Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem Examination May-2024

CE3ET02 Advanced Design of RCC Structures

Programme: B.Tech. Branch/Specialisation: CE

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.
All Is code related ADV RCC Permitted.

Q.1 i. Portal frame method is more suitable for building having- **1**
(a) High elevation (b) Low elevation
(c) Medium elevation (d) Elevation does not matter

ii. Which of the following supports are not used in portals? **1**
(a) Fixed (b) Pin (c) Roller (d) None of these

iii. Width of cantilever retaining wall is- **1**
(a) 0.48H to 0.56H (b) 0.6H to0.9H
(c) 0.9 H to 1.1 H (d) 1.1H to 1.3 H

iv. In a cantilever retaining wall of height h the horizontal pressure of earth will act at a distance of- **1**
(a) h/3 from the top (b) h/3 from the base
(c) h/2 from the base (d) h/4 from the base

v. The modular ratio m of a concrete whose permissible compressive stress is C, may be obtained from the equation. **1**
(a) 280/3c (b) 300/3c (c) 380/3c (d) 480/4c

vi. According to IS: 3370 (Part-2) permissible direct tensile stress in M25 grade of concrete is _____. **1**
(a) 1.3 (b) 1.5 (c) 1.7 (d) 1.9

vii. Which theory is used for bunker? **1**
(a) Airy's theory (b) Coulomb theory
(c) Janseen theory (d) Mohr theory

viii. Formula for hoop tension is- **1**
(a) PD/6t (b) PD/4t (c) PD/2t (d) PD/8t

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	ix.	How many types of losses in prestress are observed in pretensioned member? (a) 7 (b) 8 (c) 4 (d) 2		**1**
	x.	The sudden changes in loss of prestress may be due to _____. (a) Humidity (b) Temperature (c) Frost (d) Steel		**1**
Q.2	i.	Write down assumptions of Portal frame method?		**4**
	ii.	A portal frame with end hinged is to be analysed for the following data: Spacing of portal frame = 4 m Height of columns = 4.5 Distance between column centre = 9 m Live load on the roof = 1.5 kN/m^2 RCC slab is provided over the portal frame. Analyse the portal frame.		**6**
OR	iii.	Explain the step wise procedure for analysis of a frame by portal frame method.		**6**
Q.3	i.	Define retaining wall.		**2**
	ii.	Design a cantilever retaining wall to retain an earth embankment with horizontal top 3.5 m above ground level. Density of earth =18 kN/m^3. Angle of internal friction =30^0. SBC of soil is 200 kN/m^2. Take coefficient of friction between soil and concrete =0.5. Adopt M20 grade concrete and Fe-415 steel.		**8**
OR	iii.	Explain the step wise procedure for Counter Fort Retaining wall.		**8**
Q.4	i.	Define water tank. Explain the types of water tank.		**3**
	ii.	Design a wall of circular water tank of 200 kl capacity having rigid wall and base connection. Maximum depth of water is limited to 3.2 m. Take M25 and Fe415.		**7**
OR	iii.	Design a circular water tank with flexible base resting on the ground to store 50,000 litres of water. The depth of tank may be kept 4 m. Take M25 and Fe415.		**7**
Q.5	i.	Write differences between bunker and silo.		**3**
	ii.	A silo with internal diameter 5.5 m. height of cylindrical portion 18 m and central opening with 0.5 m is to be built to store wheat. Design the cylindrical wall. Take M20 and Fe415.		**7**

OR	iii.	Design a bunker to store 330 kN of coal with the following data- Unit weight of coal =8400 N/m^3 Angle of repose =30^0 Coefficient of friction between coal and concrete =0.45		**7**
Q.6		Attempt any two:		
	i.	Explain the prestressed concrete. Write its advantage and disadvantage.		**5**
	ii.	A prestressed rectangular beam of size 100 mm wide and 250 mm deep is pre tensioned with 6 bars of 7 mm at an eccentricity of 95 mm. Estimate the total loss of prestressing force if initial prestress in the wire is 1200 N/mm^2. Modulus of elasticity of steel E_s =2.1*x10^5 N/mm^2 Modulus of elasticity of concrete E_c =35000 N/mm^2 Creep coefficient =1.6		**5**
	iii.	Explain the type of losses in prestressed concrete.		**5**

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Marking Scheme

Advanced Design of RCC Structures (T) - CE3ET02 (T)

Q.1	i)	Portal frame method is more suitable for building having B) Low elevation	**1**
	ii)	Which of the following supports are not used in portals? C) Roller	**1**
	iii)	Width of is cantilever retaining wall A) 0.48H to 0.56H	**1**
	iv)	In a cantilever retaining wall of height h the horizontal pressure of earth will act at a distance of B) h/3 from the base	**1**
	v)	The modular ratio m of a concrete whose permissible compressive stress is C, may be obtained from the equation. A) 280/3c	**1**
	vi)	According to IS: 3370 (Part-2) permissible direct tensile stress in M25 grade of concrete. A)1.3	**1**
	vii)	Which theory is used for bunker A) Airy's theory	**1**
	viii)	Formula for hoop tension is C)PD/2t	**1**
	ix)	How many types of losses in prestress are observed in pretensioned member? C) 4	**1**
	x)	The sudden changes in loss of prestress may be due to _____ B) Temperature	**1**

Q.2	i.	Assumptions of Portal frame method?	2*2 Marks	**4**
	ii.	Dimension of beam-	1 Marks	**6**
		Dimension of column-	1 Marks	
		Load calculation -	1 Marks	
		Distribution factor-	1 Marks	
		Moment distribution calculation-	1 Marks	
		Shear force calculation-	1 Marks	
OR	iii.	Each step give 1.5 marks-1.5*4=	6 Marks	**6**
Q.3	i.	Define Retaining wall?	2 Marks	**2**
	ii.	Determine minimum depth of foundation-	2 Marks	**8**
		Determine dimension of retaining wall-	2 Marks	
		Check for stability-	2 Marks	
		Pressure under base slab-	2 Marks	
OR	iii.	Each steps give 2marks-	2*4marks = 8 Marks	**8**
Q.4	i.	Define Water Tank?	1 Marks	**3**
		Explain the types of water tank?	2 Marks	
	ii.	Determination of diameter-	1 Marks	**7**
		Max. hoop tension-	2 Marks	
		Find thickness of wall-	2 Marks	
		Design of base slab-	2 Marks	
OR	iii.	Determination of diameter-	1mark	**7**
		Max. hoop tension-	2marks	
		Find thickness of wall-	2marks	
		Design of base slab-	2marks	
Q.5	i.	Difference between bunker and silo?1 mark each	1mark*3=3marks	**3**
	ii.	Hydraulic mean radius-	1Marks	**7**
		Horizontal pressure-	2Marks	
		Hoop tension-	2Marks	
		Design of hooper bottom-	2 Marks	
OR	iii.	Hydraulic mean radius-	1 Marks	**7**
		Horizontal pressure-	2 Marks	
		Hoop tension-	2 Marks	
		Design of hooper bottom-	2 Marks	
Q.6		Attempt Any two		
	i.	Explain the Prestressed concrete.	1 Mark	**5**
		Advantage	2 Marks	
		Disadvantage	2 Marks	
	ii.	Loss of prestress in steel=290N/MM^2	2.5 Marks	**5**
		Total loss of prestressing force=67166N	2.5 Marks	
	iii.	Each loss 1 mark	5*1= 5Marks	**5**

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