(V) **Assertion (A):** Plate load test gives bearing capacity and is normally conducted at the level of the proposed foundation.
Reason (R): Plate load test is reliable because it reflects the true behaviour of foundation stratum below the proposed level of foundation and extending up to large depth below. (a) (2)

Q.7(I) Match the following: (1)

(A) Loess (2)	(1) Lake deposits
(B) Peat (3)	(2) Deposited by wind
(C) Lacustrine clay (1)	(3) Organic soil
(D) Calcareous Sand (4)	(4) Marine water deposits

Q.7(II) Match the following: (1)

(A) When soil is soft clay (2)	(1) Spread Footing
(B) When structural load is heavy and/or soil is erratic (3)	(2) Piles
(C) When soil has good bearing capacity at shallow depth (1)	(3) Raft
(D) When bridge is to be constructed on river bed of sand (4)	(4) Wells

Q.7(III) Match the following: (1)

A. Plate load test (2)	1. Total and frictional resistances —
B. Standard Penetration test (4)	2. Load intensity and settlement values
C. Static Dutch Cone Penetration test (1)	3. In situ undrained shear strength
D. Vane shear test (3)	4. Penetration resistance —

Q.7(IV) Match the following: (1)

A. Pneumatic roller (4)	1. Cohesive and granular soils
B. Smooth wheel roller (3)	2. Plastic soils of moderate cohesion
C. Sheep foot roller (2)	3. Cohesionless soils
D. Vibratory roller (1)	4. Silty soils of low plasticity

Q.7(V) Match the following: (1)

A. Swelling soil (2)	1. End-bearing piles -
B. Weak clay followed by rock at shallow depth (1)	2. Underreamed piles
C. Load bearing walls (4)	3. Raft foundation -
D. Compressible soil but moderate loading (3)	4. Strip footing

Q.7(VI) Match the following: (1)

A. Diamond core drilling (2)	1. Cohesionless soils and exploration to large depth
B. Uncased wash boring (4)	2. Rocky formation
C. Open pit excavation (3)	3. Exploration to a shallow depth below ground level
D. Cased boring (1)	4. Medium strong cohesive soils

Q.8 A soil sampler has inner and outer radii of 25 mm and 30 mm, respectively. The area ratio of the sampler is _____ 44% _____ (in percent). (1)

Q.9 In a plate load test on sand soil, the test plate of 60 cm x 60 cm undergoes a settlement of 5 mm at a pressure of 120 kPa. The expected settlement of 3 m x 3 m footing under same pressure is ___ 25 ___ mm. (2)

Q.10 A stratified soil deposit has three layers of thicknesses: $z_1 = 4$; $z_2 = 1$, $z_3 = 2$ units and the corresponding permeabilities of $k_1 = 2$, $k_2 = 1$ and $k_3 = 4$ units. The average permeability perpendicular to bedding planes will be ___ 2 ___ units. (2)

Q.11 In Q.10, the average permeability parallel to the bedding planes will be $\left(\frac{17}{7}\right)$ units. (2)

Q.12 Actual observed N-value is 23 in a fine sand layer (saturated density = 20 kN/m³) at 12 m depth. Ground water table is at the ground surface. The corrected N-value as per IS code will be $N = 21.2646$

$$N = 18.132$$

(2)

CEL 321 : Geotechnical Engineering
Minor Test I (Aug 28, 2014)

Max Marks: 30   Time: 1 hr

Q.1   In a compaction test if the compacting effort is increased, it will result in   (1)
     (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.2   Which of these statements is/are correct?   (1)
     A dispersed structure is formed in clay when
     (A) the net electrical forces between adjacent soil particles are repulsive
     (B) there is high concentration of dissolved minerals in water
     (C) soil particles are deposited in marine environment
     (D) platelets have face to face contact in more or less parallel arrays

Q.3   A flownet is drawn to obtain   (1)
     (a) seepage, coefficient of permeability and uplift pressure
     (b) exit gradient, coefficient of permeability and uplift pressure
     (c) Seepage, exit gradient and uplift pressure
     (d) Seepage, coefficient of permeability and exit gradient

Q.4   The configuration of flownet depends upon   (1)
     (a) permeability of soil   (b) head difference between upstream & downstream
     (c) boundary condition of flow   (d) Amount of seepage that takes place

Q.5   Which of the following statements is/are correct: (1)
     Phreatic line in an earth dam is
     (A) elliptical in shape   (B) an equipotential line
     (C) the topmost flow line with zero water pressure   (D) approximately a parabola

Q.6   An **Assertion (A)** and a **Reason (R)** is given below. Select the answers to these items using the codes given below:
     Codes: (a) Both A and R are true and R is correct explanation of A
             (b) Both A and R are true but R is not a correct explanation of A
             (c) A is true but R is false
             (d) A is false but R is true

(I)   **Assertion (A):** Wash boring is recommended to obtain undisturbed soil sample above ground water table.
     Reason (R): In wash boring, water pumped through the hollow drill rod disintegrates soil fragments.   (d)   (2)

(II)   **Assertion (A):** In case of sand deposits with uniform density, N values are found to increase with depth.   (a)
     Reason (R): Overburden pressure increases with depth below ground level.   (2)

(III)   **Assertion (A):** For a given soil, the optimum moisture content increases with the increase in compactive effort.
     Reason (R): Higher the compactive effort, higher is the dry density at the same moisture content.   (d)   (2)

(IV)   **Assertion (A):** Black Cotton soils are clays and they exhibit characteristic property of swelling.
     Reason (R): These clays contain Montmorillonite which attracts external water into its lattice structure.   (a)   (2)