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**SUBJECT CODE NO:- H-372**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**B.E.(Civil) (Sem-I)**  
**Design of Structures- III**  
**[OLD]**

[Time: Four Hours]

[Max. Marks:80]

- Please check whether you have got the right question paper.
- N.B 1) Attempt any two questions from Section A and B each.  
 2) Use of IS: 456, IS: 3370 is allowed.  
 3) Assume suitable data, if necessary, state it clearly.
- Section - A
- Q.1 a) Write disadvantages of a flat slab over a conventional slab supported on beams. 04  
 b) Design an interior panel of flat slab  $6\text{m} \times 6\text{m}$  for a live load of  $4\text{ kN/m}^2$ . Show the reinforcement details on a neat sketch. 16
- Q.2 Two columns A and B are located 3.8m apart. The sizes of the columns are 450 mm and 450 mm. Loads on them are 1100kN and 1700kN respectively. The projection of the footing parallel to the length of footing beyond axis of column 'A' is restricted to 1m. The SBC of soil is  $300\text{kN/m}^2$ . Design a combined footing for two columns. Use M-20 and Fe-500 grades. 20
- Q.3 Design heel slab and vertical wall of a counter fort retaining wall 7m high above G.L is to be provided to retain earth with top. Density of earth is  $16\text{kN/m}^3$  and its angle of repose is  $30^\circ$ . Hard strata having SBC of soil  $260\text{kN/m}^2$  is available at 1m below ground level. The counter forts are provided at 3.3 m c/c. 20
- Section - B
- Q.4 Design an elevated rectangular water tank to store 30,000 litres of water. Design walls and base slab of water tank. Assume walls are fixed at base and free at top. Show reinforcement detailing. Use M-35 concrete and Fe-500 grade steel. Use IS code method. Show reinforcement detailing. Take  $L/B = 1.6$ . 20
- Q.5 a) Design the formwork for a column of size  $400\text{ mm} \times 400\text{ mm}$ , having a height of 3m. It is proposed to pour the entire concrete in one stage. 15  
 b) Write requirements of an ideal formwork for RCC constructions. 05
- Q.6 a) Explain Freyssinet system of prestressing in detail. Draw sketches. 10  
 b) Design a circular slab for a room of 6 m effective diameter with partially restrained edges. Total superimposed load on the slab is  $5\text{kN/m}^2$ . Use M-20 and Fe-500 grades. Show the reinforcement details on neat sketches. 10