Q. Lacustrine soils are soils

(a) transported' by river and streams

(b) trasnported by glaciers

(c) deposited in sea beds

(d) deposited in lake beds

Q. Consider the following statements in the context of aeolian soils.

1.The soil has low desity and low compressibility

2.The soil is deposited by wind.

3.The soil has large permeability.

Of these statements

(a) 1, 2 and 3 are correct

(b) 2 and 3 are correct

(c) 1 and 3 are correct

(d) 1 and 2 are correct

Q. Acidic soils are reclaimed by

(a) leaching of the soil

(b) using limestone as a soil amendment

(c) using gypsum as a soil amendment

(d) provision of drainage

Q. The collapsible soil is associated with

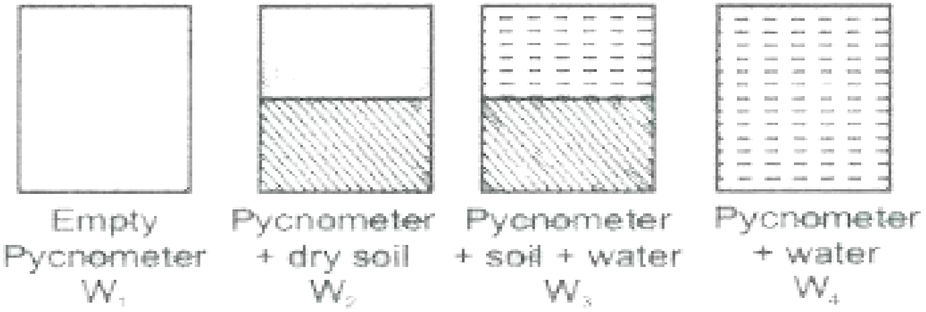
(a) Dune sands

(b) Laterite soils

(c) Loess

(d) Black cotton soils

Q. The given figure indicate the weights of different pycnometers :



The specific gravity of the soils is given by

A. $\frac{W_2}{W_4-W_2}$ **B.** $\frac{W_2-W_1}{(W_3-W_4)(W_2-W_1)}$

C. $\frac{W_2}{(W_3-W_4)}$ **D.** $\frac{W_2-W_1}{(W_2-W_1)-(W_3-W_4)}$

Q. A soil sample has a shrinkage limit of 10% and specific gravity of solids as 2.7. The porosity of the soil at shrinkage limit is

(a) 21.2%

(b) 27%

(c) 73%

(d) 78.8%

Q. In a wet soil mass, air occupies one-sixth of its volume and water occupies one-third of its volume. The void ratio of the soil is

(a) 0.25

(b) 0.5

(c) 1.00

(d) 1.50

Q. A soil has liquid limit of 60% plastic limit of 35% and shrinkage limit of 20% and it has a natural moisture content of 50%. The liquidity index of soil is

(a) 1.5

(b) 1.25

(c) 0.6

(d) 0.4

Q. A fill having a volume of 1,50,000 cum is to be constructed at a void ratio of 0.8. The borrow pit soil has void ratio of 1.4. The volume of soil required (in cubic metres) to be excavated from the borrow pit will be

(a) 1,87,500

(b) 2,00,000

(c) 2,10,000

(d) 2,50,000

Q. Which one of the following tests CANNOT be done without undisturbed sampling?

(a) Shear strength of sand

(b) Shear strength of clay

(c) Determination of compaction parameters

(d) Atterberg limits

Q. If a soil sample of weight 0.18 kg having a volume of 10-4m^3 and dry unit wt. of 1600 kg! m^3 is mixed with 0.02 kg of water then the water content in the sample will be

List - I	List - II
A. Void Ratio	1. V_V/V
B. Porosity	2. W_W/W_S
C. Degree of saturation	3. W/V
D. Water content	4. V_V/V_S

Codes :

a. A – 4, B – 2, C – 5, D – 1

b. A – 5, B – 4, C – 3, D – 1

c. A – 4, B – 2, C – 5, D – 2

d. A – 5, B – 1, C – 3, D – 2

Q. If an unconfined compressive strength of 4 kg/cm in the natural state of clay reduced by

A. 1

B. 2

C. 4

D. 8

Q. The value of porosity of a soil sample in which the total volume of soil grains is equal to twice the total volume of voids would be

(a) 75%

(b) 66.66%

(c) 50%

(d) 33.33%

A soil sample having a void ratio of 1.3, water content of 50% and a specific gravity of 2.60, is in a state of

(a) Partial saturation

(b) Full saturation

(c) Oversaturation

(d) Undersaturation

Q. Consistency as applied to cohesive soils is an indicator of its

(a) Density

(b) Moisture content

(c) Shear strength

(d) Porosity

Q. Match List! (Unit/Test)..with List II (Purpose) and select the correct answer using the codes :

List - I	List – I
A. Cassagrande' s apparatus	1. Determination of grain size distribution
B. Hydrometer	2. Consolidation characteristics
C. Plate load test	3. Determination of consistency limits
D. Oedometer	4. Determination of safe bearing capacity of soil

a. A – 1, B – 3, C – 2, D – 4

b. A – 1, B – 3, C – 4, D – 2

c. A – 3, B – 1, C – 2, D – 4

d. A – 3, B – 1, C – 4, D – 2

Q. Two soil samples A and 8 have porosities n_A 48. = 40% and ns = 60% respectively. What is the ratio of void ratios $e_A : e_s$?

