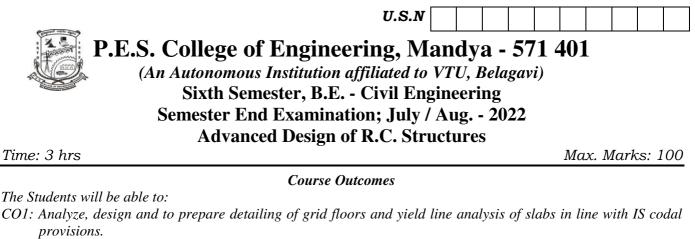
P18CV63



Page No... 1

CO2: Analyze, design and to prepare detailing of flat slabs in line with IS codal provisions.

CO3: Analyze, design and to prepare detailing of overhead circular water tanks in line with IS codal provisions.

CO4: Distinguish between Janssen's theory and Airy's theory, application of the theory in the Design of silos and analysis of shell roofs in line with IS codal provisions.

<u>Note:</u> I) PART - A is compulsory. Two marks for each question.

II) PART - B: Answer *One* full question in each unit for a Maximum of 23 marks from each unit. *III* Use of IS456:2000 is permitted.

Q. No.	Questions	Marks	BLs	COs	POs
τ.	I: PART - A	08	т 1	CO1	124012
I a.	What is grid floor?	2	L1		1,3,4, 8,12
b.	With respect to flat slabs, define; Column strip and ii) Panel.	2	L1	CO2	1,3,4, 8,12
c.	With a neat sketch, depict the structural elements of an elevated water tank.	2	L1	CO3	1,3,4, 8,12
d.	For a storage structure to be classified as a silo, what is the criteria				
	to be satisfied with respect to h, b, ϕ , where h = height of structures	2	L1	CO4	1,3,4, 8,12
	b = breadth of structure, ϕ = angle of repose.				
	II : PART - B	92			
	UNIT - I	23			
1 a.	A RC grid floor is to be designed to cover floor area of				
	$12\ m\times 18\ m.$ The spacing of the ribs in mutually perpendicular				
	direction is 1.5 m c/c, live load on floor is 3 kN/m ² . Adopt M20				
	grade concrete and Fe415 grade steel. Assume ends are simply	23	L4	CO1	1,3,4, 8,12
	supported. Analyze the grid floor by Rankine's Grashoff method				
	and design suitable reinforcement in the grid floor.				
	Sketch the details.				
b.	List any four characteristic features of yield lines and hence				
	design a rectangular slab of size 4 m x 6 m which is simply				
	supported along the edges and has to carry a service line load	22	тл	CO1	124013
	of 4 kN/m ² . Assume coefficient of orthotropy, $\mu = 0.75$ m.	23	L4	CUI	1,3,4, 8,12
	Use M20 grade concrete and Fe415 grade steel. The design is				
	restricted to bending only.				
	Contd 3				

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P1	8 C	V63	
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Page No... 2

	UNIT - II	23	- <i>cugo</i> <u>-</u>
2 a.	Design the interior of a flat slab for a ware house to suit the		
	following date:		
	Size of warehouse = $24 \text{ m} \times 24 \text{ m}$ divided into panels of $6 \text{ m} \times 6 \text{ m}$	23	L4 CO2 1,3,4, 8,12
	loading class = 5 kN/m^2 . Materials – M20 grade concrete and	23	L+ CO2 1,5,4, 0,12
	Fe415 grade steel. Adopt diameter of column head = $D = 1.5$ m,		
	slab drop = 200 mm. Sketch reinforcement details.		
b.	Design an interior panel of a flat slab with panel size $5 \text{ m} \times 5 \text{ m}$		
	supported by columns of size 500 x 500 mm. Provide suitable	23	L4 CO2 1,3,4, 8,12
	drop. Consider line load as 4 kN/m ² . Use M20 concrete and Fe415	20	
	steel. Sketch the reinforcement details.		
	UNIT - III	23	
3 a.	A circular flat bottom elevated water tank is to designed having a		
	diameter of 9 m and total height = 3.8 m which is to be supported		
	by ring beam. The ring beam is in turn supported by six columns		
	which are equally spaced. Using M20 grade concrete and Fe415	23	L4 CO3 1,3,4, 8,12
	grade steel, design;		
	i) Top dome ii) Top Ring beam iii) Cylindrical wall		
1	Sketch the details.		
b.	A circular elevated water tank needs to be designed to store 200 m^3		
	of water. The top of the tank shall be coved with a dome and		
	bottom shall be flat. Using M25 grade concrete and Fe415	23	L4 CO3 1,3,4, 8,12
	grade steel, design;i) Top domeii) Top ring beam		
	iii) Cylindrical wall iv) Bottom slab		
	UNIT - IV	23	
4 a.	i) Explain the principal involved in calculation of pressure intensity	20	
i u.	in silos by H. Janssen's and W. Airy's theories.	23	L4 CO4 1,3,4, 8,12
	ii) Differentiate between bunkess and silos.		
b.	A cylindrical silo has an internal diameter of 6 m and 20 m deep		
	(cylindrical portion) with a conical hopper bottom. The material		
	stored is wheat with a density of 8 kN/m ³ . Design;		
	i) Side walls ii) Hopper Bottom	23	L4 CO4 1,3,4, 8,12
	Sketch the reinforcements. Adopt M20 grade concrete, Fe415		
	grade steel and Janssen's theory for pressure calculations.		

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