

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech., Winter 2017 - 18 Examination

Semester: 1**Date: 26-12-2017****Subject Code: 03215101****Time: 02:00PM to 04:30PM****Subject Name: Advanced Foundation Engineering****Total Marks: 60****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

- Q.1** A) What are the assumptions made in the derivation of terzaghi's bearing capacity theory? (05)
 B) Discuss various methods of soil exploration. (05)
 C) What is a coffer dam? Name the different type of coffer dam with their advantage and disadvantage. (05)

- Q.2** Answer the following questions. (Attempt any three) (Each five mark) (15)
 A) What are the factors affecting efficiency of pile group?
 B) Differentiate between general shear failure and local shear failure.
 C) Discuss components of well foundation.
 D) Describe methods for design of various components of a braced cuts.

- Q.3** A) Describe plate load test and also its significance (07)
 B) Following are the results obtained from a plate load test performed on a square plate of 30 cm x 30 cm size at a depth of 1.5 m below in a homogenous sand bed (08)

Load(kN/m²)	50	100	150	200	250	300	350
Settlement (mm)	4	6	10	15	19	30	55

Determine ultimate load which a footing of size 2m x 2m placed at 1.5 m below G.L. in same soil, if allowable settlement of the footing is 15 mm

OR

- B) What will be the gross and net safe bearing pressure of sand having $\phi = 36^\circ$ and effective unit weight of 1.8 ton/m^3 under the following cases: (08)
 (i) 1 m wide strip footing
 (ii) 1m x 1m square footing

Consider the footing is placed at a depth of 1m from ground surface and water table is at a great depth. Assume factor of safety of 3. Use terzaghi's theory. Given for $\phi = 36^\circ$ $N_q = 47$, $N = 43$.

- Q.4** A) A precast concrete pile 35cm x 35 cm is driven by a single acting steam hammer. Estimate the allowable load using engineering news record formula (F.O.S=6) use following data (07)
 maximum Rated energy=3500 kN cm
 weight of hammer= 35 kN
 efficiency of hammer=0.8
 no of blows for last 25.4 mm penetration =6 no.
 modulus of elasticity of concrete= $2 \times 10^7 \text{ kN/m}^2$
 $C=2.5$

OR

- A) A group of 9 piles, 9m long is used as the foundation of column. The piles are 300 mm in diameter with center to center spacing of 900 mm. piles are arranged in a square pattern in a uniform deposit of stiff clay with unconfined compressive strength of 170 kN/m^2 . adhesion factor for pile is 1. Estimate the safe load take factor of safety =3 (07)

- B) Write a note on pile load test. (08)