Find also the hoop stress induced. Take $E = 2 \times 10^5$ N/mm², $\mu = 0.3$. [7+8]
- The outer diameter of a cylinder is 1.4 times its inner diameter. Assuming v = 0.30, determine the ratio of external and internal pressures applied separately, so that in both the cases (a) the largest stresses have the same numerical values and (b) the largest strains have the same numerical values. [15]

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