

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII (Old) EXAMINATION – WINTER 2019****Subject Code: 180604****Date: 02/12/2019****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. Figures to the right indicate full marks.
4. Use of IS:456, IS:800, IS:875, IS:3370, SP:16 and Steel Table is permitted.

- Q.1 (a)** A cantilever retaining wall is to be constructed for the following requirement and data. Fix up the dimensions of various elements and provide required stability checks. **07**
- (i) Height of horizontal earth fill from GL : 5.0 m
(ii) Unit weight & angle of internal friction of soil: 18 kN/m³, 30°
(iii) S.B.C. of soil: 150 kN/m².
(iv) Co-efficient of friction between concrete base and soil: 0.5
- (b)** Design stem of the cantilever retaining wall for the data of Q.1 (a) and provide the reinforcement detailing. **07**
- Q.2 (a)** Explain various types of loads acting on transmission line towers **07**
- (b)** For a structural layout of G+3 storey building as shown in fig. 1 calculate the load coming on to the column B at level of storey 1. Take live load on roof and floor 1 kN/m² and 4 kN/m² respectively, Floor finish 1 kN/m², Thickness of slab 120 mm, Beam dimension 230 mm width and 450 mm overall depth, all wall thickness 230 mm, column dimension 350 mm X 350 mm. **07**
- OR**
- (b)** For a structural layout of G+3 storey building as shown in fig. 1 calculate the load coming on to the Beam ABCD for the same data as in Q.2(b) above. Also draw load distribution diagram. **07**
- Q.3** Design a gantry girder without lateral restraint along its span carrying EOT crane of capacity 200 kN & span of gantry girder = 10 m, Span of crane girder = 18 m, Wheel spacing = 3.5m, Weight of rail 0.4 kN/m, Weight of crab = 50 kN, Minimum hook approach = 1.2 m. Weight of crane girder = 180 kN. Use Fe 250 steel. Only show the check for shear and moment only for the section. **14**
- OR**
- Q.3** Design a welded plate girder for a simply supported bridge deck 20 m in span subjected to a point load of 200 kN at distance 5 m from both ends in addition to the imposed load of 20 kN/m and dead load excluding self weight is 20 kN/m. Provide only end stiffeners and avoid the intermediate transverse stiffener. Use simple post critical method. **14**
- Q.4** 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.. **14**

OR

Q.4 Roofing system of an industrial shed consists of trusses spaced at 5 m apart. The span of roof truss is 24 m and pitch is 1/4. The level of eaves is 10 m above the ground. Assume suitable configuration of truss. Design bottom chord member near support only. The shed is situated on flat terrain with sparsely populated buildings. The shed has less than 10% permeability. **14**

Q.5 An underground rectangular RCC water tank with clear plan dimensions 6 m x 4 m is to be design for 60000 litre capacity. Consider top edges of walls free. Design of long wall, short wall & top slab and furnish reinforcement detailing. **14**

OR

Q.5 Estimate wind load acting on an internal frame at node points and plot wind pressure diagram for a multi storey building of plan area 20 m X 30 m **14**

Height of building = 30 m

Bottom Storey height = 5 m

All other storey height = 4 m

Bay width in both direction = 5 m

location of Building = Ahmedabad,

Terrain Category= II

Topography= plane with upwind slope less than 3°

Design life 100 years.

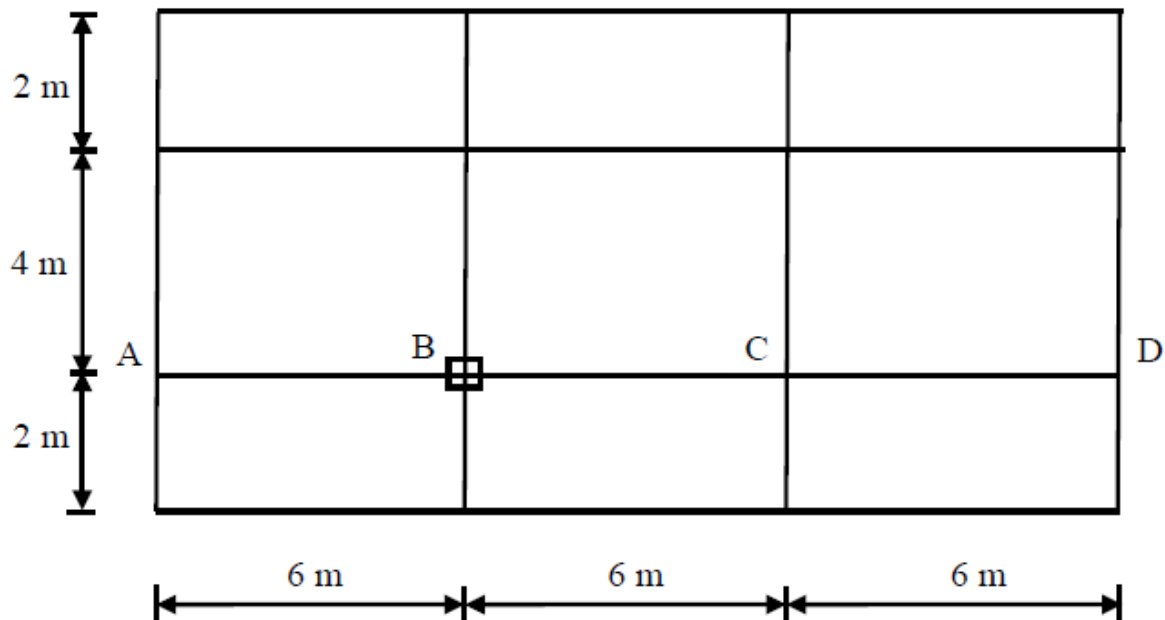


Figure 1
