

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2450

Roll No.

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**B. Tech.**

(SEM. VI) THEORY EXAMINATION 2011-12  
**ADVANCED CONCRETE DESIGN**

Time : 3 Hours

Total Marks : 100

**Note :** Attempt **all** questions. All questions carry equal marks. IS-456 and IS-3370 is permitted. Assume any suitable data, if missing. Show the structural details of design problems.

1. Attempt any *two* parts of the following : **(10×2=20)**
- Design a circular water tank with flexible base for a capacity of 450 kL. The depth of water is 4.5 m. Allow suitable free board. Use M-25 concrete and Fe-415 steel.
  - Design the tank walls of a rectangular water tank 3 m × 5 m × 2.5 m resting on the ground. Use M-25 concrete and Fe-415 steel.
  - Design middle ring beam, balcony and vertical wall for an intze type tank shown in Fig. 1(a).

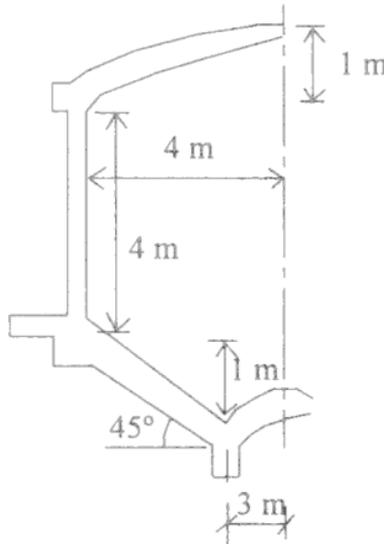
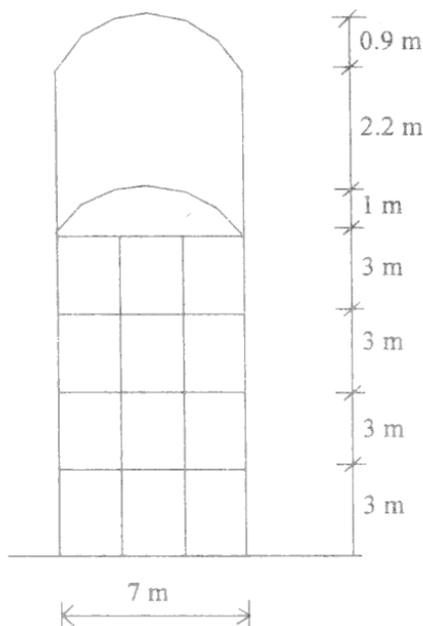


Fig. 1(a)

2. Attempt any *one* part of the following : (20×1=20)

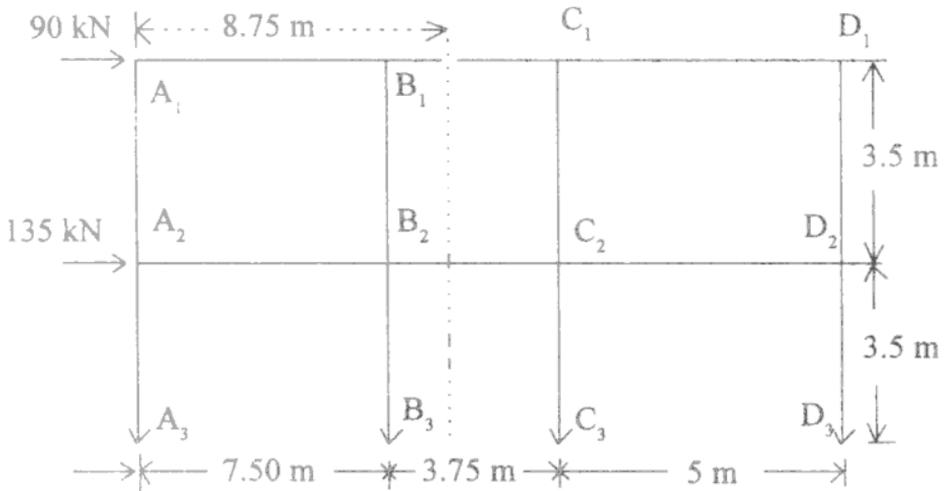
- (a) An overhead water tank has staging of 12 m. The tank is supported on 6 equally spaced columns with column circle diameter of 7 m as shown in Fig. 2(a). The braces are spaced at 3 m. Design the column and braces of water tank. Assume the wind pressure as  $1.5 \text{ kN/m}^2$  and vertical load on each column is 750 kN. Use M-25 concrete and Fe-415 steel.



**Fig. 2(a)**

- (b) Design the foundation of an intze type water tank supported by 6 columns with mean diameter of column circle as 7 m. The load transmitted by each column is 800 kN. The safe bearing capacity of soil is  $200 \text{ kN/m}^2$ . Use M-20 concrete and Fe-415 steel.

3. Attempt any **one** part of the following : (20×1=20)
- (a) Analyse the frame shown in Fig. 3(a) by the cantilever method. Assume that all the columns have the same section.
- (b) Analyse the frame shown in Fig. 3(a) by the portal method. Assume that all the columns have the same section.



**Fig. 3(a)**

4. Attempt any **two** parts of the following : (10×2=20)
- (a) Discuss the Pigeaud's method for finding out moment in a slab due to concentrated load.
- (b) Discuss Courban's method of load distribution in longitudinal grades.
- (c) Design a slab bridge for class AA (tracked) vehicle loading for the following data :
- Clean span = 5.0 m
- Clean width of roadway = 7.0 m
- Use M-25 Concrete and Fe-415 Grade Steel.

5. Write short notes on any *four* of the following : (5×4=20)

- (a) High performance concrete
- (b) Design steps of a composite beam
- (c) Self compacting concrete
- (d) Fire resistance concrete
- (e) Polymer concrete.