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Question Paper Code	13625

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Sixth Semester

Civil Engineering

20CEPC603 - STRUCTURAL ANALYSIS II

Regulations - 2020

(If any data missing, please assume and proceed)

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	The influence line for the reaction at a support of a simply supported beam is: (a) A straight line with a slope equal to 1 (b) A parabola (c) A straight line with a slope equal to the span (d) Horizontal line	1	K1	CO1
2.	The influence line for shear force at a section of a simply supported beam is: (a) A horizontal line (b) A triangular line with a discontinuity at the section (c) A straight line with constant slope (d) Parabolic	1	K2	CO1
3.	The influence line for axial force in a member of a pin-jointed truss depends on: (a) The geometry of the truss (b) The location of the load (c) Both A and B (d) Neither A nor B	1	K1	CO2
4.	In a pin-jointed frame, the influence line for a member force is zero when: (a) The load acts perpendicular to the member (b) The load is at the member itself (c)The load does not pass through the member's line of action (d) None of the above	1	K1	CO2
5.	Muller-Breslau's principle is used to: (a) Draw influence lines for determinate structures (b) Draw influence lines for indeterminate structures (c)Analyze deflection in beams (d) Calculate bending stresses	1	K1	CO3
6.	In a propped cantilever beam, the influence line for the reaction at the fixed support is: (a) Triangular (b) Parabolic C) Linear with discontinuity (d) A straight line	1	K2	CO3
7.	The temperature effects in an arch are minimized when: (a) The arch is circular (b) The arch is hinged (c)The arch is parabolic (d) The arch is fixed	1	K1	CO4
8.	Which of the following is a statically determinate arch? (a) Two-hinged arch (b) Fixed arch (c) Three-hinged arch (d) Semi-circular arch	1	K1	CO4
9.	The length of a cable depends on: (a) The horizontal span and sag (b) The material of the cable (c) Only the sag (d) The type of load applied	1	K1	CO5
10.	A plastic hinge forms when: (a) The entire cross-section yields (b) The section is in its elastic range (c) The deflection is zero (d) None of the above	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

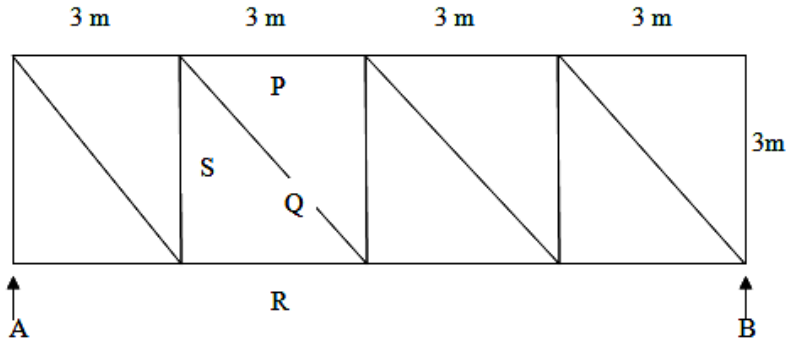
Answer ALL Questions

11.	List the uses of Influence Lines.	2	K1	CO1
12.	Draw ILD for reaction at A in a simply supported beam AB of span 'l'.	2	K2	CO1
13.	Define Absolute Maximum Bending moment.	2	K1	CO2
14.	How do you locate the load for finding Absolute Maximum Bending moment?	2	K2	CO2
15.	Illustrate the principle used to draw influence lines of statically indeterminate beams.	2	K2	CO3
16.	List out the uses of Influence line diagram.	2	K1	CO3
17.	Write the difference between circular arch and parabolic arch.	2	K2	CO4
18.	Give the equation for temperature effect in arches.	2	K1	CO4
19.	Why stiffening girders are necessary in the suspension bridges?	2	K2	CO5
20.	A cable of span 100 m and central dip 16m carries an udl of 16kN/m all along its span. Find the cable Tension.	2	K2	CO5
21.	Define load factor.	2	K1	CO6
22.	List out the shape factors for rectangular, triangular, circular and diamond sections.	2	K1	CO6

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	A single rolling load of 100kN moves on a girder of span 20m. (a) Construct the influence line for (i) shear force (ii) bending moment for a section 5m from left support. (b) Construct the influence line for points at which the absolute maximum shears and absolute maximum bending moment develop. Determine the absolute maximum values.	11	K3	CO1
		OR			
	b)	A girder having a span of 18m is simply supported at the ends. It is traversed by a train of loads 100kN, 200kN, 100kN and 50kN with 3m, 2m and 3m spacing respectively and 50kN load is leading. Find the maximum Bending moment (i) under 200kN load and (ii) 50kN load.	11	K3	CO1
24.	a)	For a through type N girder, draw the influence line for force in any four members. The bridge has 6 bays of 3m each.	11	K3	CO2
		OR			
	b)	Draw ILD for forces in P and Q	11	K3	CO2



25.	a)	Using Muller Breslau principle, draw the IL for bending moment at the mid-point D of the span BC of the continuous beam ABC, hinged at A with roller at B and C. AB = BC = 6m.	11	K3	CO3
		OR			

	b)	Draw the IL for RB and for the support moment MA at A for the propped cantilever AB of length 10m. Compute the IL ordinates at every 2 m interval.	*11*	*K3*	*CO3*
26.	a)	A symmetrical parabolic 3 hinged arch of span 40m and rise 8m carries an udl of 30kN/m over the left half of the span. Find the bending moment, normal thrust and radial shear at D, 10m from the left support.	*11*	*K3*	*CO4*
		OR			
	b)	A three hinged parabolic arch of span 20 m and rise 4m carries a UDL of 20 kN/m over the left half of the span. Determine the maximum bending moment.	*11*	*K3*	*CO4*
27.	a)	A suspension cable of span 100m is subjected at the same level. It is subjected to a udl of 28.5kN/m. If the maximum tension in the cable is limited to 4000kN. Calculate the minimum central dip needed.	*11*	*K3*	*CO5*
		OR			
	b)	A suspension bridge has a span of 60m with a 15m wide runway. It is subjected to a load 35KN/m including self-weight. The bridge is supported by a pair of cables having a central dip of 6m.Find the cross sectional area of the cable necessary, if the maximum permissible stress in the cable material is not to exceed 650 MPa.	*11*	*K3*	*CO5*
28.	a)	A Simply supported beam of span 5m is to be designed for a udl of 25 kN/m. Design a suitable I section using plastic theory, Assuming yield stress in steel as fy = 250 N/mm^2.	*11*	*K3*	*CO6*
		OR			
	b)	Calculate the shape factor for a Diamond section of breadth ‘b’ and depth‘d’.	*11*	*K3*	*CO6*