Model Question Paper-1 with effect from 2019-20 (CBCS Scheme)

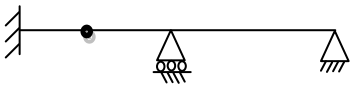
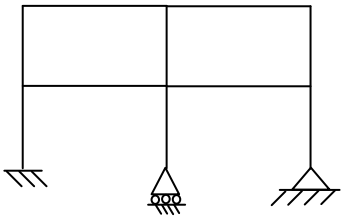
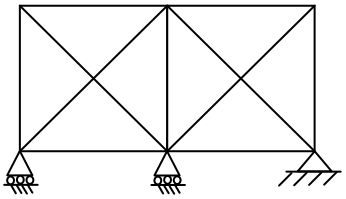
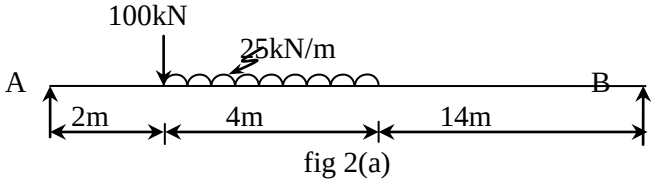
USN | | | | | | | | | | |

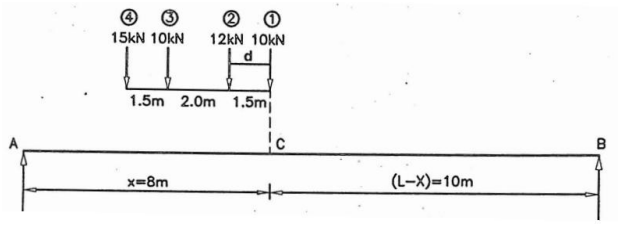
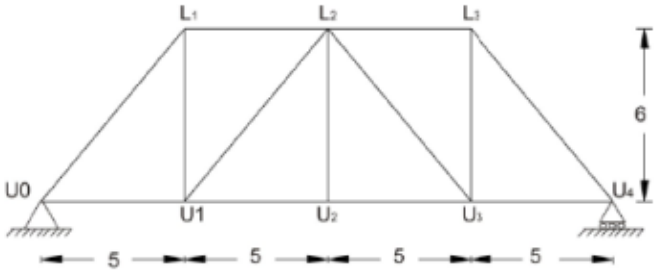
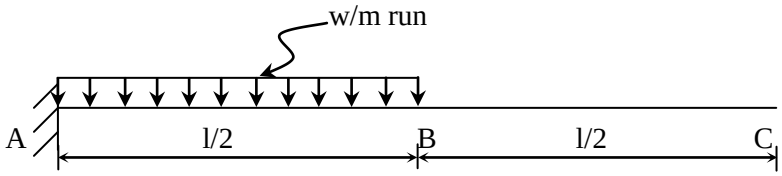
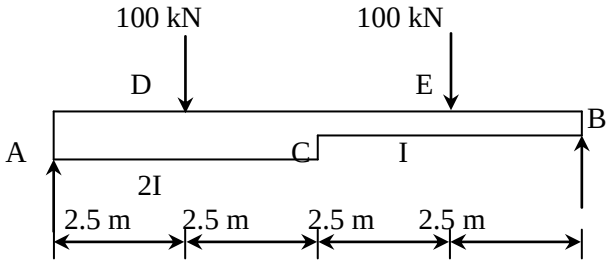
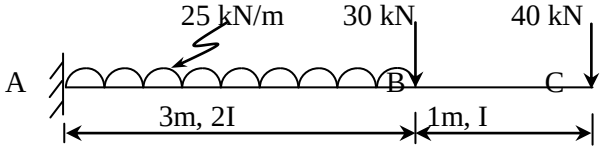
Fourth Semester B.E. Degree Examination

