Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

B.Tech. Winter 2022-23 Examination

Semester: VII **Date: 11-10-2022**
Subject Code: 203104405 **Time: 10:30PM TO 1:00PM**
Subject Name: 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 Objective Type Questions - (Fill in the blanks, one word answer, MCQ-not more than Five in case of MCQ) (All are compulsory) (Each of one mark) **(15)**

1. Which of the following foundation is most suitable for expansive soils
   a. Mat Foundation b. Pile Foundation c. Caissons d. Underreamed pile
2. The symbol "q_{nu}" denotes
3. One of the most important factor deciding between shallow and deep foundation is _____
4. The first theory proposed for shallow foundation was by
   a. Rankine b. Prandtl c. Terzaghi d. None of these
5. The type of pile used in pure sand is based on load transfer through
   a. End Bearing b. Friction c. Negative Skin Friction d. All of these
6. Inclined piles are most commonly used for _____ foundations.
7. Factor of safety considered for wooden piles is
   a. 2 to 3 b. 3 to 6 c. 1 to 2 d. Greater than 6
8. _____foundation is an example of marine foundation.
9. If settlement of two foundations is constant then the major factor affecting the value of angular distortion is
   a. Size of column b. Foundation Size c. C to C distance between columns d. All of these
10. The full form of SCPT is
11. Which is the most prominent force considered when designing foundations in seas?
11. If angle of internal friction of soil is less than 20º then the prominent mode of failure is _____.
12. The most common known marine soil is _____.
13. The maximum length of a prestressed precast pile is _____
14. The pile foundation used at the 7 star hotel at Dubai is
   a. Precast Piles b. Driven Cast In Situ c. Friction Pile d. Prestressed Piles
15. _____ is called the Father of Modern Soil Mechanics

Q.2 Answer the following questions. (Attempt any three) **(15)**

A) Enlist and explain the various Design Criteria for shallow foundations.
B) Give classification of submarine soils using the tool of your choice.
C) A wooden pile is being driven with a drop hammer weighting 20kN with a free fall of 100cm. The pile penetrates in the soil by a value of 5mm. Determine the load carrying capacity of the pile according to Engineering News Formula.
D) Classify and explain the types of pile foundation depending on method of construction.

Q.3 A) A strip footing, 1mt wide at its base is located at a depth of 0.8m below ground level. If the soil has a bulk density of 1.8gm/cc and c = 30kN/sq.m with angle of internal friction as 20º. Determine the SBC considering FOS = 3. If the water table rises to the base of the footing find the change in the SBC assuming saturated density of 1.95gm/cc. Assume 1kg = 10N. Use Terzaghi's Bearing Capacity Theory with Nc = 11.8, Nγ = 1.7, Nq = 3.9. Assume local shear failure of soil. **(07)**

B) Illustrate and elaborate with relevant examples and neat sketches any three factors affecting selection of type of foundations. **(08)**

OR

B) Prepare a neat sketch for plate load test for finding bearing capacity of soil and discuss in detail the procedure for its interpretation. **(08)**

Q.4 A) Recommend the general characteristics of Marine/ Offshore soil exploration and sampling. **(07)**

OR

A) A pile group consists of 45cm diameter and 10m long piles at a centre-to-centre distance of 1500mm, determine whether the failure would occur with the pile individually or as a group if it consists of 16 piles. Neglect tip resistance of the pile and take a constant of 0.7 for shear mobilization around each pile. **(07)**

B) Illustrate with relevant examples and sketches various types of shallow foundations used on field **(08)**