[M19 ST 1108]

I M. Tech I Semester (R19) Regular Examinations
ADVANCED REINFORCED CONCRETE DESIGN
(STRUCTURAL ENGINEERING)
MODEL QUESTION PAPER

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**
All questions carry equal marks
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			CO	KL	M
		UNIT - I			
1.	a).	Analyse and Check the suitability to reduce the maximum moment at support B by 30% and redistribute to the spans of a T-beam ABC which is continus over two spans of 8m each and it carries a factored UDL of 75 kN/m. Assume M25 concrete and Fe415 steel are used. The T-beam flange width = 1000 mm, web thickness = 300 mm, slab thickness = 150 mm, Overall depth D= 820 mm and effective depth d= 770 mm. Also design the sections for maximum positive and negative moments.	1	K4	15
		OR			
2.	a).	Compute the values at salient points on the stress-strain curve of concrete in bending of an unconfined concrete member if cylindrical strength of concrete used is f'_c=25 N/mm^2. If such a concrete is confined in a section of (b x D) 300 x 500 mm with a clear cover of 50mm with 10mm stirrups at 100 mm c/c, compute the stress-strain curve for inelastic analysis of the structure. Use the relation f'_c=0.8 f_{ck}	1	K4	15
		UNIT - II			
3.	a).	Analyse and design a slab isosceles in shape using yield line analysis by equilibrium method. The slab sides are 4m, 4m and 3m and simply supported in 4m sides with free end on 3m. The slab carries an imposed load of 2 kN/m^2 and finishes 1.5 kN/m^2. Use M20 concrete and Fe 415 grade steel.	2	K4	15
		OR			
4.	a).	Analyse and design a square slab of size 4m x 4m which is continus on all fr sides, using yield line analysis by Virtual work method. The slab carries an imposed load of 3 kN/m^2 and finishes 1.0 kN/m^2. Use M25 concrete and Fe 415 grade steel.	2	K4	15
		UNIT - III			
5.	a).	Analyse& Design a flat plate supported on columns spaced at 6000m in both directions. The size of columns is 500 x 500mm and the imposed load on panel is 4.4 kN/m^2; Floor height is 4m; Floor finish is 1.4kN/m^2. Assume Fe 415 grade steel & M25 concrete. Exposure is severe	3	K5	15
		OR			

6.		Analyse& Design a flat plate with suitable column head supported on circular columns spaced at 7200m in both directions. Diameter of columns is 600mm and the imposed load on panel is 4kN/m^2; Floor height is 3.6m; Floor finish is 1 kN/m^2. Assume Fe 415 steel & M35 concrete. Exposure is mild	3	K5	15
		UNIT - IV			
7.	a).	Compute the thickness and reinforcements for a simply-supported transfer girder of length 6000mm loaded from two columns at 1.50m from each end with load 5kN. The total depth of beam is 3600mm and the width of supports is 500. Assume Fe 415 grade steel & M25 concrete			15
		OR			
8.	a).	Analyse& Design a deep beam with an opening for the following data. Span = 5000mm; Girder subjected to two point loads of each 4kN acting at 1.25m from supports; Total depth of beam is 3000mm; Width of supports is 450mm; Assume Fe 415 grade steel & M20 concrete. Width and depth of opening is 150 x 250mm; Location of bottom of opening from bottom of beam is 1800mm.	4	K4	15
		UNIT - V			
9.	a).	Compute the maximum factored axial load carrying capacity of the slender column using additional moment method, given that the column is braced against sideway and has an unsupported height of 7.00m. The column cross section is 500 x 300 mm with a clear cover of 40mm and reinforced with three 25mm dia bars on each longer face and 8mm lateral ties. Assume effective length ratios $k_x = k_y = 0.85$. Use M25 concrete and Fe 415 steel.	4	K4	15
		OR			
10.	a).	Design the longitudinal reinforcement for a braced column, 300 x 400 mm, subjected to a factored load of 1500 kN and factored moments of 60 kNm and 40 kNm w.r.t. major and minor axis respectively at the top end. Assume that the is bent in dble curvature (in both directions) with the moments at the bottom end are equal to 50% of the corresponding moments at top. Assume an unsupported height of 7.00m and an effective length ratio of 0.85 in both directions. Use M30 concrete and Fe 415 steel.	5	K5	15

CO: Crse tcome
KL: Knowledge Level
M: Marks