MCQs of Soil Mechanics and Foundation

Question No. 01

The ratio of the volume of air voids to the volume of voids, is called ?

a. Void Ratio

b. Air content

c. Degree of saturation

d. Porosity

Question No. 02

When the water table is close to the ground surface, the bearing capacity of a soil is reduced to?

a. One-fourth

b. One-half

c. Two-third

d. Three-fourth

Question No. 03

The void ratio of soil is defined as the ratio of the?

a. Weight of water to the weight of solids

b. Volume of water to the volume of voids in the soil mass

c. Total volume of voids to the volume of soil solids

d. Total volume of voids to the total volume of soil

Question No. 04

The earth's pressure at rest is defined as the lateral pressure exerted by soil?

a. when it is at rest

b. when the retaining wall has no movement relative to the backfill

c. when the retaining wall tends to move away from the backfill

d. when the retaining wall moves into the soil

Question No. 05

The bulk density of soil is defined as the ratio of?

a. Total mass of soil to the total volume of soil

b. Weight of water to the weight of solids

c. unit weight of solids to the unit weight of water

d. weight of solid grains to the volume of solids

Question No. 06

The permeability of a given soil is?

a. Directly proportional to the average grain size

b. Inversely proportional to the average grain size

c. Directly proportional to the square of the average grain size

d. Inversely proportional to the square of the average grain size

Question No. 07

The change in volume of soil per unit of initial volume due to a given unit increase in pressure is called?

a. Coefficient of permeability

b. Coefficient of compressibility

c. Coefficient of volume compressibility

d. Coefficient of curvature

Question No. 08

The seepage force in soils is?

a. Proportional to head loss

b. Proportional to exit gradient

c. Perpendicular to the equipotential lines

d. All of these

Question No. 09

The decrease in voids ratio per unit increase of pressure is called?

a. Coefficient of permeability

b. Coefficient of compressibility

c. Coefficient of volume compressibility

d. Coefficient of curvature

Question No. 10

The expansion of soil due to shear at a constant value of press is called?

a. Apparent cohesion

b. True cohesion

c. Dilatancy

d. Consistency

Question No.11

The particle size range is measured by?

a. Effective size

b. Curvature coefficient

c. Uniformity coefficient

d. None of these

Question No.12

The lateral earth pressure is?

a. directly proportional to the depth of soil

b. inversely proportional to the depth of soil

c. directly proportional to the square of the depth

d. inversely proportional to the square of the depth of the soil

Question No.13

Gravel and sand are?

 a. Cohesive coarse-grained soil

 b. Cohesive line-grained soil

c. Non-cohesive coarse-grained soil

d. Non-cohesive fine-grained soil

Question No.14

The critical height in the stability of soil is the?

a. Minimum height at which it is possible for the sloped bank of soil to be stable

b. Maximum height at which it is possible for the sloped bank of soil to be the stable

c. Minimum vertical height of the soil in an open excavation

d. Maximum vertical height of the soil is an open excavation

Question No.15

The water content ratio of soil is defined as the ratio of the?

a. Weight of water to the weight of solids

b. Volume of water to the volume of voids in the soil mass

c. Total volume of voids to the volume of soil solids

d. Total volume of voids to the total volume of soil

Question No.16

The maximum unit pressure that a soil can withstand without rupture in shear or without excessive settlement of the structure, is called?

a. Allowable bearing pressure

b. Safe bearing capacity

c. Ultimate bearing capacity

d. Bearing capacity

Question No.17

Consolidation and compressibility of soil?

a. is a measure of the ability of soil to allow water to pass through its pores

b. is a measure of the ability of soil to bear stresses without failure

c. deals with changes in the volume of pores in soil under load

d. any one of the above.

Question No.18

The plastic limit of soil is defined as the?

a. Limit of water that makes the soil flow

b. Amount of water content that makes the soil go into the liquid state

c. Amount of water content that makes the soil to go into a solid state from the liquid state

d. Minimum amount of water content which makes the soil to be rolled into 3 mm diameter threads

Question No.19

A soil sample is having a specific gravity of 2.60 and a void ratio of 0.78. The water content Soil in percentage required to fully saturate the soil at that void ratio will be?

a. 10

b. 30

c. 50

d. 70

Question No. 20

 Flow lines and equipotential lines are?

a. Perpendicular to each other

b. Parallel to each other

c. Intersecting lines at 90° to each other

d. Intersecting lines at 45° to each other

Question No. 21

The ratio of the difference between the voids ratio in its loosest state and its natural void ratio to the difference between the void ratio is the loosest and densest state, is called?

a. Density index

b. Relative Density

c. Degree of Density

d. Any one of these

Question No. 22

When the hydrometer analysis is performed, it requires correction for?

a. Temperature only

b. Meniscus only

c. Dispersing agent only

d. All of these

Question No.23

The property of soil which enables it to regain its strength lost on remolding in a short time without a change of moisture content, is called?

a. Unconfined Compressive Strength

b. Sensitivity

c. Thixotropy

d. Relative density

Question No.24

The liquid limit exists in?

a. Sandy Soils

b. Gravel Soils

c. Silty Soils

d. Silty Soils

Question No.25

The coefficient of volume compressibility is?

