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**B. E. (Civil Engineering) (Semester - VIII) Examination,  
May - 2014  
STRUCTURAL DESIGN OF FOUNDATION AND RETAINING  
STRUCTURE (ELECTIVE - II)  
Sub. Code : 49179**

Day and Date : Thursday, 22 - 05 - 2014

Total Marks : 100

Time : 02.30 p.m. to 5.30 p.m.

- Instructions : 1) Solve any two questions from each section.  
2) Figures to the right indicate full marks.  
3) Use of IS 456 - 2000 allowed.

**SECTION - I**

Q1) Design a square footing of uniform thickness for an axial loaded column of  $500 \times 500$  mm in size transmitted a vertical load of 600 kN. The safe bearing capacity of soil may be taken as  $150 \text{ kN/m}^2$ . Use M20 concrete and Fe 415 steel. [25]

Q2) A. R. C. column,  $400 \times 400$  mm carrying a load of 600 kN, is supported on three piles  $350 \times 350$  mm in section. The center to Center distance between the piles is 1.4m. Design a suitable pile cap. Use M20 concrete and Fe 415 steel. [25]

Q3) Design a suitable continuous raft foundation connecting the columns of a building  $12 \times 12$ m shown in figure to suit the following data. [25]

Spacing of columns = 4.0 m C/C

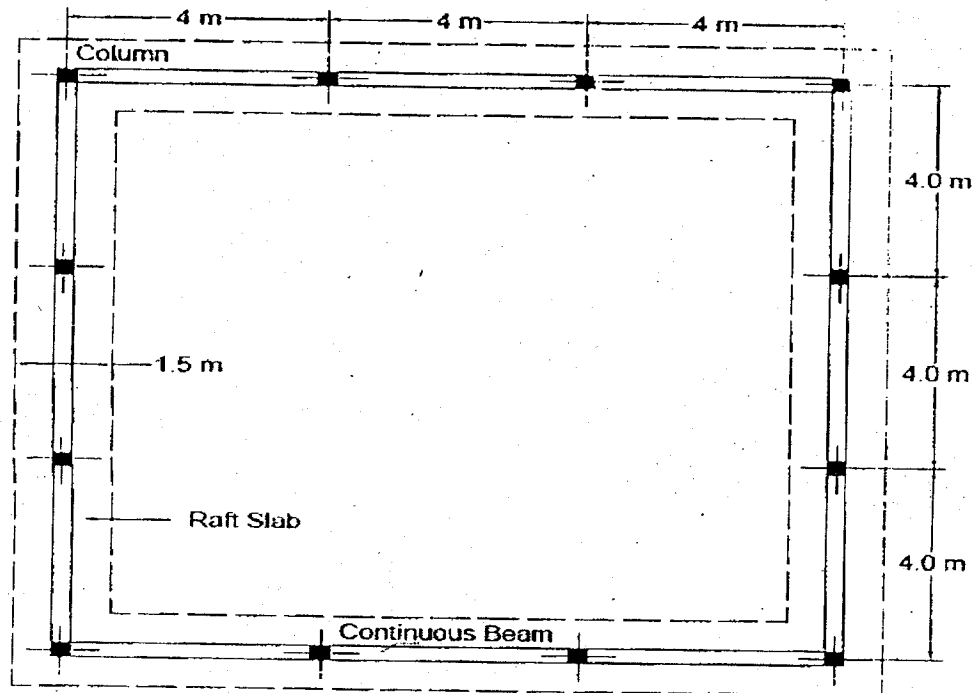
Service load transmitted = 500 kN on each column

Size of column =  $300 \times 300$ mm

Safe bearing capacity =  $100 \text{ kN / m}^2$

M 20 concrete and Fe 415 steel

P.T.O.



### SECTION - II

- Q4) a)** Explain in detail with neat sketch the various elements well foundation ? Enlist advantages of well foundation? [15]
- b)** Explain in detail with figure operation of sinking of well foundation? [10]
- Q5) a)** Design stem and heel of a cantilever retaining wall to retain earth embankment 4 m high above ground level. The unit weight of earth is  $18 \text{ kN/m}^3$  and its angle of repose is  $30^\circ$ . The embankment is horizontal at its top. The safe bearing capacity of soil  $200 \text{ kN/m}^2$  and the coefficient of friction between soil and concrete as 0.5. Use M20 concrete and Fe 415 steel. [25]
- Q6) a)** Explain in detail the classification of break waters ? Draw cross-section details of mound break water. [13]
- b)** Design a rubble mound breakwater for the following data. [12]
- Depth of water = 16.0 m
- Wind Velocity = 130 km/hrs
- Fetch of wave = 220 km

