Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– I (New course)• REMEDIAL EXAMINATION – SUMMER 2015

Subject Code: 2712008 **Date:14/05/2015**

Subject Name: Advanced Design of Concrete Structures

Time: 10:30 am to 1:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Use of M20 grade of concrete and Fe415 is permitted, until otherwise stated.**
5. **Draw neat and clean figures with pencil only.**
6. **Use of IS 456, IS 1893, IS 875 Part I, II and III, IS 13920, IS 3370 and SP 16 are permitted.**

Q.1		A circular water tank has outer cylindrical wall 15m diameter, 4m high, supporting shaft 2.5m diameter. Design the top dome and top ring beam. Use M30 concrete grade.	**14**
Q.2	**(a)**	The supporting shaft an Intze water tank is 3m internal diameter and 250 mm thick. Design the reinforcement in the shaft for combination of working axial load of 5000 kN & working bending moment 950 kNm for dead & wind load combination.	**07**
	(b)	A folded plate floor has all plates making an angle of 42 degrees with horizontal and casted so that vertical depth of folded plate is 800mm.Design reinforcement in plate to carry live load 2.5 kN/m^2 if the plate thickness is 110 mm & simply supported span of 12m.	**07**
		OR	
	(b)	A raft foundation of total size 15 m X 15 m is provided for 12 columns with 5 m c/c spacing along each direction. Assume working load on interior column as 2500 kN & on all other columns as 1500 kN. Analyze the interior beam.	**07**
Q.3		A flat slab 185 mm thick with floor finish 1.2 kN/m^2, live load 3 kN/m^2 is supported at 5.2 m X 6.5 m c/c by columns of size 450 mm diameter, circular column heads of 650 mm depth below slab and diameter ranging from 650 mm at bottom to 1800 mm at top, no slab drops provided. Check the slab for shear and design reinforcement in column strip along long span.	**14**
		OR	
Q.3		A Grid floor system is provided for hall with overall dimensions 15 m X 18 m and provided by beams of size 160 x 1200 mm (excluding slab) provided at 3 m c/c along both directions. Assume slab thickness of 120 mm, floor finish of 1.2 kN/m^2, live load of 4.2 kN/m^2, and calculate the maximum bending moment in central beam. Use any method.	**14**
Q.4	**(a)**	Explain the serviceability criteria for reinforced concrete structure element for both beam and column.	**07**
	(b)	Explain how the analysis of bunker wall and silo wall are differing.	**07**
		OR	
Q.4		Design a bunker wall of 220 mm thick to resist moment of 50 kNm. Perform all necessary checks.	**14**

Q.5	**(a)**	A spherical dome having a span of 20m central rise of 2.5m and has thickness of 250mm, floor finish 1.5 kN/m^2. Design bottom ring beam of 350mm width and supported through out with masonry wall. Assume no live load acting in this system.	**10**
	(b)	Explain the basic difference in the design method of Grid, (1) IS method (2) Rankine Grashoff Method.	**04**

OR

Q.5	A column of size 450 mm x 850 mm carrying P_u =4500 kN, M_{ux}= 550 kNm, Muy= 140 kNm is supported by a pile cap 1600 mm thick resting on 5 piles (of 800 mm Diameter each) at 1500 mm c/c. Design the reinforcement in pile cap and calculate maximum pile load.	**14**

****