



BRAINWARE UNIVERSITY

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Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125

Term End Examination 2023-2024
Programme – Dip.CE-2022
Course Name – Geotechnical Engineering
Course Code - DCEPC305
(Semester III)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Select the correct answer for the blank :Water content of soil can _____.
- a) Never be greater than 100 % b) Take values only from 0 % to 100 %
c) Be less than 0 % d) Be greater than 100 %
- (ii) Choose the correct answer:Volume change in soil is due to _____ factor.
- a) Water content is changed b) Increase in soil density
c) Change in pressure d) Change in particle size
- (iii) Choose the correct answer: Coefficient of permeability or simple permeability is expressed in terms of _____
- a) cm/sec b) m/day
c) feet/day d) all of the mentioned
- (iv) Choose the correct answer:The shearing resistance of a soil is constituted by _____
- a) Structural resistance and Frictional resistance b) Shearing strength
c) None of the mentioned d) All of the mentioned
- (v) Select the correct answer for the blank :A soil mass in a three-phase system consists of _____
- a) solids, water and air b) sand, gravel and air
c) solids and water only d) solids and air only
- (vi) Select the correct answer for the blank :The single grained structure is a characteristic of _____
- a) Coarse-grained soil b) Fine-grained soil
c) None of the mentioned d) All of the mentioned
- (vii) Select the correct answer for the blank : Ground water may be also called as _____
- a) Gravitational water and Free water b) Capillary water
c) None of the mentioned d) All of the mentioned

(viii) Select the correct answer for the blank :The standard proctor test was developed by

- a) Darcy
c) Proctor

- b) Terzaghi
d) Rendulic

(ix) Choose the correct answer:For testing a saturated clay for shear strength, the test recommended, is _____.

- a) Direct shear test
c) Unconfined compression test

- b) Triaxial compression test
d) All of the mentioned

(x) Select the correct answer for the blank :The failure condition for a soil can be expressed in terms of limiting shear stress, called _____

- a) Principal stresses and Shear strength
c) None of the mentioned

- b) Shearing resistances
d) All of the mentioned

(xi) Choose the correct answer:Soils containing organic matters _____.

- a) Are of spongy nature
c) Shrink with increase of moisture content

- b) Swell with decrease of moisture
d) None of these

(xii) Select the correct answer for the blank :The density of soil can be increased

- a) By reducing the space occupied by air
c) By expelling water from pores

- b) By elastic compression of soil grains
d) All of the mentioned

(xiii) Select the correct answer for the blank :The angle that Coulomb's failure envelope makes with the horizontal is called _____.

- a) Cohesion
c) Angle of repose

- b) Angle of internal friction
d) None of these

(xiv) Select the correct answer for the blank :The compression index of a soil

- a) Decreases with an increase in the liquid limit
c) Decreases with an increase in the plastic limit

- b) Increases with an increase in the liquid limit
d) Is not related with plastic limit

(xv) Select the correct answer for the blank :Residual soils are formed by

- a) Glaciers
c) Water

- b) Wind
d) None of these

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Define geology and explain different branches of geology. (3)
3. Explain Mohr-Coulomb Theory. (3)
4. Explain what do you mean by optimum moisture content. (3)
5. Explain Disturbed and Undisturbed soil. (3)
6. A unit volume of a mass of saturated soil is subjected to horizontal seepage. The saturated unit weight is 20 kN/m³, hydraulic gradient is 0.3. Evaluate force due to seepage. (3)

OR

A unit volume of a mass of saturated soil is subjected to horizontal seepage. The saturated unit weight is 20 kN/m³, hydraulic gradient is 0.3. Evaluate force due to effective stress. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Define coefficient of permeability. (5)
8. Explain liquid limit, plastic limit, shrinkage limit. (5)
9. Explain the difference between compaction and consolidation. (5)
10. Justify Mohr-Coulomb Failure Theory. (5)
11. Differentiate between unconsolidated undrained test and a drained test. (5)

12. Explain field method of bearing capacity.

(5)

OR

Differentiate standard Procter from modified Procter test.

(5)

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