GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER–VIII (OLD) EXAMINATION – WINTER 2020

Subject Code:180604   **Date:30/01/2021**

Subject Name:Structural Design-II

Time:02:00 PM TO 04:00 PM   **Total Marks: 47**

Instructions:
1. **Attempt any THREE questions from Q.1 to Q.6 .**
2. **Q.7 is compulsory.**
3. **Make suitable assumptions wherever necessary.**
4. **Figures to the right indicate full marks.**
5. **Use of IS:456, IS:800, IS:875, IS:1893, SP:16 and Steel Table is permitted.**
6. **For RCC, wherever not mention use M20 grade of concrete and Fe 415 steel.**
7. **For STEEL, wherever not mention use Fe 410 grade.**

Q.1	**(a)**	Estimate wind forces for a water tank for the following data. Total height of tank = 30 m, Which includes height of the supporting shaft =20 m, height of the bottom conical portion = 2m , height of cylindrical portion =4 m , Rise of top sherical dom =1 m, Diameter of supporting shaft= 4m, and diameter of cylindrical portion=10m, Location is Ahmedabad, Terrain categary =II and class =B, Ground slope = 1 vertical to 7 horizontal, hill height =280 m, location from crest 100 m windward. Design life 100 years.	**07**
	(b)	Explain guidelines for preparation of structural layout of buildings.	**07**
Q.2	**(a)**	Draw a neat sketch of ductile detailing of 'Beam Reinforcement' as per Indian Standard.	**07**
	(b)	Prepare a typical structural layout for G+ 3 storey building having 4 bays of 5m In X-direction and 5 bays of 4 m in Y-direction . Design a two way slab at a typical floor with one edge discontinuous . Floor height is 3.3 m and live load is 3 kN/m^2.	**07**
Q.3	**(a)**	Design a circular tank resting on ground for the capacity of 50,000 litres. Assume that the joint between wall and base slab is rigid. Approximate method may be used for analysis. Depth of tank may be 4 m. Use M-25 concrete and Fe-415 steel.	**07**
	(b)	Wtite a short note on Buckling on web plate	**07**
Q.4	**(a)**	Which are the forces acting on retaining wall.	**07**
	(b)	Design preliminary dimensions for counterfort retaining wall for the following Data :(1) Angle of repose =30^0 (2) Unit weight of soil = 16 kN/m^3 (3) Height wall above the G.L. =7m (4) Safe bearing capacity of soil = 150 kN/m^2 (5) Co -efficient of friction between the base and the soil is 0.60. Use M20 concrete and Fe 415 steel.	**07**
Q.5	**(a)**	What is a foot bridge? What is the popular geometry of the foot bridge?	**07**
	(b)	Design a gantry girder to carry two elecrically operated overhead crane travelling in tendem, having following data: (1) Crane capacity (each)= 200kN (2) Weight Of crane girder = 180 kN (3) Wheel spacing = 3.2 m (4) Weight of crab =50kN (5) Span of crane between rails =16m (6) Minimum edge distance =1.2 m (7) Minimum spacing between cranes =2.0m (8) Span of gantry girder =8 m (9)Weight of rail =0.5 kN/m (10) Height of rail section =75 mm. Check only for buckling resistance .	**07**

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Q.6 **(a)** Design welded plate girder for a simply supported bridge deck beam with clear **14**
Span 24 m, subjected to dead load 20 kN/m (excluding self weight), live load 10
kN/m And two concentrated loads of 200 kN each at 6 m from each end. Assume
that the top compression flange of plate girder is reatrained laterally and
prevented from rotating . Use Fe 415 grade steel. Design as an unstiffened plate
girder with thick web

Q.7 Which are the components of Roof truss. **05**

OR

Explain in detail types of steel chimney. **05**

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