Multiple choice questions

1. Mohr's circle is……

a) Soil circle **b) Stress envelop** c) Envelope of strain d) Strain circle

2. A flow is called laminar when Reynold's number is……

a) <2000 b)>2000 c) 2000 to 3000 d) None of these

3. Effective pressure at a point in soil mass…….as the capillary rise

a) Increases b) Not increases c) Remain same d) Decreases

4. Sedimentation analysis is based on……..law

a)Darcy's law **b) Stoke's law** c) Sedimentation law d) None of the above

5. Relationship between voids ratio (e) and porosity (n) is ---------

a)e=n/1+n **b)(1-n)=1/1+e** c)n=e/1-e d) none of the above

6. If consistency index of the soil is equal to unity it is at……

a) Liquid limit b) Semi-solid state c) Shrinkage limit **d) Plastic limit**

7. Single grained structure is characteristics of……..grained soils

a) Coarse b) Medium c)Fine d) Clay

8. In Mohr stress circle, No. of stress: considered are:……..

a) One **b) Two** c) Three d) Addition of above

9. Major principal stress is .....

a) Horizontal b) Vertical c) Inclined d) Circular

10. The maximum stress occurs in plan with angle a=……

a) 360 degrees b) 180 degree c) 90 degree **d) 45degree**

11.Soil is classified as…….. System

a) single b) two **c) three** d) none of the above

12.Which of the following method gives accurate determination of water content……

a) sand bath b) alcohol c) calcium carbide **d) oven drying**

13.Relation between porosity and void ratio is given by…….

a)e=n/1+n **b)n=e/1+e** c)n=e/1-e d) none of the above

14.Compaction is aimed at……..

a) decreasing dry density b) increasing porosity **c) decreasing void ratio** d) all the above

15.Maximum size of the clay can be…… mm

a) 0.002 b) 0.02 c) 0.2 d) 2

16.Seepage velocity is ……..discharge velocity.

a) more than b) less than c) equal to d) none of the above

17.When the soil is ……. shearing stresses are induced in it.

a) loaded b) unloaded c) compact d) loose

18.Unit weight of solids is…….

a) Weight of soil solids per unit total volume

b) Volume of soil solids per unit mass of soil solids.

c) Difference of weight of soil solids and volume of soil solids.

d) Weight of soil solids per unit volume of solids.

19.The seepage velocity in the soil is……..

a) Equal to discharge velocity b) less than discharge velocity **c) more than discharge velocity** d) none of the above.

20.The ratio of volume of voids to the total volume is called as……..

a) Void ratio **b) porosity** c) degree of saturation d) bulk density

21.Normally with increasing temperature, permeability is,

a) Decreases b)Equal c) Not changing. **d) Increases**

22.The specific gravity of solid particles of most of the soil varies from

a. 1.5 to 2 b. 2 to 2.4 **c. 2.5 to 2.8** d.3 to 3.5

23.The area bounded by any two neighbouring seepage flow lines is called

a. Open channel b. Wetted perimeter c. Effective area **d.Flow channel**

24. Equipment are normally used for compaction purpose

a. Rotavator b. Rotary tiller c. Seed drill equipment **d. Smooth wheel rollers and vibrating rollers**

25.Method for determining the dry unit density (or) field density of the soil in situ condition

a. Dynamic method b. Vibration method c. Safe bearing capacity **d. Sand replacement method**

26. worst soil for construction purpose is

a. Dune sands b. Silt soils c. Coarse sand **d. Black cotton soils**

27. Cohesionless soils are formed due to

a. Oxidation b. Hydration **c. Physical disintegration** d.Chemical decomposition

28. Stokes' law holds good if the diameter of the particles is

a. Ranging from 0.2 to 0.0002mm b. Less than 0.002mm c. Greater than 0.2 d.Greater than 0.2 mm and less than 0.002mm.

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

a. Void **b. Porosity** c. Air content d. Degree of saturation:

30. Bulk density of soil is equal to the

a. Mass of solids upon volume of solids.

b. Density of the soil in the dried condition

c. Mass of solids upon the total volume of soil.

d. Total mass of soil upon total volume of soil

31. Mohr's circle is related to

a. Soil circle b. Envelop of strain **c. Stress envelop** d. Strain circle

32. Soil mechanics is

a. Pure science b. Soil science c. Applied science **d. Engineering mechanics**

33.Hydrometer method is used for

a. Grain size analysis b. Voids ratio c. Bulk density d. Specific gravity of soil

34.Tri axial test is related to

a. Shear parameter b. Consolidation c. Compaction d. None of these

35.Replacement method is used to determine

a. Field density b. Moisture content c. Bulk density d. Shear strength of soil

36. Rankine's theory is related to

a. Sea pressure **b. Earth's pressure** c. River pressure d. Atmospheric pressure

