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**Presidency University**

**Bengaluru**

**SCHOOL OF ENGINEERING**

**MAKEUP EXAMINATION JULY-2024**

**Semester:** VII

**Course Code**: CIV3008

**Course Name**: Advanced RCC Structures

**Program** : B.Tech

**Date**: 1st July 2024

**Time**: 9:30 AM to 12:30 PM

**Max Marks**: 100

**Weightage**: 50%

**Instructions:**

1. *Read all the questions carefully and answer accordingly.*
2. *Use of IS456:2000 and SP16 is allowed.*
3. *Use of Non-Programmable Scientific calculators is allowed.*

**Part A [Memory Recall Questions]**

**Answer any four Questions. Each question carries 5 marks. (4Qx5M = 20M)**

1. Define a Flat slab. Mention the various types of flat slabs.

(C.O.No.1) [Knowledge]

1. Describe the conditions that necessitate the design of combined footing.

(C.O.No.2) [Knowledge]

1. What is a combined footing? Mention the types of combined footing based on the shape.

(C.O.No.2) [Knowledge]

1. Mention the various types of water tanks based on location and shapes.

(C.O.No.3) [Knowledge]

1. Distinguish between circular water tanks and rectangular water tanks based on their design considerations.

(C.O.No.3) [Knowledge]

1. What is a portal frame? Mention the different types of structures that are built using the portal frames.

(C.O.No.4) [Knowledge]

**Part B [Thought Provoking Questions]**

**Answer any two Questions. Each question carries 20 marks. (2Qx20M = 40M)**

1. An interior panel of a large single storey warehouse flat slab roof with drop and panel size of 6 m × 6 m is supported by columns of size 450 mm × 450 mm. Take live load as 3.5 kN/m2 and the weight of finishes including waterproof treatment as 2.5 kN/m2. Use M25 concrete and Fe 415 steel. Assume moderate environment. Design the flat slab and sketch the reinforcement detailing of flat slab.

(C.O.No.1) [Comprehension]

1. A cylindrical tank of capacity 4,50,000 liters is resting on a good unyielding ground. The depth of tank is limited to 4m. A free board of 300 mm may be provided. The wall and the base slab are cast integrally. Design the tank using M20 concrete and Fe415 grade steel. Draw the following i) Plan at base ii) Sectional elevation of the tank.

(C.O.No.3) [Comprehension]

1. Design a rectangular water tank 5m x 4m with depth of storage 3m, resting on ground and whose walls are rigidly joined at vertical and horizontal edges. Design the water tank and draw the following i) Plan at base ii) Sectional elevation of the tank. Assume M20 grade concrete and Fe415 grade steel.

(C.O.No.3) [Comprehension]

**Part C [Problem Solving Questions]**

**Answer any two Questions. Each question carries 20 marks. (2Qx20M = 40M)**

1. Design a slab type rectangular combined footing for supporting two columns 450x450 mm in size to carry a load of 1200kN each. Center to center distance between the columns is 4.0m. The projection of the footing on either side of the column with respect to center is 1m. Safe bearing capacity of the soil can be taken as 200 kPa. Use M20 concrete and Fe-415 steel.

(C.O.No. 2) [Application]

1. The roof of a 8m wide hall is supported on a 3-bay portal frame spaced at 4m intervals. The height of the portal frame is 4m. The continuous slab is 120 mm thick. Live load on roof = 2 kN/m2, SBC of soil = 150 kN/m2. The columns are connected with a plinth beam and the base of the column may be assumed as fixed. Design the slab, column, beam and footing members of portal frame. Adopt M20 grade concrete and Fe415 steel.

(C.O.No. 4) [Application]

1. Explain in detail the various design steps involved in the design of Portal frames.

(C.O.No. 4) [Application]