(a) 2 :3

(b) 3 :2

(c) 4 : 9

(d) 9 :4

Q. A cohesive soil yields a maximum dry density of 16 kN/m^3 during a standard proctor Compaction test. If the specific gravity is 2.65, what would be its void ratio?

(a) 0.552

(b) 0.624

(c) 0.712

(d) 0.583

Q. Consider the following statements:

1. The minimum value of group index for a soil can be taken as zero.

2. The maximum possible value of group index for a soil is twenty.

Which of the above statements is/are correct?

(a) Both 1 and 2 (b) 1 only

(c) 2 only (d) Neither 1 nor 2

Q. Match List-I with List-II and select the correct answer using the code given below the lists:

List - I	List -II
A. Plate load	1.Specific gravity
B. Pycnometer	2.Bearing capacity
C. Core cutter	3.Grain size analysis
D. Mechanical sieve	4.Field density

Codes :

a. A – 3, B – 1, C – 4, D – 2

b. A – 2, B – 1, C – 4, D – 3

c. A – 3, B – 4, C – 1, D – 2

d. A – 2, B – 4, C – 1, D – 3

Q. In a wet soil mass, air, occupies one-fourth of its volume and water occupies one-half of its volume. The void ratio of this soil is

A. 1

B. 2

C. 3

D. 4

Q. A sand sample has a bulk density of 20 kN/m^3 and a degree of saturation of 70%. If the specific gravity of soil grains is 2.65, the value of critical hydraulic gradient for the soil will be

(a) 1.02 (b) 1.05

(c) 1.1 0 (d) 1.15

Q. The correct sequence of plasticity of minerals in soil in an increasing order is

(a) Silica, Kaolinite, Illite, Montmorillonite

(b) Kaolinite, Silica, Illite, Montmorillonite

(c) Silica, Kaolinite, Montmorillonite, Illite

(d) Kaolinite, Silica, Montmorillonite, Illite

Q. Match List-l (Deposit) with List-II (Soil structure) and select the correct answer using the codes given below the lists:

List - I	List - II
A. Coarse grained soil	1. Flocculated
B. Silt deposit	2. Cohesive matrix
C. Clay deposit	3. Honeycomb
D. Composite soil	4. Single-grained

Codes :

A. A – 2, B – 3, C – 1, D – 4

B. A – 4, B – 3, C – 1, D – 2

C. A – 2, B – 1, C – 3, D – 4

D. A – 4, B – 1, C – 3, D – 2

Q. Sheep-foot rollers are recommended for compacting

(a) granular soils

(b) cohesive soils

(c) hard rock

(d) any type of soil

Q. Consider the following statements:

1. Relative compaction' is not the same as 'relative density'.
2. Vibro floatation is not effective in the case of highly cohesive soils
3. Zero air void line' and '100% saturation line' are not identical.

Of these statements

(a) 1 and 2 are correct (b) 1 and 3 are correct

(c) 2 and 3 are correct (d) 3 alone correct

Q. In a compaction test if the compacting effort is increased, it will result in

(a) Increase in maximum dry density and OMC

(b) Increase in maximum dry density but OMC remains unchanged

(c) Increase in maximum dry density and decrease in OMC

(d) NO change in maximum dry density but decrease in OMC

Q. An increase in compaction effort will lead to which of the following?

(a) Decrease in the optimum moisture content (OMC) and maximum dry density

(b) Decrease in both the optimum moisture content (OMC) and increase in the maximum dry density

(c) Increase in the optimum moisture .content (OM C) and decrease in the maximum dry density

(d) Increase in both the optimum moisture content (OMC) and maximum dry density

Q. The field density and field moisture content of a soil can be determined by

Core cutter method

Sand replacement method

Proctor compaction test

Modified proctor compaction test

(a) 1,2 3 and 4

(b) 1 and 2 only

(c) 2 and 3 only

(d) 2 and 4 only

Q. If during a permeability test on a soil sample with a falling head permeameter, equal time intervals are noted for drop of head from h, to h2 and again from h2 to h3' then which one of the following relations would hold good?