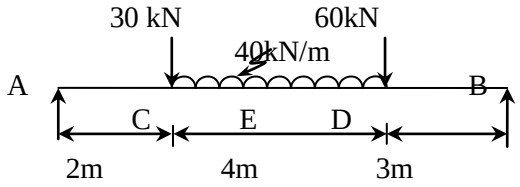
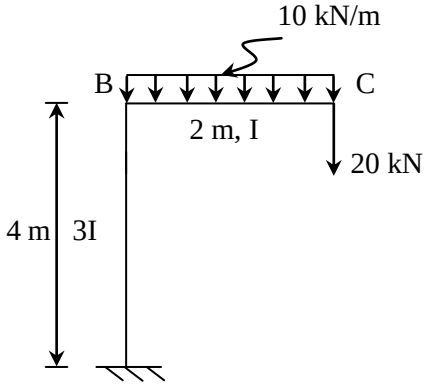
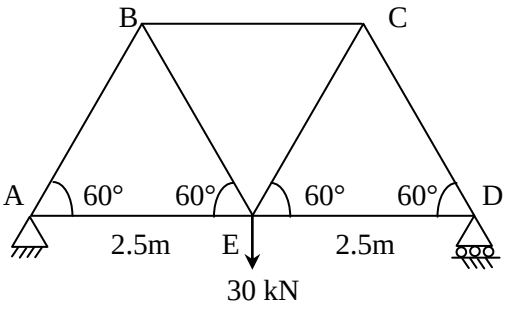
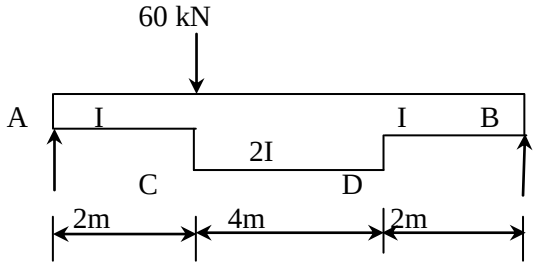
Analysis of Determinate Structures

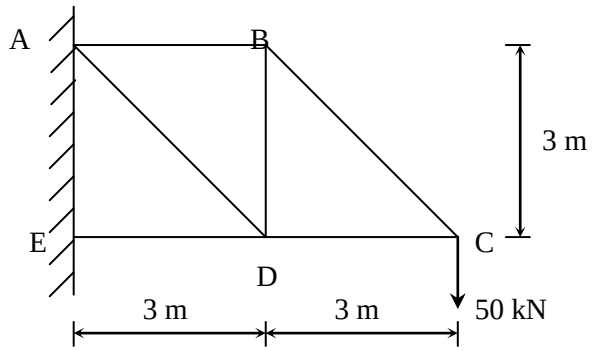
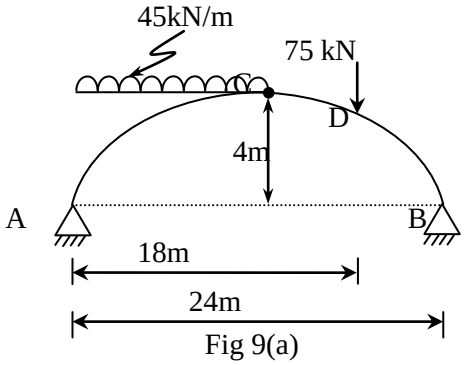
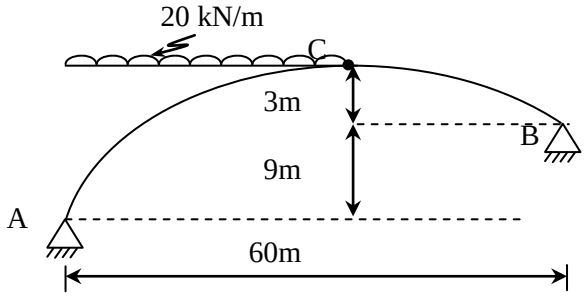
TIME: 03 Hours **Max. Marks: 100**

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.
02.
03.

