

Seat No.	
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**B.E. (Civil Engineering) (Semester - VIII) Examination,
April - 2016**

**STRUCTURAL DESIGN OF FOUNDATION AND RETAINING
STRUCTURES (Elective - II)
Sub. Code : 49179**

Day and Date : Sunday, 24 - 04 - 2016

Total Marks : 100

Time : 03.00 p.m. to 06.00 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 an isolated footing for a square column, 450 mm × 450 mm carrying service loads of 1600 kN. The safe bearing capacity of soil is 320 kN/m² at a depth of 1m below the ground level. Use M 25 and Fe 415. [25]
- Q2)** Design a suitable pile cap consisting of three piles of 450 mm ϕ support an RCC column 450 × 600 mm carrying a service load of 2400 kN. The piles are located parallel to column face with their centers located 1000 mm from center of column. Adopt M25 grade concrete and Fe415 steel. [25]
- Q3)** A building rests on ten columns, each 450 mm × 450 mm, arranged in two rows of five each, the c/c distance between the columns being 5 m in both the directions. The corner columns carry a load of 1000 kN each and other columns carry 1500 kN. Design a mat foundation for the system, considering beam below columns, the spacing between beams along rows being 2.5m. Use M20&Fe415. Take SBC = 80kN/m². [25]

P.T.O.

SECTION - II

- Q4) a)** Explain in detail with neat sketch the various elements well foundation? Enlist advantages of well foundation? [10]
- b) A cylindrical well of external diameter 8m and internal diameter 5m is sunk to a depth of 18m below the maximum scours level in sand deposits. The well is subjected to a horizontal force of 1500 kN acting at height of 10m above the scour level. Determine the lateral allowable equivalent resisting force due to earth pressure, assuming that the wall rotates about a point above the base. Assume $\gamma_{\text{sub}} = 10.5 \text{ kN/m}^3$, $\phi = 28^\circ$ F.O.S = 2. Use Terzahi's Approach. [15]
- Q5)** Design stem and heel slab of retaining wall. The stem of a cantilever retaining wall is 5.5 m tall retaining soil of specific weight 18.5 kN/m^3 and having an angle of repose is 30° . The embankment is horizontal at its top. Design the wall. The safe bearing capacity of soil 250 kN/m^2 and the coefficient of friction between soil and concrete as 0.60. Use M25 concrete and Fe 415 steel. [25]
- Q6) a)** Explain different method of construction of mound type of breakwater.[13]
- b) Design a wall breakwater for the following data. [12]
- Depth of water = 14.0 m
- Wind Velocity = 150 km/hrs
- Fetch of wave = 300 km