(a) $h^2_3 = h_1 h_2$

(b) $h_2^2 = h_1 h_3$

(c) $h_1^2 = h_2 h_3$

(d) $(h_1 - h_2) = (h_2 - h_3)$

Q. Due to rise in temperature, the viscosity and unit weight of percolating fluid are reduced to 70% and 90% respectively. Other things being constant, the change in coefficient of permeability will be

(a) 20.0%

(b) 28.6%

(c) 63.0%

(d) 77.8%

Q. The total, neutral and effective vertical stresses (in Um^2) at a depth of 5m below the surface of a fully saturated soil deposit with a saturated density of $2t/m^3$ would , respectively, be

(a) 5, 5 and 10

(b) 5, 10 and 5

(c) 10, 5 and 10

(d) 10, 5 and 5

Q. A stratified soil deposit has three layers of thicknesses: $Z_1 = 4$, $Z_2 = 1$, $Z_3 = 2$ units and the corresponding permeability of K1 = 2, K2 = 1 and K3 = 4, respectively. The average permeability perpendicular to the bedding planes will be

a. 4

b. 2

c. 8

d. 16

Q. Match List-I (Soil Description) with List-II (Coefficient of Permeability, mm/s) and select the correct answer

List - I	List - II
A. Gravel	1. > 1
B. Clay silt admixtures	2. 10^{-2} to 10-4
C. Loess	3. < 10-6
D. Homogenous clay	4. 10-4 to 10-6

Codes :

A. A – 4, B- 1, C – 3, D – 2

B. A – 1, B- 4, C – 3, D – 2

C. A – 4, B- 1, C – 2, D – 3

D. A – 1, B- 4, C – 2, D – 3

Q. Consider the following statements:

The coefficient of permeability K depends upon

1. **Void ratio of the soil.**
2. **Duration of flow.**
3. **Equivalent diameter of the soil grains.**
4. **Shape of the particle.**

Which of the above statements are correct?

(a) 1, 2, 3 and 4 **(b) 2 and 3 only**

(c) 1, 3 and 4 only **(d) 3 and 4 only**

Q. Consider the following statements:

1. Organic matter increases the permeability of a soil
2. Entrapped air decreases the permeability of a soil

Which of the statements given above is/are correct?

(a) 1 only (b) 2 only

(c) Both 1 and 2 (d) Neither 1 nor 2

Q. A soil has discharge velocity of 5×10^{-7} m/s and a void ratio of 0·50. Its seepage velocity will be

(a) 15×10^{-7} m/s

(b) 10×10^{-7} m/s

(c) 20×10^{-7} m/s

(d) 30×10^{-7} m/s

Q. The void ratio of a given soil A is twice that the another soil B, while the effective size of particles of soil A is one-third of that of .soil B. The ratio of height of capillary rise of water in soil A to that in soil B will be

(a) 0.67

(b) 1.0

(c) 1.5

(d) 2.0

Q. A soil has a discharge velocity of 6 x 1 0^{-7} m/s and void ratio of 0.5. Its seepage velocity is

(a) 18 x10^{-7} m/s

(b) 12 x 10^{-7} m/s

(c) 6 x 10^{-7} m/s

(d) 3 x 10^{-7} m/s

Q. A flow net is drawn to obtain

(a) Seepage, coefficient of permeability and uplift pressure

(b) Coefficient of permeability, uplift pressure and exit gradient

(c) Exit gradient, uplift pressure and seepage quantity

(d) Exit gradient, seepage and coefficient of - permeability

Q. An upward hydraulic gradient i of a certain magnitude will initiate the phenomenon of boiling in granular soils. The magnitude of this gradient is

(a) $0 \leq i \leq 0.5$

(c) $i \simeq 1.0$

(b) $0.5 \leq I < 1.0$

(d) $1 < i \leq 2$

Q. A deposit of fine sand has a porosity 'n' and specific gravity of soil solids is G The hydraulic gradient of the deposit to develop boiling condition of sand is given by

A $I_c = (G - 1)(1 - n)$

B. $I_c = (G - 1)(1 + n)$

C. $i_c = \frac{G-1}{1-n}$

D. $i_c = \frac{G-1}{1+n}$

Q. A sand deposit has a porosity of *1/3* and its specific gravity is 2.5. The critical hydraulic gradient to cause sand boiling in the stratum will be

(a) 1.5

(b) 1.25

(c) 1.0

(d) 0.75

Q. Consider the following statements:

Phreatic line in an earth dam is

1. **Elliptic in shape**
2. **An equipotential line**
3. **The topmost flow line with zero water pressure.**
4. **Approximately a parabola**

Of these statements

(a) 1, 2 and 3 are correct

(b) 2, 3 and 4 are correct

(c) 3 and 4 are correct

(d) 1 alone is correct

Q. A flownet of a Coffer dam foundation has 6 flow channels and 18 equipotential drops. The head of water lost during seepage is 6m. If the coefficient of permeability of foundation is 4 x 10^{-5} m/min., then the seepage loss per m length of dam will be

