MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : CE(PE)601B Foundation Engineering
UPID : 006735

Time Allotted : 3 Hours   *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer *any ten* of the following :   [1 x 10 = 10]

(I) Write one advantage of using Geotextiles.

(II) If a hammer is raised by steam and allowed to fall by gravity on top of the pile, it is called as_____ .

(III) Which of the following piles is used to compact loose granular soil?

(IV) Auger boring is used in _____ type of soil.

(V) The loading to the test plate is applied with _____ [Choose the correct alternative]
a) Fluid tube
b) Hydraulic jack
c) Sand bags
d) Cross-joists

(VI) Write one function of sheet pile.

(VII) Sand drains are used as ground improvement technique in _____ type of soil.

(VIII) When two column loads are unequal, which of the possible footing can be provided?
[Choose the correct alternative]
a) Strap footing
b) Raft footing
c) Trapezoidal combined footing
d) Mat footing

(IX) The surface area of a pile with dia 200 mm and length 10 m is _____ .

(X) Electrical resistivity method is based on measurement of _____ [Choose the correct alternative]
a) Specific resistance
b) Voltage
c) Potential drop
d) Current

(XI) Diameter of plate used in plate load test is _____ .

(XII) The depth of embedment is lesser in anchored bulkhead as compared to cantilever sheet pile. True or false?

Group-B (Short Answer Type Question)

Answer *any three* of the following :   [5 x 3 = 15]

2. A plate load test was conducted in sand on a 300 mm diameter plate. If the plate settlement was 5 mm at a pressure of 100 kPa, calculate the settlement (in mm) of a 5 m × 8 m rectangular footing at the same pressure.   [5]

3. Discuss about the dynamic formula used to calculate the bearing capacity of pile foundation. [Engineering News formula and Hiley's formula and write the meaning of the symbols used]   [5]

4. Discuss any five application of geosynthetics in several sectors of construction.   [5]

5. State some situations where deep foundations are preferred over shallow foundation.   [5]

6. Write a short note on Seismic refraction method.   [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following :   [15 x 3 = 45]

7. A group of piles has to support a vertical axial load of 2000 kN. The piles are driven into clay and have a length of 10.5 m. The thickness of the clay stratum is 15m. The clay is followed by rock. The saturated unit weight of clay is 19 kN/m^3 and its cohesion is 25 kN/m^2. The clay is normally consolidated and has a liquid limit of 60. Its specific gravity is 2.7. The water table is at the ground surface itself. Assuming the diameter   [15]

of the piles as 300 mm, Design a pile group. A factor of safety of 3 is required against shear failure. Compute its Ultimate settlement.

8. (a) What is Soil exploration?   [3]

    (b) Write any six objectives of Soil exploration.   [6]

    (c) Discuss about the three stages of soil exploration.   [6]

9. Determine the depth of embankment for the can   tilever sheet pile shown in figure (H=6m). The soil has   [15]
    effective unit weight of 17.5 kN/m2. And angle of internal friction of 30°. Use simplified method.
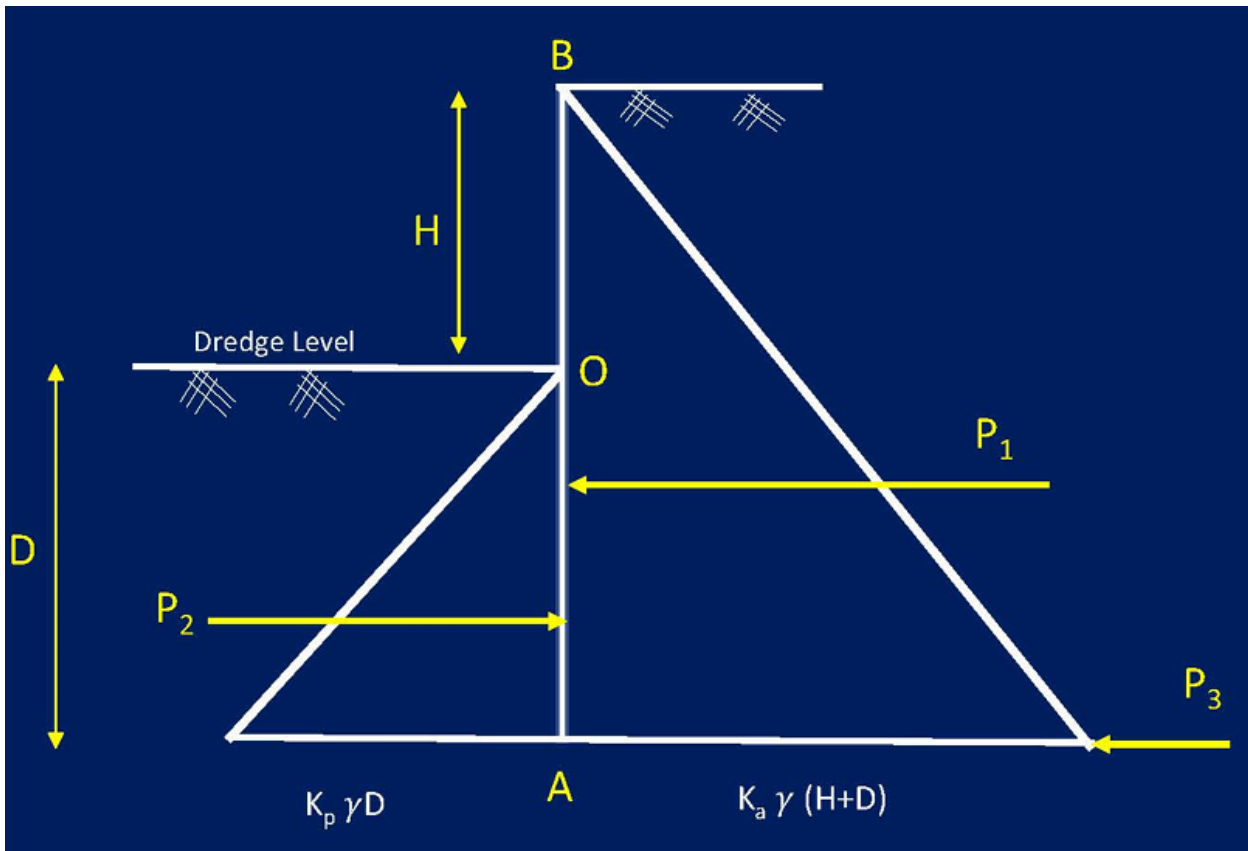
10. Write short note on Vibroflota   tion in sands. Draw a neat sketch to support your answer. In the same   [15]
    context, write the description of a vibroflot.

11. A plate load test was conducted using a plate of 0.75 m x 0.75 m size, on a uniform deposit of sand and   [15]
    the following data were obtained:

Pressure (kN/m²)	Settlement (mm)
0	0
50	1.5
100	2
200	4
300	7.5
400	12.5
500	20
600	40.6

Calculate the safe bearing capacity of soil taking factor of safety as 2.5.
Calculate settlement of a square footing of size 2m x 2m at safe bearing capacity.

*** END OF PAPER ***