Total No. of Questions – [04]

Total No. of Printed Pages (03)

U218-114(T1)

G.R. No.	

OCTOBER

2018 / IN - SEM (T1)

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

COURSE NAME :Strength of Materials

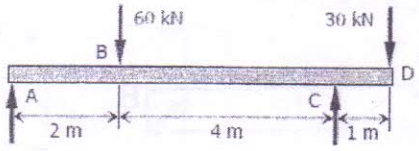
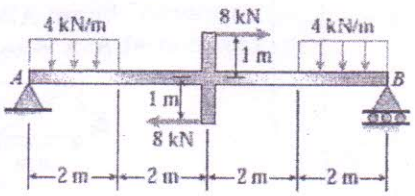
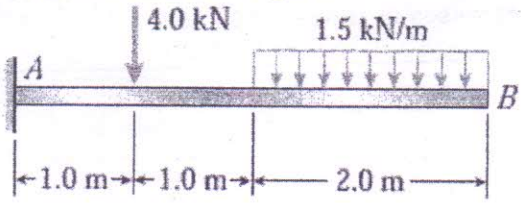
COURSE CODE CVUA21174

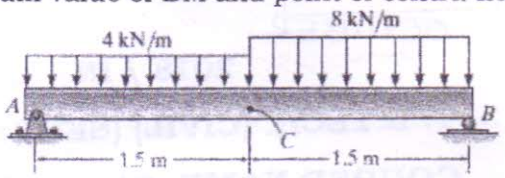
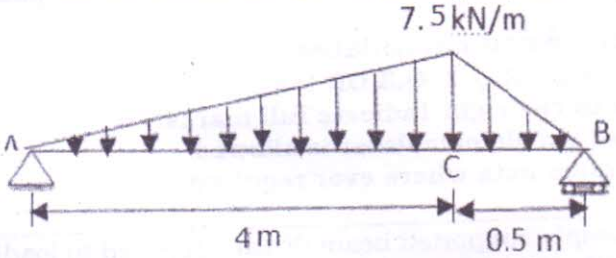
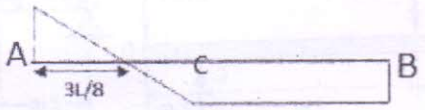
(2017 PATTERN)

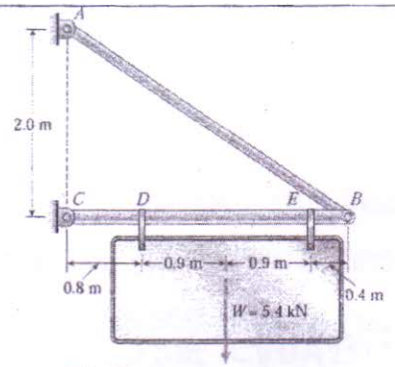
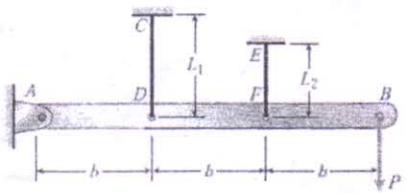
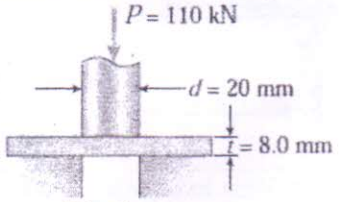
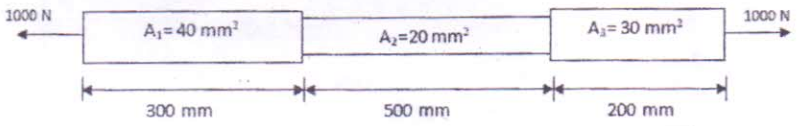
Time :[1 Hour] [Max. Marks : 30]

(*) 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)	A simply supported beam 0f 7m subjected to loading of 60 KN & 30 KN at B & D respectively as shown in fig1. Draw SFD & BMD. Evaluate point of contra-flexure if any  Fig1  Fig 2	[6]
	b)	A simple beam AB of 8m is loaded by two segments of uniform load of 4KN/m and two horizontal forces of 8KN acting at the ends of a vertical arm as shown in fig 2. Draw bending moment diagram for this beam.	[6]
	c)	Calculate the shear force *V* and bending moment *M* at a cross section located 0.5 m from the fixed support of the cantilever beam *AB* shown in the figure 3.  Fig 3	[4]

		OR	
Q2)	a)	A beam ACB of 3m subjected to udl of 4KN/m over AC and 8KN/m over CB as shown in fig 4. Draw SFD & BMD with maximum value of BM and point of contra-flexure if any.  Fig 4	[6]
	b)	A 4.5 long simply supported beam AB carries a triangular load of maximum intensity 7.5 KN/m as shown in figure 4. What is the location of zero shear force from point A?.  Fig 5	[6]
	c)	Following is the Shear force diagram (Fig6) for a simply supported beam AB of span L. If CB = 2.6L/6, Evaluate support reaction at A & B.  Fig 6	[4]
Q3)	a)	The two-bar truss *ABC* shown in Fig.7 has pin supports at points *A* and *C*, which are 2.0 m apart. Members *AB* and *BC* are steel bars, pin connected at joint *B*. The length of bar *BC* is 3.0 m. A sign weighing 5.4 kN is suspended from bar *BC* at points *D* and *E*, which are located 0.8 m and 0.4 m, respectively, from the ends of the bar. Determine the required cross-sectional area of bar *AB* if the allowable stresses in tension 125 MPa	[6]

		 Fig 7	
	b)	A 4-m-long steel rod must not stretch more than 3 mm and the normal stress must not exceed 160MPa when the rod is subjected to a 10kN axial load. Knowing that E = 200GPa, Design diameter of the rod to sustain the loading.	[4]
	c)	Demonstrate the application of generalized Hook's law with neat figure to find volumetric strain.	[4]
		OR	
Q4)	a)	A horizontal rigid bar AB is pinned at end A and supported by two wires (CD and EF) at points D and F. A vertical load P acts at end B of the bar. The bar has length 3b m. For wire CD, length L_1=0.40m, diameter d_1=4mm, modulus of elasticity E_1=72GPa & for wire EF , L_2=0.3m, d_2=3mm, E_2= 45 GPa. Calculate the allowable load P, if the allowable stresses in CD & EF are $\sigma 1$ = 200 MPa and $\sigma 2$ = 175 MPa, respectively  Fig 8  Fig 9	[6]
	b)	A punch for making holes in steel plates is shown in Fig 9. If punch having diameter d = 20 mm is used to punch a hole in an 8-mm plate. If a force P = 110 kN is required to create the hole, determine the average shear stress in the plate and the average compressive stress in the punch?	[4]
	c)	A stepped bar shown in Figure 10 is subjected to axial force of 1KN.Evaluate total deformation of the bar. Use E = 200GPa  Fig 10	[4]