(a) 2.16 x 10^{-2} m^3/day

(b) 6.48 x 10^{-2} m^3/day

(c) 11.52 x 10^{-2} m^3/day

(d) 34.56 x 10^{-2} m^3/day

Q. From a flow net which of the following information can be obtained?

1. Rate of flow 2. Pore water pressure

3. Exit gradient 4. Permeability.

Select the correct answer using the code given below:

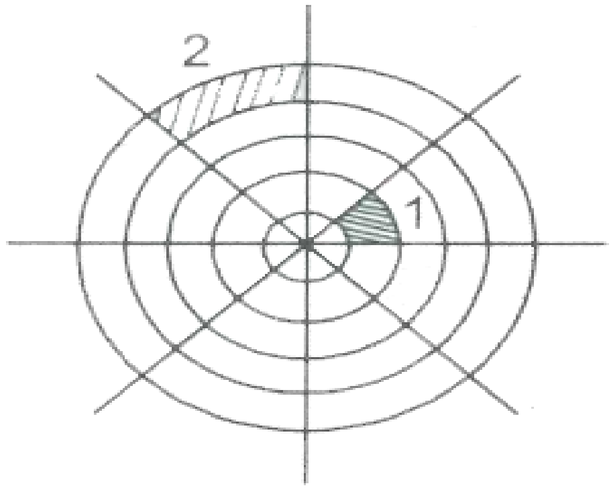
(a) 1, 2, 3 and 4

(b) 1, 2 and 3

(c) 2, 3 and 4 only

(d) 1 only

Q. Standard Newmark's influence chart is shown in the given figure. If loaded equally the areas marked 1 and 2 will yield pressures at the centre such that



(a) 1 yield more than 2
(b) 2 yield more than 1
(c) 1 and 2 yield the same
(d) 1 yield exactly half of that of 2

Q. In a Newmark's influence chart for stress distribution, there are 10 concentric circles and 50 radial lines. The influence factor of the chart is

(a) 0.0002

(b) 0.002

(c) 0.02

(d) 0.2

Q. An isobar is a line which connects all points below the ground surface at which

(a) The local ground elevation is same

(b) The settlement is same

(c) The vertical stress is the same

(d) The ground elevation is varying

Q. The natural void ratio of a saturated clay strata, 3 m thick is 0.90. The final void ratio of the clay at the end of consolidation is expected to be 0.71. The total consolidation settlement of the clay strata is

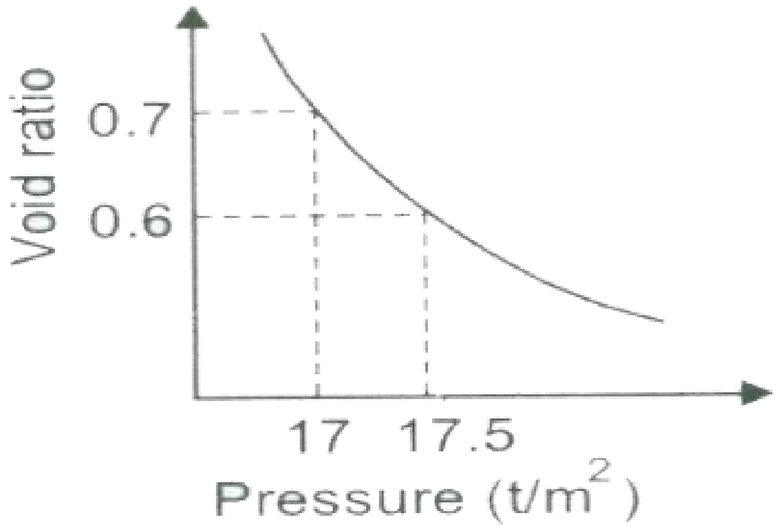
(a) 30 cm

(b) 25 cm

(c) 20 cm

(d) 15 cm

Q. The void ratio-pressure diagram is shown in the given figure. The coefficient of compressibility is



(a) 0.050 m2/t
(b) 0.073 m2/t
(c) 0.20 m2/t
(d) 0.25 m2/t

Q. Match List-I (Property) with List-II (Slope of the curve)

List - I	List - II
A. Coefficient of compressibility	1. Stress – deformation
B. Compression index	2. Stress void- ratio
C. Coefficient of subgrade modulus	3. Volume pressure

Codes :

A. A – 4, B – 2, C – 1

B. A – 4, B – 3, C – 2

C. A – 2, B – 4, C – 1

D. A – 3, B – 4, C – 1

Q. Which one of the following soils has stress strain response similar to that of dense sand? (OCR stands for over consolidation ratio)

(a) Over consolidated clay having high OCR

(b) Over consolidated clays having low OCR

(c) Normally consolidated clays

(d) Unconsolidated clays