

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech. Winter 2018 – 19 Examination

Semester: 1
Subject Code: 203215101
Subject Name: Advance Foundation Engineering

Date: 10/12/2018
Time: 10:30 am to 1:00 pm
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) Enlist different methods of soil exploration and explain any one in brief. (05)
 B) Define – i) Ultimate bearing capacity ii) split spoon sampler iii) caisson iv) negative skin friction v) Expansive soil. (05)
 C) In a 16 pile group, the pile diameter is 45cm, 20 m long and centre to center spacing of the square group is 1.5 m. If $c=50\text{kN/m}^2$, determine whether the failure would occur with the pile acting individually or as a group? Neglect bearing at the tip of the pile. Take $\alpha = 0.7$ (05)
- Q.2 Answer the following questions. (Attempt any three) (Each five mark) (15)**
 A) Enlist all the forces acting on a caisson?
 B) What is Collapsible soil? Provide remedial measures for construction on such soils?
 C) Differentiate between SPT test and DCPT test.
 D) A drop hammer weighing 50 kN and having an effective fall of 0.75 m drives an RCC pile weighing 35kN. The average settlement per blow is 1.4 cm. The total temporary elastic compression is 1.8 cm. assuming coefficient of restitution as 0.25 and factor of safety 2.5, determine ultimate bearing capacity and allowable load on pile.
- Q.3** A) Describe pneumatic caisson in detail. (07)
 B) A square concrete pile of 30 cm is driven into a homogeneous sand layer, ($\phi=30^\circ, \gamma= 18\text{kN/m}^3$) for a depth of 12 m. calculate the ultimate load. Take $K= 1.3, \delta=18^\circ, N_q=29$ (08)
- OR**
- B) A square pile group of 16 piles penetrates through a filled up soil of 3 m depth. The pile diameter is 250 mm and pile spacing is 750 mm. the unit cohesion of the material is 18kN/m^2 and unit weight of soil is 15kN/m^3 . Compute negative skin friction of the group. (08)
- Q.4** A) compute the safe bearing capacity of a square footing of size 1.5 m located at a depth of 1 m below ground level in a soil of density $18\text{kN/m}^3, \phi=30^\circ$ ($N_c= 30.14, N_q=18.4, N_\gamma = 22.4$). If the water table rises to the ground level, what is reduction in SBC. Take FOS=3. (07)
- OR**
- A) Determine settlement of a square footing 1.2 m wide resting at a depth of 1 m in a saturated clay layer 4 m deep. Properties of clay are : unconfined compressive strength= 40 kN/m^2 , liquid limit= 30% , $\gamma_{\text{sat}}= 17.8\text{kN/m}^3, w=28\%$ and $G=2.68$. it carries a safe load of 95 kN (07)
 B)What do you mean by cofferdam? Explain use of each shape of cofferdam in detail. (08)