

**Subject Code: XXXXX**

**Roll No:**

--	--	--	--	--	--	--	--	--	--

**BTECH**  
**(SEM-7) ADVANCED CONCRETE DESIGN 2021-22**

**TIME:3 HOUR**

**Total Marks: 100**

**Instruction:** Attempt the questions as per the given instructions. Assume missing data suitably.

**SECTION - A**

Attempt *All Parts* in Brief

**2\*10 = 20**

<b>Q1</b>	<b>Questions</b>	<b>Marks</b>
(a)	Define liquid retaining structures.	2
(b)	What is approximate method for design of tank ?	2
(c)	Define intze tanks.	2
(d)	Define top dome for overhead tanks.	2
(e)	What is prestressing ?	2
(f)	Define degree of prestressing.	2
(g)	What are ultimate tensile strength ?	2
(h)	Define kern distance.	2
(i)	Define deep beams.	2
(j)	Where corbel are used ?	2

## SECTION - B

Attempt *Any Three* of the following

**3\*10 = 30**

Q2	Questions	Marks
(a)	Find out the earth pressure on tank when wall with moist back fill when the tank is empty and underground.	10
(b)	Analyze the overhead tanks for wind forces.	10
(c)	Write the advantages of prestressed concrete over reinforced concrete.	10
(d)	In a post tensioned beam the cable is subjected to 1150 N/mm <sup>2</sup> . If the slip at the jacking end is found to be 3.50 mm <sup>2</sup> . Find the percentage loss of stress due to this case if the beam is 20 m long.	10
(e)	What situation when deep beams are used? And write empirical expressions for lever arm (z).	10

## SECTION - C

Attempt *Any One* of the following

**5\*10 = 50**

Q3	Questions	Marks
(a)	A clarifier tank of diameter 35 m has walls 5.25 m tall above its base slab. Using M25 concrete and Fe 415 steel design the tank.	10
(b)	Find the active earth pressure for the tank if back fill is saturated sandy soil.	10
Q4	Questions	Marks
(a)	Find the bending moment for the base slab of tank situated above ground level.	10
(b)	A reinforced concrete water tank is 6 m x 3 m with a maximum depth of 2.5 m, 150 mm x 150 mm splays are provided at the junction of walls and base slab. The tank is supported on brick masonry walls all round. Design the tank use M20 concrete and mild steel reinforcement.	10
Q5	Questions	Marks
(a)	Write the basic concepts of prestressed concrete.	10
(b)	A rectangular concrete beam 300 mm x 500 mm with a span of 7.5 m is prestressed by a straight cable carrying an effective prestressing force of 400 kN, located at an eccentricity of 50 mm. If the beam supports a live load of 2.5 kN/m, calculate the resultant stresses at the central cross - section of the beam.	10
Q6	Questions	Marks
(a)	Write the short notes on following: i. Loss due to shrinkage of concrete.	10

	ii. Loss due to friction for curvature effect.	
(b)	A pretensioned concrete beam , 150 mm wide and 300 mm deep, is prestressed by straight wires carrying a initial force of 150 kN at an eccentricity of 50 mm. The values $E_s$ and $E_c$ are 210 kN/m <sup>2</sup> and 35 kN/m <sup>2</sup> respectively. Estimate the percentage loss of stress in steel due to elastic deformation of concrete if the area of steel wires is 188 mm <sup>2</sup> .	10
<b>Q7</b>	<b>Questions</b>	<b>Marks</b>
(a)	A corbel attached to a 250 mm x 250 mm RCC column, carries a factored load of 400 kN at a distance of 170 mm from the face of column. Design the corbel using M25 concrete.	10
(b)	Design a deep beam 300 mm wide and 4 m deep, simply supported over a span of 6 m. The beam carries a live load of 160 kN/m at the service state and is supported on walls of 600 mm thick on each end. Use M20 concrete and Fe415 steel having permissible tensile stress of 230 N/mm <sup>2</sup> .	10