		Module -1	*Bloom's Taxonomy Level	Marks
Q.01	a	Define statically determinate and indeterminate structures.	L1	2
	b	Determine the static and kinematic indeterminacy for the following structures shown in fig 1(b). Neglect axial deformations. i.  ii.  ii.  iv.  Fig 1(b)	L2	8
	c	In a simply supported girder of span 20m, determine the maximum bending moment and maximum shear force at a section 5m from left support, due to a uniformly distributed load of intensity 20 kN/m, longer than the span.	L3	10
		OR		
Q.02	a	Calculate reactions at supports, shear force and bending moment at 5m from the left support for the simply supported beam shown in fig 2(a).  fig 2(a)	L4	10
		Module-2		
Q. 03	a	A moving UDL of 20 kN/m and 8m long cross over a simply supported beam of span 20m. Determine a. Maximum +ve SF, -ve SF and BM at 6m from left support. b. Absolute maximum SF and BM anywhere on the beam.	L4	10
	b	Two point loads of 100 kN and 200 kN spaced 3m apart cross a girder of span 15m from left to right with the 100 kN load leading. Draw the influence line for shear force and bending moment and find the value of maximum shear	L4	10

		force and bending moment at a section, 6m from the left hand support. Also, find the absolute maximum moment due to the given load system.		
		OR		
Q.04	a	A train of loads shown in fig 4(a) crosses a simply supported girder of span 18m from left to right. Calculate the maximum S.F. and B.M. at section 8m away from support A  Fig 4(a)	L4	10
	b	Draw the influence line diagram for members L_1L_2, U_1L_2 and U_1U_2 of the truss shown in fig 4(b).  Fig 4(b)	L4	10
		Module-3		
Q. 05	a	Derive the Mohr's first theorem of moment area method.	L2	3
	b	Find the slope and deflection at the free end of cantilever beam shown in fig 5(b) by moment area method.  Fig 5(b)	L4	7
	c	Calculate the maximum slope and deflection for the beam shown in fig 5(c) using Conjugate beam method.  Fig 5(c)	L4	10
		OR		
Q. 06	a	Compute the slope and deflection at B and C of the cantilever beam shown in fig 6(a) by moment area method.  fig 6(a)	L4	10

	b	Find the maximum slope and deflection at C, D and E for the beam shown in fig 6(b) by Conjugate beam method.  fig 6(b)	L4	10
		Module-4		
Q. 07	a	Derive the expression for strain energy stored in a member due to bending.	L2	3
	b	Find the vertical deflection at point C for the frame shown in fig 7(b) using Castigliano's method. Assume E = $2x10^5$ N/mm^2 and I = $2x10^8$ mm^4.  Fig 7(b)	L4	7
	c	Determine the vertical deflection of joint E for the Warren truss shown in fig 7(c) by unit load method. Take A = 645 mm^2 and E = 200 kN/mm^2 for all the members.  fig 7(c)	L4	10
		OR		
Q. 08	a	Find the deflection under the concentrated load, using Castigliano's method, for the beam shown in fig 8(a). Assume E = 200 kN/mm^2, I = 1 x 10^7 mm^4.  fig 8(a)	L4	10
	b	Find the vertical deflection at C for the cantilever truss shown in fig 8(b) using strain energy method. Assume the cross sectional area of each member as 1000 mm^2 and E = 200 kN/mm^2.	L4	10

		 fig 8(b)		
		Module-5		
Q. 09	a	Determine the bending moment, normal thrust and radial shear at a section 6m from the left support for a three hinged parabolic arch shown in fig 9(a).  Fig 9(a)	L4	10
	b	A bridge cable is suspended from the towers 80m apart and carries a UDL of 45kN/m on the entire span, the maximum sag is 8m, calculate the maximum tension in the cable and forces transferred to the tower if the cable is supported by saddles which are stayed by wires inclined at 25^0 to the horizontal.	L4	10
		OR		
Q. 10	a	A three hinged parabolic arch of 60m span is loaded as shown in fig 10(a). Find the normal thrust and radial shear at 20m from the left hand support.  Fig 10(a)	L4	10
	b	A cable is suspended from two points A and B which are 80m apart. A is 5m below B. The lowest point on the cable is 10m below A. The cable supports a udl of intensity 20kN/m over the entire span. Compute the required diameter of the cable if the maximum stress in the cable is not to exceed 150MPa.	L4	10

*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the COs and POs to be attained by every bit of questions.