Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (OLD) - EXAMINATION – SUMMER 2017

Subject Code:180604 **Date:09/05/2017**

Subject Name: Structural Design II

Time:10:30 AM to 01:30 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 IS-800,IS-456,IS-3370,IS-875,SP-16 and steel table is permitted.**
5. **Consider M20 grade concrete and Fe 415 grade steel for RCC elements and structural steel fy=250 MPa if not given in the data.**

Q.1	**(a)**	A seven storey building square in plan with floor height 3 m each and 5 bays of 5 m along both the direction is to be constructed at Bhuj. Evaluate wind forces as per IS-875(III) and plot its distribution diagram along the height.	**07**
	(b)	Sketch the qualitative reinforcement detailing for aundergroundrectangular water tank.	**07**
Q.2	**(a)**	A cantilever retaining wall is to be constructed for the following requirement and data. Fix up the dimensions of various elements and provide required stability checks. (i) Height of horizontal earth fill from GL : 5.0 m (ii) Unit weight & angle of internal of soil : 18 kN/m^3, 22° (iii) Allowable Bearing Capacity of soil: 150 kN/m^2. (iv) Co-efficient of friction between concrete base and soil: 0.5	**07**
	(b)	Design stem of the cantilever retaining wall for the data of Q.2 (a) and provide the reinforcement detailing.	**07**
		OR	
	(b)	Design heel slab of the cantilever retaining wall for the data of Q.2 (a) and provide the reinforcement detailing.	**07**
Q.3	**(a)**	Prepare structural layout for G+3 storey bank building corresponding to plan shown in the fig.1.Design any one corner column or any one continuous beam of an intermediate storey and furnish reinforcement details.	**14**
		OR	
Q.3	**(a)**	An Intze water tank is to be designed for the capacity 5 lacs litre with staging height 20 m.Proportion the tank container and design (i) Top Ring Beam (ii) Cylindrical wall. Furnish the R/F detailing.	**14**
Q.4	**(a)**	Design a gantry girder for an industrial shed having plan dimension 16m X 48m.Use following data: (i) Crane capacity=250 kN (ii) Crane weight =8 kN/m (iii) Crab Weight= 30 kN (iv)Wheel base=2.0m (v) Span of gantry girder=6m(vi) Minimum hook distance from the centre of the girder is 1.0 m.	**14**
		OR	
Q.4	**(a)**	A foot over bridge is to be designed for the following requirements: (i) Type of truss-N type (ii) Span =20 m (iii) Live load=5 kN/m^2 (iv) Way width=2.5 m (v)Truss height=2.0 m.Take Dead weight of truss 1.2 kN/m.Design a cross beam and a bottom chord.	**14**

Q.5 **(a)** A simply supported plate girder for 20 m span is to be design to carry 40kN/m superimposed dead load, and central point load of 450kN. Maximum plate length available is 10 m.Design cross sectionof the girder and provide required checks as per IS code provisions. Furnish details in L/S and C/S. **14**

OR

Q.5 **(a)** An industrial building roof is to be constructed using howe type trusses of 18 m placed at 5.0 m c/c spacing at Ahmedabad. Workout an appropriate truss configuration and purling spacing. Design continuous type purlin only. **14**

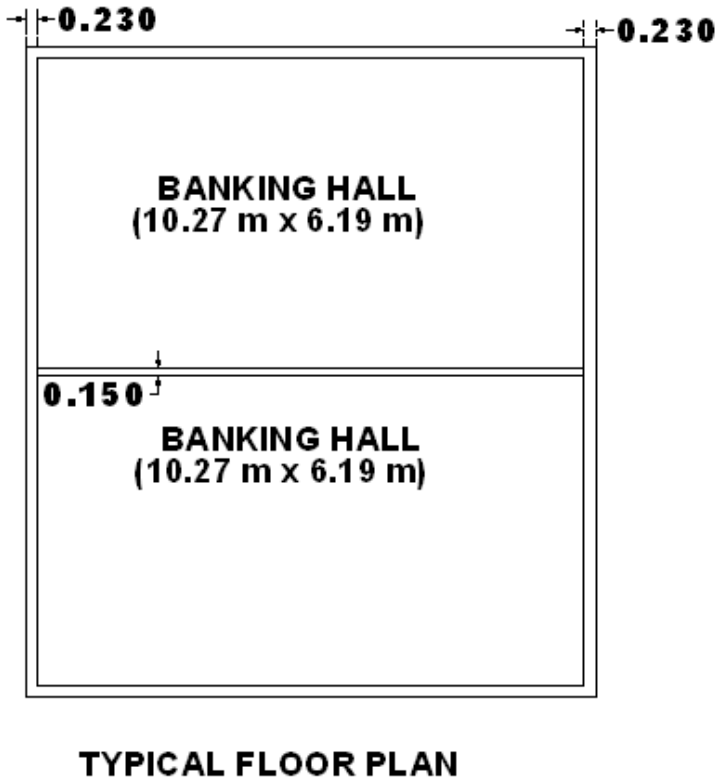

Fig.1 Q.3(a)