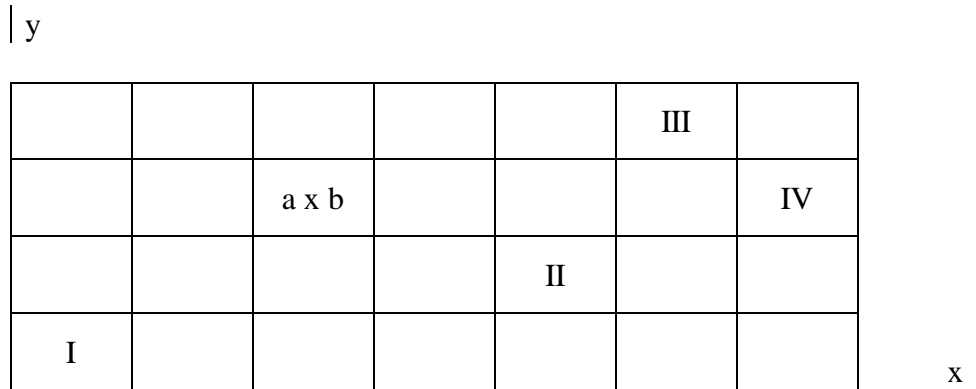


GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER – VIII. EXAMINATION – WINTER 2016

Subject Code: 180604**Date: 25/10/2016****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:3370, IS:800, IS:875, SP:16 and steel tables is permitted
5. Use M-20 & Fe-415 unless specified otherwise

- Q.1 (a)** A G+3 structure located in Rajkot has following plan having (a x b) as a typical slab panel **07**



Relevant details are as under

Length of building along x-direction = 35.7 m [a = 5.1m]

Width of building along y-direction = 12.0 m [b = 3.0 m]

Rectangular columns are provided at all beam intersections

No. of beams per floor along or parallel to x = 5

No. of beams per floor along or parallel to y = 8

No of columns = 40

Typical floor height = 3.2 m

External walls = BBM 230 mm thick

Internal walls = BBM 115 mm thick

Floor finish = 25 mm thick Marble mosaic tiles

Live load = 2.00 kN/m²

Draw structural plan and show column orientations

Specify the boundary conditions for typical 2-way slab panels I, II, III and IV

Find design BM for middle strips of panel – I for second floor level slab

- (b)** Design middle strips of panel – I of Q.1(a) at second floor level. Give reinforcement detailing. Also design corner reinforcement. **07**
- Q.2 (a)** Find the maximum BM and BM at centre of end span of a typical 4-span continuous interior beam parallel to width of building at second floor level of problem in Q.1(a) above **07**

- (b) Design a singly reinforced rectangular beam for the end span of beam in Q.2(a). Sketch reinforcement details **07**
- OR**
- (b) Explain various types of loads acting on transmission line towers **07**
- Q.3** (a) Find the wind load for any intermediate frame parallel to width of building (y-direction) given in Q.1(a) **07**
- (b) Design a circular water tank of capacity 85000 litre with a flexible joint at the junction of wall and base resting on ground. **07**
- OR**
- Q.3** Design stem of a cantilever retaining wall having stem height 3.4m retaining soil level with top. Take density of soil as 16kN/m^3 , SBC as 240 kN/m^2 , angle of internal friction 30° . Coefficient of friction between soil and concrete is 0.4 Take stability checks **14**
- Q.4** An industrial shed is 40m long and 18m wide. Height at the eaves level is 6.2m and that at the ridge is 10.70m Consider a suitable column spacing and suggest the truss geometry. Design a typical purlin and the segment of rafter at the eaves level. The structure is located in Bhuj **14**
- OR**
- Q.4** A foot over bridge has a span of 28m and width 3.5m. It carries a pedestrian load of intensity 4kN/m^2 . Using a suitable truss geometry find the force carried by the end segment and the segment near centre of top chord member. Design that near centre. Design a typical cross girder. **14**
- Q.5** Design a simply supported welded plate girder to carry u.d.l. of intensity 24kN/m on entire length in addition to two point loads each of magnitude 120kN acting at one third span length from ends. The beam has a span 18m. Also design bearing stiffener at support. **14**
- OR**
- Q.5** Design a gantry girder for following data ... **14**
 Span 5.6m simply supported
 Span and weight of crane girder 18m, 138kN
 Type and capacity of crane ... EOT, 160kN
 Weight of trolley 37kN
 Minimum approach of hook 1.20m
 Wheel base 2.30m
 Weight of rail 0.28kN/m
