

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E Sem-II Remedial Examination December 2010****Subject code: 722002****Subject Name: ADVANCED CONCRETE STRUCTURES****Date: 20 /12 /2010****Time: 02.30 pm – 05.00 pm****Instructions:****Total Marks: 60**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of IS 456 , IS 875 , SP 16 , IS 3370 and IS 1893 are permitted

Q.1 (a) Design an interior FLAT slab panel having c/c dimension of 6 meter x 6 meter. The flat slab is rested on 500 mm x 500 mm RCC column. Consider that Drops and Column heads are provided. Consider L.L = 5 kN/m² and F.F=1.0 kN/m² . Use M20 and Fe 415. Do not check the flat slab for shear. Sketch the design output details **12**

Q.2

- (a)** Design only Spherical Dome to cover a hall of 15 meter diameter with a rise of 3 meter. The dome is supported on 300 mm wide ring beam on periphery. Consider superimposed load of 2.0 kN/m². Use M20 and Fe 415 **06**
- (b)** A folded plate floor has all plates making an angle of 60 degrees with horizontal and casted so that vertical depth of folded plate is 1.3 meter. Design reinforcement in plate to carry L.L = 2.5 kN/m². Assume plate thickness 130 mm and simply supported span of 15 meter. Use M20 and Fe 415 **06**

OR

- (b)** Design a conical roof over a 10 meter diameter hall with a rise of 2.1 meter. Assume L.L=1.5 kN/m². Use M20 and Fe 415. The dome is supported on 450 mm wide continuous support on periphery **06**

Q.3

A building of size 16 meter x 16 meter has 25 columns of size 500 mm x 500 mm , spaced at 4 meter c/c. Assume 230 mm thick brick masonry wall on periphery only and no internal walls. Consider 2.5 meter x 1.2 meter window opening in each panel and in each storey on periphery only. The building has 5 stories of 3.5 meter each. The plinth level of RCC slab and beam is at 1.0 meter above G.L and footing is provided at 1.5 meter below G.L. Consider beam size 300 mm x 600 mm in both direction and slab thickness 150mm. Consider L.L = 4 kN/m² and F.F = 1.0 kN/m². The building is located in RAJKOT. Calculate wind forces on any one internal frame using IS 875 **12**

OR

Q.3 For the data given in Q-3 above , calculate Earthquake forces on any one internal frame using IS 1893 **12**

Q.4

Design a circular water tank rested on Ground having 12 meter internal diameter and 6 meter high fixed at base and free at top. Use M20 and Fe 415 **12**

OR

Q.4 An Intze type over head water tank has following data **12**

- (1) Diameter of top dome – 15 meter
- (2) Rise of top dome – 2 meter
- (3) Diameter of cylindrical portion – 15 meter
- (4) Height of cylindrical portion – 6 meter

Using M20 and Fe 415 , Design 1. Top Dome 2. Top Ring beam 3. Cylindrical Tank wall 4. Bottom Ring Beam

- Q.5 (a)** Design a pile cap to support column load of 1200 kN. Size of column is 400 mm x 400 mm. The cap is supported on four 300 mm diameter piles spaced at 900 mm c/c. The cap projects 150 mm beyond the pile face. Use M 20 and Fe 415 **06**
- (b)** A slab beam type combined footing is required under two columns c1 & c2 which are 4.5 meter c/c and carries limit state load of 1500 kN each. Consider S.B.C of soil 200 kN/m² and width of footing 1.2 meter. The size of columns are 400 mm x 400 mm. Design combined footing using M20 and Fe 415 **06**

OR

- Q.5** A Grid Floor has slab thickness of 100 mm which carries L.L= 2.5 kN/m² and F.F=1.0 kN/m², is provided for a hall of 16 meter x 16 meter with wall on outer periphery and 3 beams of 16 meter span in either direction to form slab panel of 4 meter x 4 meter. Consider size of beam as 350 mm x 1400 mm. Design central beam of 15 meter span for reinforcement. **12**
