

7. (a) Describe allowable bearing pressure based on N-value. Also mention different correction applied to correct N-value. **7.5**
- (b) A square footing $2.5 \text{ m} \times 2.5 \text{ m}$ is located at a depth of 1.8 m in sand. Calculate the ultimate bearing capacity if :
- (i) GWT is well below the foundation level
- (ii) GWT is at the surface.
- Given unit weight of sand = 18 kN/m^3 , $c' = 0$ and $\phi = 38^\circ$. For $\phi = 38^\circ$, $N_q = 49$ and $N_\gamma = 67$. **7.5**

Section D

8. Write short notes on the following :
- (i) Negative skin friction of piles
- (ii) Uplift capacity of pile group
- (iii) Under-reamed pile
- (iv) Plate load test. **15**
9. (a) Describe the various factors which cause the settlement of foundation. What is the allowable settlement according to I.S. code ? **7.5**
- (b) Define load capacity of a pile. Briefly describe “pile load test” and “pile driving formulae” to estimate the pile capacity. **7.5**

J-21-0003

B. Tech. EXAMINATION, 2021

Semester V (CBCS)

GEOTECHNICAL ENGINEERING-II

CE-503

Time : 2 Hours

Maximum Marks : 60

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

Note : Attempt *Four* questions in all, selecting *one* question from any of the Sections A, B, C and D. Q. No. 1 is compulsory. Assume missing data, if any, suitably.

(Compulsory Question)

1. Explain the following :
- (i) Collapsible soil
- (ii) Exploration logs

- (iii) Coefficient of earth pressure
- (iv) Types of Wall movement due to earth pressure
- (v) Depth of foundation
- (vi) Plate load test
- (vii) Safe bearing capacity
- (viii) Preventive measures to reduce settlement
- (ix) Classification of piles on different basis
- (x) Undisturbed sampling. 1.5×10=15

Section A

2. What do you mean by sub-surface exploration ? Explain different types of sounding and geophysical methods of sub-surface exploration in detail. 15
3. (a) What is the necessity of boring in soil exploration ? Explain different types of methods of boring. 7.5
- (b) A sampling tube having 38 mm external diameter and 1.2 mm wall thickness is attached to a cutting shoe flushed with sampling tube from inside and having 42 mm external diameter. Calculate the area ratio, inside clearance and outside clearance. Also comment on samples collected using this tube. 7.5

Section B

4. (a) What are the different types of earth pressure ? Describe each in detail with diagram. 7.5
- (b) Explain Culmann's graphical method to determine active and passive earth pressure with diagram. 7.5
5. A retaining wall 10 m high retains a cohesionless soil having an angle of internal friction of 30° . The surface of the soil is level with the top of the wall. The top 3 m of the fill has a unit weight of 20 kN/m^3 and that of the rest is 30 kN/m^3 . Find the magnitude per metre run and point of application of the resultant active thrust. Assume angle of internal of friction same for both the strata. 15

Section C

6. (a) What are the different types of shallow foundations ? How is the depth of shallow foundation decided ? 7.5
- (b) What are the different modes of shear failure ? Explain each with neat diagram. 7.5