

# 18I-113

May-2015

B.Arch./ID/BCT, Sem.-VI (New)

AR-603 : Structures-VI

Time : 2 Hours]

[Max. Marks : 50

- Instructions :**
- (1) Figures to right indicate full marks.
  - (2) Answer must be precise and up to the point.
  - (3) Use M20 grade of Concrete and Fe415 steel.
  - (4) Use of IS456 is permitted.

1. Answer any **three** : **9**
- (1) Write a note on folded plates and explain the load transfer mechanism in folded plates.
  - (2) Why can a pre-tensioned or a post-tensioned beam can take more load as compared to conventional RCC beam ? Also write three difference between pre-tensioning and post-tensioning methods.
  - (3) When are retaining wall required ? Mention the types of retaining walls and the elements of retaining wall.
  - (4) Write a note on Geodesic Dome.

**OR**

A retaining wall to retain earth of 5 m height, the top surface is flat behind the wall. Depth of foundation 1.25 m with SBC of 145 kN/cum. Unit weight of soil 16 kN/cum, coefficient of friction between soil and concrete 0.55, angle of repose 30 degrees. Check the stability of it against overturning and sliding and give your comments. Also design the stem and toe of the retaining wall.

2. (a) What are the two critical conditions for designing the underground water tank is to be designed ? **2**
- (b) Design a circular over ground water tank for capacity of 80,000 litres. Consider SBC of 275 kN/cum. Modular ratio 13,  $\sigma_{ct} = 120$  N/sq. mm,  $\sigma_{st} = 100$  N/sq. mm. Consider grade of concrete M20 and Fe415 steel. Also draw the reinforcement detail for the wall. **8**

3. A prestress beam 300 mm × 450 mm deep has a span of 9 m. It is subjected to UDL of 35 kN/m and the central point load of 200 kN. An initial prestressing force of 300 kN is applied with an eccentricity of 8 cm below the axis of beam. Consider losses in prestressing is 13%. Calculate fiber stress in the concrete at mid span and at the end span. Also draw the stress diagram for each case. **10**
4. A community hall of 10 m × 20 m in which beams of 100 mm × 600 mm inclusive of slab thickness of 100 mm are provided at 2 m c/c in both directions. Calculate the total load per sq.m. Live load = 5 kN/sq.m. Floor finish 1 kN/sq.m. Draw the reinforcement details for the same. **6**
5. (1) Write a note on shell as a roofing element and the behavior. **3**  
 (2) Write a note on flat slabs and components of flat slab. **3**  
 (3) Write a note on machine foundations. **3**  
 (4) Enlist principal materials used for prestressed concrete. **1**  
 (5) What are the different losses in prestress concrete ? **3**  
 (6) Write a note on waffle slab. **2**
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