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	Question Paper Code			13	326	1										
B.E. / B.Tech DEGREE EXAMINATIONS, NOV / DEC 2024																
Seventh Semester																

Civil Engineering

20CEPC702 – ADVANCED REINFORCED CONCRETE STRUCTURES

Regulations - 2020

(Use of IS 456-2000, IS 3370 is permitted)

PART - A (MCQ) (20 × 1 = 20 Marks) Answer ALL Questions Morks $\frac{F_{cred}}{Ecred}$ colspan="2">Colspan="2">Colspan="2">Morks $\frac{F_{cred}}{Ecred}$ Colspan="2">Colspan="2">Colspan="2">Morks $\frac{F_{cred}}{Ecred}$ Colspan="2">Colspan="2"Colspan	Du	Iration: 3 Hours Max	. Mai	rks: 1	00				
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slabs.(a) triangular and circular(b) rectangular and square(c) hexagonal and elliptical(d) polygonal and trapezoidal	16.	The fan pattern of yield lines is mainly used to determine the collapse loads of	1	K1	<i>CO5</i>				
 (a) triangular and circular (b) rectangular and square (c) hexagonal and elliptical (d) polygonal and trapezoidal 		slabs.							
(c) hexagonal and elliptical (d) polygonal and trapezoidal		(a) triangular and circular (b) rectangular and square							
(c) nonagonar and emphoni		(c) hexagonal and elliptical (d) polygonal and trapezoidal							

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17.	 Which of the following is not a benefit of using a shear wall system in a building? (a) Increases seismic resistance (b) Reduces building sway (c) Reduces foundation loads (d) Increases floor area 					
18.	(c) Reduces foundation foads (d) increases floor area What is the maximum allowable deflection for a shear wall? (a) $L/500$ (b) $L/400$ (c) $L/300$ (d) $L/200$	1	K1	<i>CO</i> 6		
19.	(a) Coupled shear wall system (c) Diagonal shear wall system (d) L/200 (e) L/300 (e) L/300 (e) L/300 (f) L/200 (d)	1	K1	C06		
20.	What is the recommended spacing of vertical reinforcement bars in a shear wall?(a)150 mm(b) 200 mm(c) 300 mm(d) 250 mm	1	K1	СО6		
	PART - B $(10 \times 2 = 20 \text{ Marks})$ Answer ALL Questions					
21.	What are the stability conditions should be checked for the retaining wall?	2	K1	COI		
22.	What is retaining wall?	2	K1	COI		
23.	Name the three factors that must be considered while designing a RCC tank.	2	K1	<i>CO2</i>		
24.	What are the methods available for analysis of circular water tank?	2	K1	<i>CO2</i>		
25.	Summarize under what circumstances flat slab construction is preferred.	2	K2	СО3		
26.	What is the load acting on stair cases?	2	K1	СО3		
27.	27. Sketch the cross section of a box culvert and indicate the components.					
28.	28. List the components of a bridge.					
29.	29. Draw the typical yield line pattern in reinforced concrete slab.					
30.	30. Define shear wall.					
	PART - C (6 × 10 = 60 Marks)					
	Answer ALL Questions					
31.	 a) Design the stem of the Cantilever retaining wall to retain 5m of horizontal backfill. The Density of the soil is 17 KN/m³ Safe Bearing Capacity of the Soil=165 KN/m² Angle of internal Friction of Soil=30°. The Coefficient of friction between base slab and concrete is 0.50. Factor safety against sliding and over turning is 1.45 Use M20 concrete & Fe415 HYSD bars. Check the stability. 	10	К3	<i>CO1</i>		
	b) Analyze the different types of retaining walls their forces with neat sketches.	10	K3	CO1		
32.	a) Design a circular tank with a fixed base with a capacity of 3 lakh litres. The depth of water is 3.5m and free board is 150mm. Use M20 grade concrete. Permissible stress in concrete is 1.0 N/mm ² and steel is 100 N/mm ² . Sketch the reinforcement details of tank wall.	10	К3	<i>CO2</i>		
	OR					
	b) A reinforced concrete water tank resting on ground is 6m x 2m with a maximum depth of 2.5m. Using M20 concrete and grade I Steel, Design the tank walls.	10	К3	CO2		
33.	a) Design an Interior Panel of a flat slab of size 5m x 5m without providing drop and column head. Size of column is 500 x 500 mm and the live load on the panel is 4 kN/m ² . Take floor finishing load as 1 kN/m ² . Use M20 concrete and Fe ₄₁₅ steel. OR	10	K3	<i>CO3</i>		
	b) Design a dog legged stair case for a room of 4.5m wide the height between floors is 4m.Use M 20 grade of concrete & Fe415 grade of steel. Assume Relavent Data.	10	К3	CO3		

34.	a)	Explain briefly about loads considered in the design of concrete road bridge with neat sketches.	10	K2	<i>CO4</i>
		OR			
	b)	Explain in detail about the design principles of box culvert.	10	K2	<i>CO4</i>
35.	a)	Derive the expression for calculating the ultimate moment (virtual work method) for simply supported square slab.	10	K3	CO5
		OR			
	b)	A right angled triangle simply supported slab the adjacent edges AB and BC. The side AB=4M and BC=3m and CA=5m .The slab is isotropically reinforced with 10 mm diameter at 100mm c/c at an effective depth of 120mm and D=150mm.Use M20 grade of concrete and Fe415 HYSD bars. Determine permissible live load by using yield line theory.	10	K3	<i>CO5</i>
36.	a)	Analyze in detail about general dimensions of rectangular shear walls, vertical and horizontal reinforcements and strength Requirements of shear wall. OR	10	K3	<i>CO</i> 6
	b)	A bar bell type shear wall with central part 3500×100 mm and two 300×300 mm strong bands at each end is supported on a footing 8m x 4m, which rests on soil whose modulus is 25000 kN/m ³ . Determine the lateral stiffness of the wall. Assume	10	К3	<i>CO</i> 6

fck = 20 and height of the wall as 12m.