U218-114(T2)

Total No. of Questions – [04] Total No. of Printed Pages (02)

G.R. No.	

~~SEPTEMBER~~ October 2018 / IN - SEM (T2)

S. Y. B.TECH. (CIVIL) (SEMESTER - I)

COURSE NAME : Strength of Materials

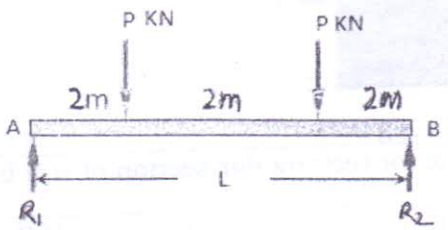
COURSE CODE: CVUA21174

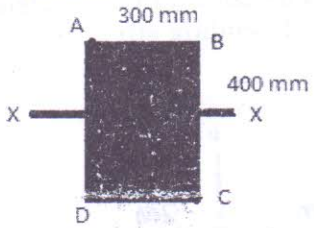
(2017 PATTERN)

Time :[1 Hour] [Max. Marks : 30]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2, Q.3 OR Q.4**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q1)	a)	Two beams, one having circular cross –section & another square cross section are subjected to the same amount of bending moment. If the cross sectional area as well as the material of both the beams are the same, then calculate the ratio of bending stresses developed in circular to rectangular section.	[6]
	b)	A beam AB of rectangular in cross-section of size 150mm x300mm is subjected to load P KN as shown in fig 1. Determine the maximum value of P, if limiting values of bending stress is 60 MPa and that of shearing stress is 1.5 MPa.  Fig 1	[6]
	c)	A structural beam is subjected to Hogging bending moment, & has a cross- section which is an unsymmetrical I-section having overall depth of 300mm. The bending stresses in the beam at top and bottom are 150MPa & 300MPa, respectively. Determine the position of Neutral axis in mm from bottom flange.	[4]

		OR	
Q2)	a)	Determine the ratio of moment carrying capacity of square beam of size D, and circular beam of diameter D made up of same materials.	[6]
	b)	The cantilever T beam is formed by joining two rectangular pieces of wood. The T section has flange of size 100mmx50mm,& web 100mmx50mm with overall depth150mm. The beam is subjected to a maximum shearing force of 60 kN. Determine (a) MI at NA (b) the maximum shearing stress. (c) shearing stress at the junction between the two pieces of wood. (d) Also draw shear stress distribution diagram	[6]
	c)	A rectangular beam of 100mm wide ,is subjected to a maximum shear force of 50 KN and the corresponding maximum shear stress is 5MPa.Determine the depth of beam required.	[4]
Q3)	a)	An I-section steel column has 3m effective length. Find the safe load carrying capacity of column using Euler's & Rankine's formula . Consider E= 200GPa. σy= 320MPa, A= 7485 mm^2 I_{xx}= 1.2545 x10^8 , I_{yy}= 2.1936 x10^7,	[6]
	b)	Explain through figure, buckling pattern & relation between actual length,effective length of column under buckling for different end conditions.	[4]
	c)	Determine the ratio of Euler critical buckling load of two columns having same parameters with (i) both ends fixed and (ii) both ends hinged Ans:4	[4]
		OR	
Q4)	a)	A rectangular column of 400 mm x300mm, as shown in fig2 is subjected to compressive load of 300 KN, acting on a diagonal DB of the section at a distance of 60 mm from centre Determine the stresses at four corners of the section.  Fig 2	[6]
	b)	Explain the middle third rule for rectangular section of size b x d	[4]
	c)	A short hollow column having cross-sectional area A as 15000 mm^2 and the section modulus Z= 10^6 mm^3 ,carries an axial load of 300 KN and another of 30 KN load on a bracket at a distance of 600 mm from the centre of the column. Determine the maximum and minimum stress intensities.	[4]

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