

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

**PAPER ID :**

**Roll No.**

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**B.TECH.**

**Theory Examination (Semester-VI) 2015-16**

**ADVANCE CONCRETE DESIGN**

*Time : 3 Hours*

*Max. Marks : 100*

- Notes :** (1) Attempt **all** questions.  
 (2) All questions carry equal marks.  
 (3) Use of IS : 456 and IS : 3370 is permitted.  
 (4) Assume any data suitably, if missing.  
 (5) The design must be supported by structural drawings

**SECTION-A**

1. Attempt all **parts** of the following: (2×10=20)
- What are the factors that should be considered while designing R.C.C. tanks?
  - Discuss joints in tanks.
  - Explain the term "Impact factor".
  - What is "effective width method" for design of road bridges?
  - Why free board is provided in water tank?
  - What do you mean by high performance concrete?
  - Enlist the different types of IRC loadings and IRC codes used for road bridges.
  - What are the multistory frames?
  - List the various types of possible vertical and horizontal loads which act on buildings.
  - What is Raft foundation?

**SECTION-B**

2. Attempt any five parts of the following : (10 x 5 = 50)
- Design a rectangular RC water tank of capacity of 80 kl. The inside dimensions may be taken as 6 m × 4 m. Use M 25 grade concrete and Fe 415 grade steel.
  - Design a circular water tank with a spherical top dome to a capacity of 55 kl. The depth of storage may be taken as 4 m, free board is to be kept as 200 mm. Use M 30 grade concrete and Fe 415 grade steel.
  - Design an interior span of a three span continuous beam in a multi-storey building. The effective length of span is 5m. The beam is subjected to 2KN/m dead load and 4KN/m live load along all the spans. The beam is monolithic with supporting columns. Choose a rectangular cross section for the beam.
  - Discuss with neat sketches the various types of footing used for the over head water tanks supported on columns and bracings. Explain briefly their design features.
  - Analyse a three storey, three span building frame using the portal method. The height

Of each storey is 3.5 m and effective span length for each span is 4 m. The frame is subjected to horizontal loads of 20 KN at each floor level. Draw the bending moment And shear force diagrams for the frame.

(f). Compute the maximum bending moment for a culvert for the following data:

Load	: Class AA tracked vehicle
Clear span	: 6 m
Clear width of roadway	: 7.5m
Average thickness of wearing coat	: 80 mm
Width of wearing	: 0.4 m

(g). What do you understand by Ready mixed concrete? How it is produced and transported to the site?

(h). Explain different types of shear connectors used for composite construction.

### SECTION-C

Attempt any two parts of the following :

(15 x 2 = 30)

3. An Intze tank is to be provided for a capacity of 1000 kl, supported on elevated tower consisting of 8 columns. The base of tank is 15 m above ground and depth of foundation is 1.0 m below ground level. Determine the dimensions of all components of the tank. Also design the top dome, top ring beam and side wall. Use M 30 grade concrete and Fe 415 grade steel
4. Design the foundation for an Intze type water tank supported on an elevated tower consisting of 8 columns. The diameter of the beam is 10 m. The load on each column is 2500 kN. Safe bearing capacity of soil is  $240 \text{ kN/m}^2$ . Use M 25 grade concrete and Fe 415 grade steel. Take constants as  $k_1 = 0.0083$ ,  $k_2 = 0.0041$  and  $k_3 = 0.006$ .
5. Design the reinforced concrete slab culvert for the following data:

Clear span	: 5m
Clear width of roadway	: 7.0m
Thickness of wearing coat	: 75 mm
Width of supports	: 400 mm
Width of kerbs	: 600 mm

Load class : “ IRC A ”loading, use M20 concrete and Fe 415 steel.