**Reg. No. :** | | | | | | | | | | |

# Question Paper Code: 44102

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

Fourth Semester

Civil Engineering

14UCE402-SOIL MECHANICS

(Regulation 2014)

Duration: Threehours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The ratio of the volume of voids to the total volume of soil is

   (a)Void ratio (b)Degree of Saturation
   (c)Air content (d)Porosity

2. Predict the range of optimum water content for standard proctor test for clay soil is

   (a) 6 to 10 % (b)8 to 12 % (c)12 to 15 % (d) 14 to 20 %

3. A flow net has 4 flow channels and 20 equi-potential drops, the shape factor is

   (a)1/5 (b) 5 (c)8 (d)None of these

4. The permeability of soil varies

   (a) inversely as square of grain size (b) as square of grain size
   (c) as grain size (d) inversely as void ratio

5. Newmark's influence chart can be used for the determination of vertical stress under

   (a) Circular load Area only (b) Rectangular loaded area only
   (c) Strip load only (d) Any Shape of loaded Area

6. When Consolidation of a Saturated soil Sample occurs, the degree of Saturation

   (a) increases (b) decreases
   (c) Remains constant (d) May increases or decreases

7. When drainage is permitted throughout the triaxial test, the test is known is

(a) Quick test (b) Drained Test
(c) Consolidated undrained test (d) None of these

8. Assess the Coulomb's equation for shear strength is

(a) $c = s + \sigma \tan \phi$ (b) $c = s - \sigma \tan \phi$
(c) $s = c + \sigma \tan \phi$ (d) $s = c - \sigma \tan \phi$

9. The failure occurs by rotation along a slip surface by downward and outward movement of the soil mass is

(a) Rotational Failure (b) Wedge Failure
(c) Compound Failure (d) Translational Failure

10. Method useful for Stability analysis of slopes made of homogeneous soils

(a) Friction Circle (b) Swedish Circle
(c) Fellenius method (d) None of these

PART - B (5 x 2 = 10 Marks)

11. Define liquid limit.

12. What are the steps in the construction of a flownet?

13. What is Immediate settlement?

14. Define principle stress 427.

15. What is the main cause of slope failure?

PART - C (5 x 16 = 80 Marks)

16. (a) Discuss methods of Compaction used in field. (16)

Or

(b) (i) A soil is having a specific gravity of 2.68, maximum dry density of 1.82 $g/cm^3$ and a water content of 16%. Calculate the degree of saturation, air content, percentage of air voids for the maximum dry density as well as for dry density corresponding tozero air voids at the optimum water content. (12)

(ii) Illustrate any two factors affecting compaction. (4)

17. (a) Discuss in detail about field methods for determination of Coefficient of Permeability. (16)

Or

(b) What is flow net? Describe its properties and applications. Describe different methods used to construct the flow net. (16)

18. (a) Detail about Boussinesq theory of stress distribution.Give its limitations. (16)

Or

(b) Discuss the Factors influencing compression behaviour of soils. (16)

19. (a) Describe about Vane shear Test. Give its merits and demerits. (16)

Or

(b) Explain Mohr-Coulomb failure theory in detail. (16)

20. (a) (i) Describe the types of slope failure with neat sketches. (8)

(ii) Describe the stability of slope of dry soil using friction circle method. (8)

Or

(b) Describe about slope protection measures. (16)

**44102**