37. Casagrande's method is used to determine

a. **Liquid limit** b. Texture c. Solid limit d. Structure

38. Constant head method is used to determine

a. Permeability of soil b. Drainage c. Bulk density d. Shrinkage limit

39. Relationship between voids ratio (e) and porosity (n) is given by

a)e=n/1+n **b)n=e/1+e** c)n=e/1-e d) none of the above

40.Soil water which is present at atmospheric pressure is

a. Capillary water **b. Pore water** c. Hygroscopic water d. Crystallization water

Fill in the blanks

1. Slope of flow curve is called **flow index of soil**
2. Darcy's law is valid for **laminar** flow condition in **fine saturated soil**
3. Clay soils are formed due to **Chemical** Weathering
4. Oven dry method is also known as **Thermogravimetric** method
5. The arrangement of soil particles in a soil mass is known as **Soil structure**
6. Constant head permeability test is used for **course grained soil**
7. When the soil mass is saturated its density is called **Saturated density**
8. The face to face arrangement of soil particles is obtained in **Dispersal type of soil** structure
9. **Calcium carbide method(Rapid moisture meter method)** is the quickest method to determine the water content
10. In consolidation process, the water content of a structure soil must **decreases**
11. Vane shear test is used for measuring shear strength of **cohesive** soil
12. The mathematical expression of dry density is given by **ρd=Ms/V**
13. The plasticity Index is obtained as difference between **liquid** and **plastic limits**
14. Electrical analogy method is used to draw **flownet**
15. Unit of unit weight is **KN/m3**
16. Specific gravity of quartz is **2.65**
17. Maximum size of clay is **0.002mm**
18. Triangular classification of soil is given by **US Bureau of Public Roads**
19. Stokes law helps in **Sedimentation** analysis of soils..
20. Hydraulic gradient is ratio of **i=Q/A**
21. Passive earth pressure is **more** than active pressure.
22. Shearing strength equation of coulomb is **s=c+σ tan**Φ
23. Co ordinates of center of Mohr circle are **[(σx+σy)/2 , 0)]**
24. Unit of co-efficient of permeability is **cm/s**
25. Compaction decreases **void ratio**

26. **Clay** is a cohessive soil.
27. Particle size D10 is known as **effective size**
28. Relation between ρd G and e is **ρd=Gρw/1+e**
29. If ρsat is 19.82 kN/cubic meter, submerged unit weight is **10.02KN/m3**
30. Piston and spring analogy is demonstrated by **Terzaghi**
31. Slopes of limited extent is **usually along circular arc**
32. A possible failure surface is **arc of circle**
33. Specific surface is ratio of **total surface area of material per unit of mass**
34. Numerical difference between liquid and plastic limit is **Plasticity index**
35. Unit of coefficient of permeability is **cm/s**
36. The Density of water at 4 degrees C is **1**gm/cm3
37. The soil which some of its intermediate size particles are absent is known as **gap** grade.
38. The relationship between the natural void ratio (e) and porosity ratio is **n=e/1+e or (1-n)=1/1+e**
39. **Karl von Terzaghi's** recognized as father of soil mechanics.
40. **Cappillary water** is the water held due to capillary action.
41. Compaction of soil is aimed to reduce **voids**
42. Falling head permeability test is preferable when soil sample is **fine grained (less permeable soil)**
43. Soil particles coarser than 0.075 mm are generally termed as **fine grained soil(silt or clay)**
44. The process opposite to consolidation is called **Swelling**
45. Sedimentation analysis is based on **Stokes** law
46. Shrinkage ratio of soil is equal to the **mass specific gravity** of the soil in its dry state.
47. The ratio of volume of voids to the volume of soil solids is called **void ratio**
48. **Porosity** is also known as percentage voids
49. Soil has **three** Phase system.
50. The method followed for soil water determination is by **thermogravimetric Or oven drying method**
51. Compression of soil by expulsion of air from voids is known as **compaction**
52. **Shear strength** of clay soils is due to structural and frictional resistance.
53. The method used for determination of coefficient of consolidation is **square root of time fitting method**

54. The core cutter method is used to determine **dry density or bulk density of soil**
55. **Karl von terzaghi** is called the Father of Soil Mechanics
56. A density of soil 1.8 g/cm3 is equal to **17.65** KN/m3
57. The difference between saturated unit weight and unit weight of water is called **submerged unit weight**
58. Uniformity coefficient Cu is calculated by the formula **Cu=D60/D10**

Match the following

1. Jodhpur permeameter - coefficient of permeability
2. Terzaghi one dimensional flow
3. Shearing resistance- triaxial shear test
4. Rankine's theory- active earth pressure
5. Laplace equation- two dimensional flow
6. Loess- wind
7. Peat- decaying vegetation
8. Alluvial- water
9. Ice- glacial
10. Leaning tower of pisa- settlement
11. Coulomb- shearing resistance
12. Stoke's law- settlement of solid particle
13. Rankine- earth pressure
14. Boussinesque- stress distribution
15. Mohr- shear strength
16. Atterberg- soil consistency limit
17. D10- effective size