a. Directly proportional to the void ratio

b. Inversely proportional to the void ratio

c. Directly proportional to the coefficient of compressibility

d. Inversely proportional to the coefficient of compressibility

Question No.26

The shrinkage index is equal to the?

a. liquid limit + plastic limit

b. Plastic limit - liquid limit

c. Liquid limit - shrinkage limit

d. Shrinkage limit - Liquid limit

Question No.27

The smallest sieve size according to Indian standards is?

a. 0.0045 mm

b. 0.045 mm

c. 0.45 mm

d. 0.154 mm

Question No.28

Silt is a?

a. Material deposited by a glacier

b. Soil composed of two different soils

c. Fine-grained soil with little to no plasticity

d. Clay with a high percentage of the clay mineral

Question No.29

Which of the following has an influence on the value of permeability?

a. Grain size

b. Void ratio

c. Degree of saturation

d. All of these

Question No.30

The neutral stress on the soil is due to the?

a. External load acting on the soil

b. Weight of the soil particles

c. Weight of water present in soil pores

d. Both (a) and (b)

Question No.31

The pressure exerted by water on the soil through which it percolates, is known as?

a. Hydrostatic pressure

b. Effective pressure

c. Seepage pressure

d. None of these

Question No.32

The property of the soil mass which permits the seepage of water through its interconnection voids, is called?

a. Capillarity

b. Permeability

c. Porosity

d. None of these

Question No.33

The piping failure in a hydraulic structure can be prevented by?

a. Diverting the seepage water into filter wells

b. Increasing the creep length of the flow of water

c. Increasing the stress due to the weight of the structure

d. All of the above

Question No.34

The consolidation of soil is defined as the?

a. Process of compression by gradual reduction of pore space under steady load

b. Process which gives a gradual decrease of water content at a constant load

d. Change in volume of soil due to expulsion of pure water under an applied load

e. Any one of the above

Question No.35

The time factor for a clay layer is?

a. Dimensionless parameter

b. Directly proportional to the permeability

c. Directly proportional to drainage

d. None of these

Question No.36

Which one of the following parameters can be used to estimate the angle of friction of sandy soil?

a. Particle size

b. Roughness of particle

c. Density index

d. Particle size distribution

Question No.37

The effect of cohesion on soil is to?

a. Reduce both active and passive earth pressure intensities

b. Increase both active and passive earth pressure intensities

c. Reduce active earth pressure intensity but increase passive earth pressure intensity

d. Increase active earth pressure intensity but reduce passive earth pressure intensity

Question No.38

According to the I.S. code, the total settlement of isolated footings for cohesive soil should be?

a. 30mm

b. 40mm

c. 50mm

d. 65mm

Question No.39

The degree of consolidation is proportional directly?

a. to time and inversely to drainage path

b. to drainage path and inversely to time

c. to time and inversely to the square of the drainage path

d. to the square of the drainage path and inversely to time

Question No.40

Which of the following statement is correct?

a. The settlement of a flexible footing on cohesionless soil is less in the center than at the edges.

b. The settlement of a rigid footing on cohesionless soil is uniform throughout.

c. The settlement of a flexible footing on cohesive soil is more in the center than at the edges.

d. All of the above

Question No.41

The active earth pressure of soil is defined as the lateral pressure exerted by soil

a. When it is at rest

b. When the retaining wall has no movement relative to the backfill

c. When the retaining wall tends to move away from the backfill

d. When the retaining wall moves into the soil

Question No.42

The compression index of the soil?

a. Increases with the increase in liquid limit

b. Decreases with the increase in liquid limit

c. Increases with the decrease in the plastic limit

d. Decreases with the increase in plastic limit

Question No.43

Which of the following statement is wrong ?

a. The neutral stress does not change the shearing resistance of the soil.

b. The decrease in effective stress is accompanied by an increase in the neutral stress

c. The neutral stress does not decrease the void ratio

d. None of the above

Question No.44

A flow line in seepage through a soil medium is defined as the ?

a. Path of particles of water through a saturated soil mass

b. Mass line connecting points of the equal head of water

c. Flow of movement of fine particles of soil

d. Direction of the flow particle

Question No.45

The activity of clay is defined as the ratio of?

a. Liquid limit to plastic limit

b. Liquidity index to plasticity index

c. Plasticity index to clay fraction

d. Plasticity index to shrinkage index

Question No.46

A sample of clay and a sample of sand has the same specific gravity and void ratio. Their permeabilities will differ because ?

a. Their porosities will be different

b. Their densities will be different

c. Their degrees of saturation will be different

d. Their size ranges of their voids will be different

Question No.47

The coefficient of earth pressure at rest for stiff clay is about ?

a. 0.4

b. 0.5

c. 0.6

d. 0.8

Question No.48

The effective stress on the soil is due to the ?

a. External load acting on the soil

b. Weight of the soil particles

c. Weight of water present in soil pores

d. both (a) and (b)

Question No.49

The bearing capacity factors Nc, Nq, and N?, are functions of ?

a. Cohesion of the soil

b. Friction angle

c. Internal friction angle

d. Both (a) and (b)

Question No.50

The ratio of the volume of voids to the total volume of soil mass is called?

a. Water content ratio

b. Porosity

c. Void ratio

d. Degree of saturation