

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII (NEW) - EXAMINATION – SUMMER 2018

Subject Code:2170607

Date:01/05/2018

Subject Name:Design of Reinforced Concrete Structures

Time:02.30 PM to 05.30 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Draw neat and clean figures whenever required.
5. IS 456, IS 3370, IS 875, SP 16, IS 1893, IS 1343, IS 13920 are permitted.
6. Use M20 grade of concrete and Fe415 grade of steel, if not given.

		Marks
Q-1	(a) For the building lay out shown in fig.01 with following details, Draw the load distribution diagram and estimate the loads on a typical floor beams B13 & B14. Number of storey: G+3 Floor to floor height: 3.15 m External walls: 250 mm including plaster Internal walls: 150 mm including plaster Imposed load: Roof = 1.5 kN/mm ² , Floor = 4.0 kN/mm ² Floor finish: Roof = 1.5 kN/mm ² , Floor = 1.0 kN/mm ²	03
	(b) Analyze the continuous beam B11-B12 at typical floor level of a given layout (fig.01) by substitute frame method	04
	(c) Design the continuous beam B11-B12 at typical floor level of a given layout (fig.01) for flexure and shear. Draw diagram of beams showing reinforcement details	07
Q-2	(a) Enlist advantages and disadvantages of flat slabs.	03
	(b) Write the steps with codal provisions for determination of lateral loads acting at nodal points of a residential building due to wind.	04
	(c) Estimate wind forces for a water tank located in Gandhinagar for the following data. Total height of tank = 29 m, which includes height of the supporting shaft = 21 m, height of bottom conical portion = 2.5 m, height of cylindrical wall = 4.5 m and rise of top dome = 1 m, diameter of shaft = 4.5 m and diameter of cylindrical wall = 12 m. Topography = plane with upwind slope less than 3°.	07
	OR	
	(c) Design an interior panel of a flat slab of panel size 5m x 5m without providing drop and column head. Size of columns = 300mm x 400 mm, Live load = 4 kN/m ² , Floor finish = 1 kN/m ² , Height of column 4 m above and below slab.	07
Q-3	(a) The cantilever retaining wall has to retain the earth with a horizontal top 3.6 m above ground level. Density of earth is 17 kN/m ³ . Angle of internal friction ϕ is 30 degree. SBC of soil is 200 kN/m ² . Coefficient of friction μ is 0.5. Determine dimensions of the retaining wall.	03
	(b) For problem 3 (a) above, check the stability of wall.	04

- (c) For problem 3 (a) above, design Toe and draw diagram showing reinforcement details. 07

OR

- Q-3** (a) The counter fort retaining wall has to retain the earth with a horizontal top 5.0 m above ground level. Density of earth is 16 kN/m^3 . Angle of internal friction ϕ is 30 degree. SBC of soil is 190 kN/m^2 . Coefficient of friction μ is 0.6. Determine dimensions of the retaining wall. 03

- (b) For problem 3 (a) above, check the stability of wall. 04

- (c) For problem 3 (a) above, design stem and draw diagram showing reinforcement details. 07

- Q-4** (a) The rectangular water tank open at top resting on ground having size 3.4 m x 7.2 m x 3.5 m. Design short wall. Use M30 and Fe 415. 03

- (b) For problem 4 (a) above, design long wall. 04

- (c) For problem 4 (a) above, design base slab and draw detailed plan and section of water tank showing all the dimensions and reinforcements. 07

OR

- Q-4** (a) Explain various Joints used in water tank. 03

- (b) Fix the Basic dimensions of Intze type container of an elevated water tank to store 5.5 lacs liter water and design and detail top dome. Height of staging = 15 m up to bottom of tank. Use M30 grade concrete and Fe 415 Steel. 04

- (c) For problem 4(b) above, Design top ring beam and cylindrical wall. 07

- Q-5** (a) Explain 'Strong column-Weak beam' design concept. 03

- (b) Explain effect of Irregularities on performance of RC buildings during earthquakes. 04

- (c) Draw and detail the typical qualitative reinforcement detailing of two span reinforced concrete continuous rectangular beam of dimension 230 mm X 450 mm as per IS 13920-1993. 07

OR

- Q-5** (a) Explain Short Column Effect. 03

- (b) Give the guidelines for efficient earthquake resistant design of structures 04

- (c) Calculate base shear for the three storey RC frame building (hospital) has size 25 m X 25 m located in Surat, using seismic coefficient method for following data: 07

Type of soil = Hard

Intensity of dead load = 15 kN/m^2 (Including all members)

Intensity of imposed load = 5 kN/m^2

Storey height = 3.5 m

Also determine the seismic forces and shears at each floor level.

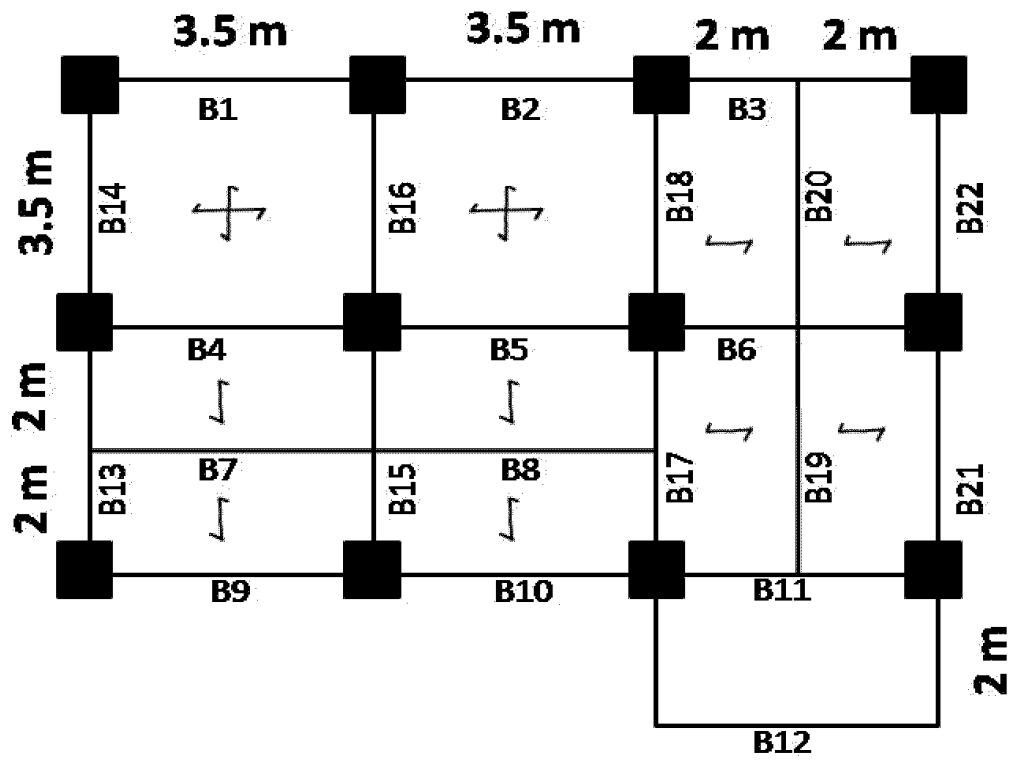


Fig. 1