

GUJARAT UNIVERSITY
B.E. Sem. VII (Civil) Examination
Design of Concrete Structures

Saturday, 29th December, 2007]

[Time : 4 Hours
 Max. Marks : 100

- Instructions :** (1) Attempt all questions.
 (2) Answer to the two sections must be written in separate answer books.
 (3) Assume suitable data if required.
 (4) Figures to the right indicate full marks.
 (5) Use of IS:456, IS:875, SP:16, IS:1893 is permissible. Reference to clauses, charts, tables, etc should be mentioned.
 (6) Assume suitable grade of material if not given.

SECTION - I

- 1 (a) Explain the significance of stability checks for retaining walls and briefly explain the steps of stability checks. 5
- (b) A counterfort retaining wall has to retain level earth of 7m height above ground level. The counterforts of 400mm width are provided at 3.3m c/c. Take $SBC=170\text{kN/m}^2$, angle of internal friction=30 degree, friction coefficient between soil and concrete=0.5 and unit weight of soil= 16 kN/m^3 . Using M_{20} grade of concrete and Fe 415 grade of steel, calculate the depth of foundation, propose cross section of retaining wall. Design and detail vertical slab and counterfort. 30

OR

Draw a typical floor plan of a small commercial building having floor height 3.3m.

- 1 (a) Draw proper structural layout, designate all structural members and draw load distribution diagram. 10
- (b) Design and detail any one typical continuous beam. Use substitute frame for analysis. 15
- (c) Design and detail two different types of slabs. 10
- 2 A multi-storeyed building (GF parking+ 7 upper floors) is 24m x 24m in plan. The building is situated on Ashram Road of Ahmedabad. Taking suitable grid in plan plot wind pressure and force distribution diagrams along the height of building as per IS:875(Part-3). 15

SECTION-II

- 3 (a) Fix the basic dimensions of suitable container of elevated water tanks to store 6 lacs liters water. Design and detail all structural components of the container. 30
- (b) Illustrate various supporting systems to support elevated storage reservoir. Explain briefly about various design forces for supporting system. 5

OR

- 3 (a) Discuss use and significance of RC portal frame 5
- (b) A fixed based portal frame having width 10m and height 7m is analysed considering $I_{\text{beam}} / I_{\text{column}} = 2.75$ and final factored moment obtained at fix base = 75 kN.m, at Beam-column joint = -150 kN.m and at mid of beam = 250 kN.m. Design & detail beam and column of the portal. 25
- (c) Draw typical detail of reinforcement of footing to be provided for above portal frame. 5
- 4 A combined footing is carrying two loads of 800kN and 900kN spaced at 3.8m. Propose the foundation plan if (i) width of footing is restricted to 2.2m and(ii) No restriction on width. Taking cross section of both columns 0.3m x 0.3m, design & detail slab type footing for any one case. 15