Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

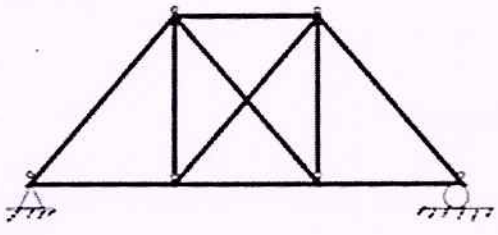
B.Tech Degree S3 (S) Examinations (FT/WP) May 2026 (2024 Scheme)

Course Code: PCCET303

Course Name: STRUCTURAL ANALYSIS - I

Max. Marks: 60 Duration: 2 hours 30 minutes

PART A

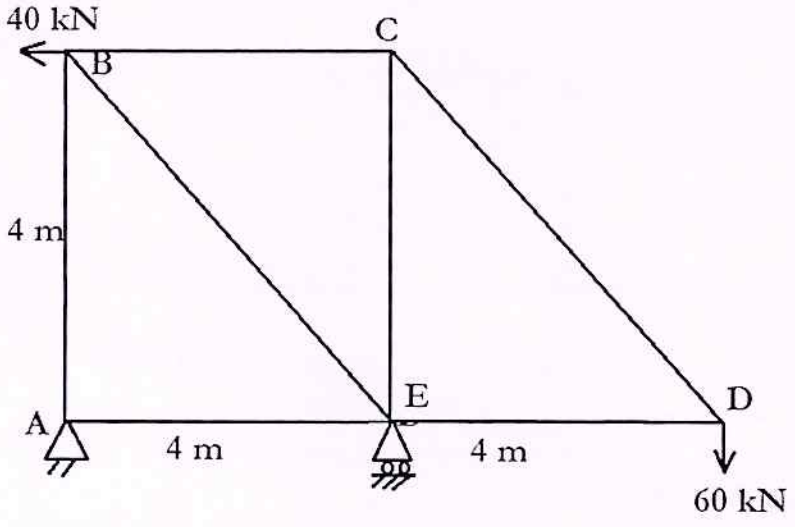
	(Answer all questions. Each question carries 3 marks)	CO	Marks
1	Explain method of joints with neat sketch	1	(3)
2	Calculate the deflection at the free end of a cantilever beam carrying a point load "W" at the free end using moment area theorem.	1	(3)
3	State Principle of virtual work and Castigliano's theorem I	2	(3)
4	Find the deflection of a simply supported beam carrying load 'W' at the centre using unit load method.	2	(3)
5	What are the characteristics of force method of structural analysis?	3	(3)
6	Find the static indeterminacy of the given truss shown in figure. 	3	(3)
7	Classify the arches based on the hinges provided in the arch. Draw neat sketches.	1	(3)
8	Define influence line diagram. List any two uses of ILD.	4	(3)

PART B

(Answer any one full question from each module, each question carries 9 marks)

Module -1

9 a) Analyse the truss using method of joints. 1 9



10 a) A suspension cable of 100m span and 10 m dip carries a uniformly distributed load of 8kN/m over the entire span. Find the vertical and horizontal forces transmitted to the support 1

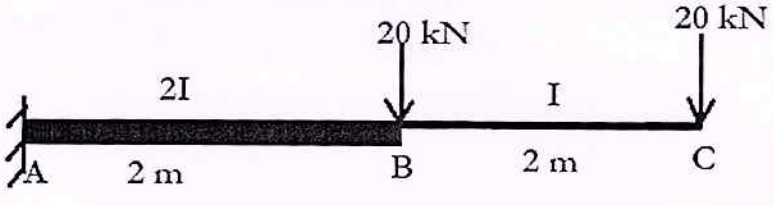
Case 1) The cable is passing over a smooth pulley

Case 2) The cable is passing over a roller on the top of a tower.

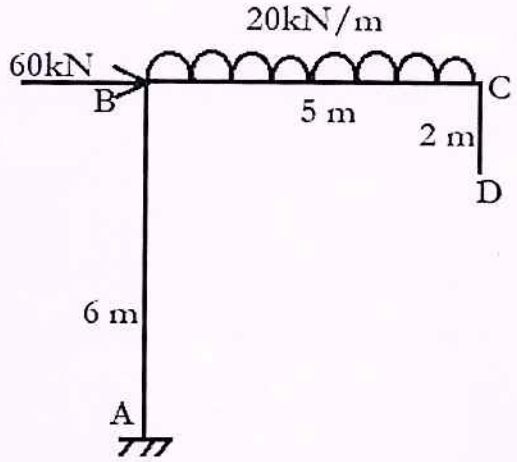
The anchor cable makes an angle 30^0 with the horizontal, and the height of the tower is 120 m. Find the moment at the base.

Module -2

11 a) Find the slope and deflection of a cantilever beam at free end loaded as shown in figure using conjugate beam method. 2

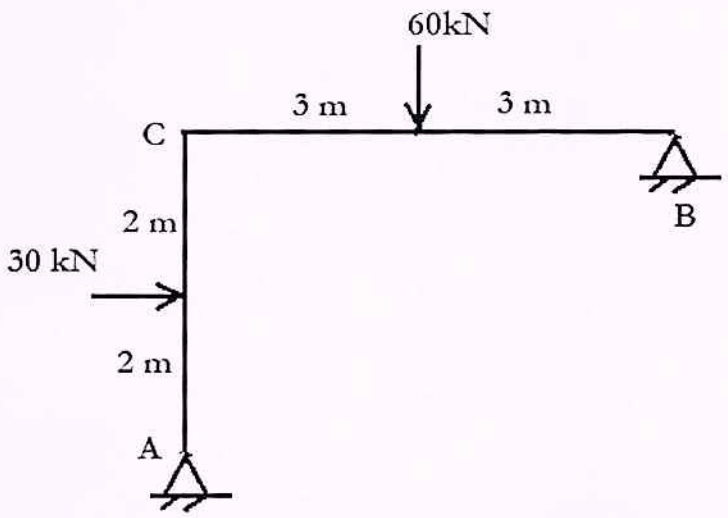


12 a) Find the vertical deflection at the free end of the frame shown in figure using unit load method. 2

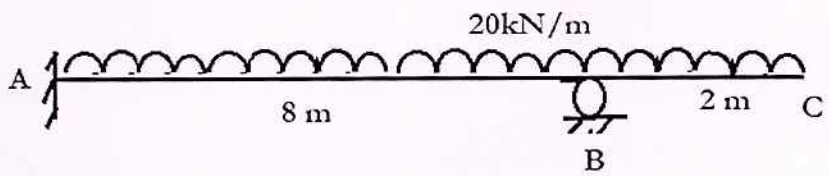


Module -3

13 a) Determine all reaction components of the frame using consistent deformation method. 3



14 a) Determine the support reaction at B using consistent deformation method. 3



Module -4

15	sa)	A three hinged circular arch hinged at the springing and crown points has a span of 40 m and a central rise of 8 m. It carries a uniformly distributed load 20 kN/m over the left half of the span together with concentrated load of 100kN at the right quarter span point. Find the reaction at the supports, normal thrust and shear at section 10 m from left support.	1	9
16	a)	Four point loads of 120, 160, 160 and 80 kN spaced equally apart at a distance of 2 m between consecutive loads, roll over a girder of 25 metres span, from left to right with 80 kN load leading. Calculate the maximum BM at 8 m from the left end.	4	9

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