Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER I (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2712008 **Date: 18/05/2016**

Subject Name: Advanced Design of Concrete Structures

Time:02:30 pm to 05:00 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 M20 grade of concrete and Fe415 grade of steel, until otherwise stated.**
5. **Use of IS 456, IS 1893, IS 3370, IS 875 and SP 16 are permitted.**
6. **Assume unit weight of RCC 25 kN/m^3 and masonry 20 kN/m^3.**
7. **Draw neat and clean figure with pencil only.**

Q.1		Design a silo wall of 320 mm thick to resist moment of 40 kNm. Perform all necessary checks.	**14**
Q.2	**(a)**	State and explain the serviceability criteria for reinforced concrete structure element for both beam and column.	**07**
	(b)	Draw the figure for bunker with typical reinforcement detail with necessary cross sections also.	**07**
		OR	
	(b)	Design a conical roof over a 16 m diameter hall with a rise of 3 m. Assume L.L= 2.5 kN/m^2. The dome is supported on 450 mm wide continuous support on periphery.	**07**
Q.3		An interior flat slab panel is having c/c dimension of 12 x 12 m. The flat slab is rested on circular column RCC having diameter 850 mm. Design this flat slab considering the Drop and Column head. Consider L.L = 4.2 kN/m^2 and F.F=1.3 kN/m^2. Perform all necessary checks for the safety.	**14**
		OR	
Q.3		A column of size 500 mm x 700 mm carrying Pu =3000 kN, Mux= 500 kNm, Muy= 200 kNm is supported by a pile cap 1700 mm thick resting on 6 piles (of 700 mm Diameter each) at 1200 mm c/c. Design the reinforcement in pile cap and calculate maximum pile load.	**14**
Q.4		A folded plate floor has all plates making an angle of 45^0 with horizontal and casted so that vertical depth of folded plate is 1.5 m. Design reinforcement in plate to carry L.L = 3.5 kN/m^2. Assume plate thickness 140 mm and simply supported span of 12 meter. Perform all necessary checks.	**14**
		OR	
Q.4		A grid floor has 150 mm thick slab, floor finish =1.5 kN/m^2 , live load 4.1 kN/m^2 is provided for a hall with overall dimensions of 25 m x 25 m c/c with wall on outer periphery only and 5 interior beams in both direction. Assume all beams of size 380 x1500mm (including slab thickness). Calculate the bending moment, torsional moment and shear force at a beam junction of hall. Also design reinforcement in side beam of 25 m long. Use IS code method only.	**14**
Q.5		A raft foundation of total size 30 m X 30 m is provided for 16 columns with equal distance c/c along both direction and 2 m projection of slab on all sides. Assume working load on interior column 7000 kN and on all other columns 2000 kN. Analyze the periphery beam.	**14**

OR

Q.5	The supporting shaft of an Intze water tank is 3 m internal diameter and 250 mm thick. Design the reinforcement and verify all the necessary checks in the shaft for combination of working axial load of 4500 kN & working bending moment 700 kNm for dead load and wind load combination.	**14**

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