

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC - SEMESTER-VIII • EXAMINATION – Winter - 2016

Subject Code: X80602**Date: 26/10/2016****Subject Name: Structural Design - II****Time: 02.30 pm - 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 of IS:456, IS:875, IS:1893, IS:13920, IS:3370, SP:16 and SP:34 are permitted.
5. Use M20 grade concrete and Fe415 grade steel if not mentioned.

- Q.1 (a)** Determine wind load on any intermediate frame of a multistory building. Also, **14**
determine nodal forces at each floor level. Use following data:
Length of building = 50 m
Width of building = 40 m
Height of building = 31 m
Storey height = 3 m
Frame spacing = 5 m in both directions
Location of building = Pune
Upwind slope = 10°
Height of hill = 800 m
Location of building on wind ward side from crest = 150 m
- Q.2 (a)** Explain different types of load to be consider while structural design as per **07**
Indian Standards.
- (b)** Explain various types of retaining walls. **07**
- OR**
- (b)** Explain importance of weep holes and shear key in retaining walls. **07**
- Q.3 (a)** Prepare a typical structural lay out for G+3 storey building having 5 bays of 5 m **14**
in X direction and 5 bays of 4 m in Y-direction. Design a two way slab at a
typical floor. Floor height = 3.0 m, floor finish load = 1 kN/m^2 and live load = 3 kN/m^2 . All exterior walls are of 230 mm thick and interior wall of 115 mm
thick. Assume beam size of 230 mm X 450 mm. Draw neat sketch of
reinforcement detailing.
- OR**
- Q.3 (a)** Prepare a typical structural lay out for G+3 storey building having 5 bays of 5 m **14**
in X direction and 5 bays of 4 m in Y-direction. Design a typical continuous
beam OR a typical column. Floor height = 3.0 m, floor finish load = 1 kN/m^2
and live load = 3 kN/m^2 . All exterior walls are of 230 mm thick and interior
wall of 115 mm thick. Assume beam size of 230 mm X 450 mm. Draw neat
sketch of reinforcement detailing.
- Q.4 (a)** Fix the basic dimensions of various elements of the cantilever retaining wall of **14**
height 4 m. Angle of repose of soil is 30° . The safe bearing capacity of soil is
 180 kN/m^2 and unit weight of soil is 18 kN/m^3 . Coefficient of friction between
soil and concrete is 0.55. Provide the checks for stability of the retaining wall.
Design the stem and heel of the retaining wall.

OR

Q.4 (a) Calculate preliminary sizes of all the components of a counterfort type retaining wall to retain 7 m earth above ground level. Angle of repose of soil is 30° . The safe bearing capacity of soil is 180 kN/m^2 and unit weight of soil is 18 kN/m^3 . Coefficient of friction between soil and concrete is 0.55. Provide the checks for stability of the retaining wall. Design the intermediate counterfort of the retaining wall. **14**

Q.5 (a) Design a circular under-ground water tank with flexible base for a capacity of 5 lakh litres. Angle of repose of soil is 30° . Unit weight of soil is 18 kN/m^3 . Use M30 and Fe415. **14**

OR

Q.5 (a) Design and detail top spherical dome and cylindrical wall of overhead circular water tank. Assume diameter of tank 10m and thickness of top dome as 100mm with 1 kN/m^2 live load. Use M25 and Fe415. **14**
