

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII (OLD) EXAMINATION – WINTER 2018****Subject Code: 180604****Date: 03/12/2018****Subject Name: Structural Design-II****Time: 02:30 PM TO 05:30 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Draw neat sketches and reinforcement detailing in support of your calculations.
4. Use of IS:456, IS:800, IS:875, IS:1893, SP:16 and Steel Table is permitted.

- Q.1 (a)** A ten storeyed building in Mumbai on plane ground has 4 bay of 5m in length (X-dir.) and 4 bay of 4m in width (Z-dir.). Height of each storey is 3.2m. Determine wind force acting at each storey on any intermediate frame in X direction. **10**
- (b)** Draw a neat sketch of structural layout of an industrial building showing all components and its importance from structural point of view. **04**
- Q.2 (a)** For a typical layout of a G+3 framed structure shown in fig.-1, plot load distribution diagrams for typical floor and design slab S1. **07**
- (b)** Determine loads on continuous B1-B2-B3 of a typical floor and design for flexure only. Draw reinforcement details qualitatively. (refer fig.-1) **07**
- OR**
- (b)** Determine load on column C1 of the ground storey and design it as axially loaded column. Draw reinforcement details. (refer fig.-1) **07**
- Q.3 (a)** For a retaining wall of height 5.0 m, decide most appropriate type of retaining wall, fix the dimensions of various structural elements and carryout stability analysis. The SBC of foundation soil is 22 kN/m². Assume additional data suitably. **07**
- (b)** For the retaining wall given in Q.3(a), design only stem of the retaining wall. Draw reinforcement details neatly. **07**
- OR**
- Q.3 (a)** For a Intze type elevated water tank of 1.5 lakh litre capacity, fix the basic dimension of container and design top covering dome of it. **07**
- (b)** For the elevated storage reservoir given in Q.3(a)(or), design and detail cylindrical wall of the container. **07**
- Q.4 (a)** A simply supported welded plate girder of span 24 m is subjected to service load of 50kN/m UDL and two fixed point loads of 200 kN each spaced at 8 m from each supports. Determine the cross section of plate girder. Perform all required checks for cross section as per IS code provisions. Take Fe250 grade of steel. **07**
- (b)** For the details of plate girder given in Q.4(a), decide whether stiffeners of any types are required or not? Design the vertical stiffeners only. **07**
- OR**
- Q.4 (a)** Design stiffener under concentrated loads for plate girder designed in Q.4(a)(or). **07**
- (b)** Design bearing stiffener at support for plate girder designed in Q.4(a)(or). **07**
- Q.5** A gantry girder of 6 m span is to be designed for crane capacity of 250 kN. The effective span of crane girder is 20 m. Weight of crane girder excluding crab is 125 kN and weight of crab is 75 kN. Take clearance as 1 m and wheel base as 3.0 m. Choose suitable section and check the bending stresses and deflection. **14**
- OR**
- Q.5** A foot over bridge is of span 20 m and pedestrian load of 4 kN/m². The clear distance between two trusses is 3.0 m and truss height is 1.75 m. Assume suitable configuration of truss and design & detail a cross beam and a bottom chord member of the mid span. **14**

Figures

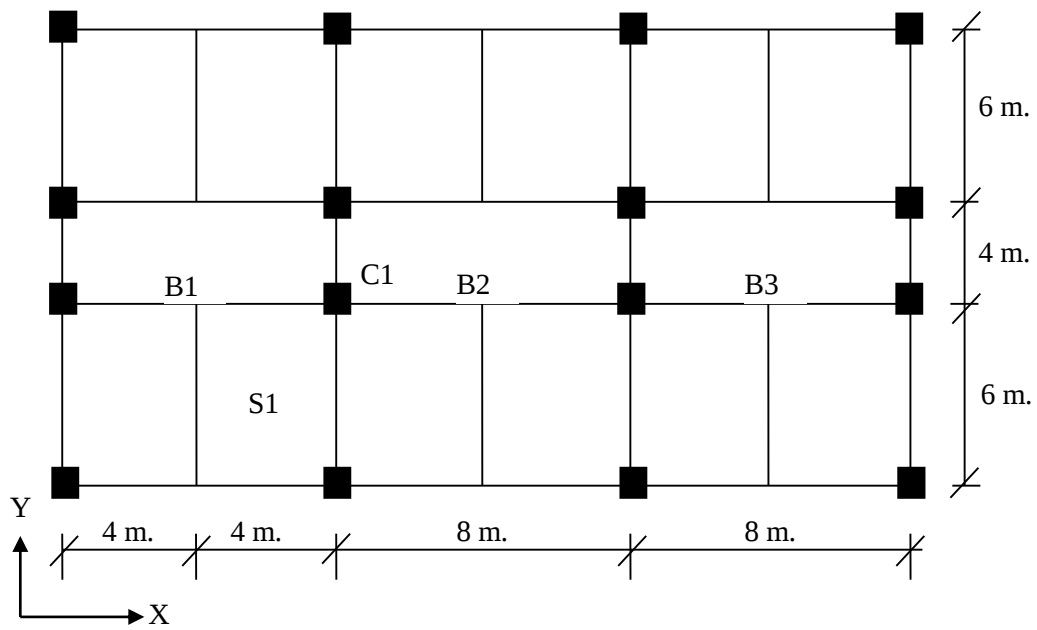


Fig:1 : Typical floor plan of G+3 storey building

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