



IV B.Tech I Sem Regular End Examination, Nov/Dec 2022

Advanced Structural Design

(CIVIL)

Time: 3 Hours.**Max. Marks: 70**

Note: 1. Question paper consists: Part-A and Part-B.

2. In Part – A, answer all questions which carries 20 marks.

3. In Part – B, answer any one question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

- ❖ Code Book: IS-456, IS-3370(Part-2 & Part-4), IRC-21, IRC-6, IS-800 & Steel table are permitted

PART- A**(10*2 Marks = 20 Marks)**

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|-------|---|----|-----|-----|
| 1. a) | State Active and Passive Earth pressure | 2M | C01 | BL1 |
| b) | Estimate of lateral earth pressure coefficient on a basement wall supports soil to a depth of 2 m. Unit weight and angle of shearing resistance of retained soil are 16 kN/m ³ and 32° respectively. | 2M | C01 | BL3 |
| c) | Write down the Advantages and disadvantages of flat slab | 2M | C02 | BL2 |
| d) | Define the terms drop and column head. | 2M | C02 | BL1 |
| e) | List out different elements of a circular water tank | 2M | C03 | BL1 |
| f) | Name the loads to be considered in a design of a circular water tank | 2M | C03 | BL1 |
| g) | Write down the different elements of a Bridge | 2M | C04 | BL1 |
| h) | Give the loads to be considered in a design of a solid slab Bridge | 2M | C04 | BL2 |
| i) | Define gantry girder. | 2M | C05 | BL3 |
| j) | Which section is recommended for gantry girder & why? | 2M | C05 | BL1 |

PART- B**(10*5 Marks = 50 Marks)**

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|---|---|-----|-----|-----|
| 2 | Design a Cantilever retaining wall to retain 4m of horizontal backfill. The Density of the soil is 18KN/m ³ Safe Bearing Capacity of the Soil=200KN/m ² Angle of internal Friction of Soil=30° The Coefficient of friction between base slab and concrete=0.55 Use M20 concrete and Fe415 Steel. Draw cross section and longitudinal section. | 10M | C01 | BL6 |
|---|---|-----|-----|-----|

OR

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|---|---|----|-----|-----|
| 3 | a) What are the different modes of failure of a retaining wall? | 5M | C01 | BL1 |
| | b) Explain about the effect of line load on retaining wall. | 5M | C01 | BL4 |

- 4 A flat slab system of a ware house is 24m X 24m and divided into 6m x 6m (interior slab) along column center lines. Loading is estimated as 5KN/m². Supporting column diameter is 400 mm. Choosing the thickness of the slab (from stiffness criteria) and appropriate dimensions for column head and drops, Design the Interior Panel and sketch the reinforcement details. 10M CO2 BL6
- OR**
- 5 R.C. grid floor is to be designed to cover a floor area of 12mx18m. The spacing of ribs in mutually Perpendicular directions is 1.5mc/c. Live load on the floor is 2kN/m. Analyse the grid floor by IS- 456 methods and design the suitable reinforcements with grid floor. 10M CO2 BL6
- 6 Design a circular tank with flexible base for capacity of 500000 liters. The depth of water is to be 4m, including a free board of 300mm. Overall height of the tank is restricted to 5m. Use M25 grade concrete and Fe415 grade steel. 10M CO3 BL6
- OR**
- 7 Explain step by step design procedure of circular tank water tank with a rigid base 10M CO3 BL4
- 8 Design a Deck slab bridge two lane for Class AA loading (tracked vehicle) with the following data
Clear Span - 6 m
Road width - 6.8m
Safety kerbs - 60cm wide
Average thickness of wearing coat - 8 cm
Materials - M15 and grade Fe415 steel
Use IRC Standards. 10M CO4 BL6
- OR**
- 9 Explain Briefly different components of a bridge and loads to be considered for designing those components 10M CO4 BL4
- 10 Design of gantry girder for an electric overhead crane with the following data:
Capacity of crane= 100 KN. Weight of trolley=40 KN, Weight of crane girder=200KN, Span of crane girder=18m. Centre to Centre distance between columns=8m, Minimum clearance between trolley and gantry girder = 1.2 m centre distance of crane wheels=3m 10M CO5 BL6
- OR**
- 11 What is a gantry girder? Explain its components and loading considerations in detail. 10M CO5 BL4

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CO-Course Outcome

BL - Blooms Taxonomy Levels