1. Match List I (Soil property measured) with List (In-situ test) and select the correct answer using the codes given below the lists:

List – I		List – II
A• Modulus of subgrade reaction	1•	Cyclic pile load test
B• Relative density & strength	2•	Pressuremeter test
C• Skin friction & point bearing.	3•	Plate load test
D• Elastic constants	4•	Standard penetration test

Codes
A• A – 1, B – 3, C – 2, D – 4
B• A – 1, B – 2, C – 4, D – 3
C• A – 2, B – 4, C – 1, D – 3
D• A – 3, B – 4, C – 1, D – 2

2. If the actual observed value of standard penetration resistance, N, is greater than 15 in a fine sand layer below water table, then the equivalent penetration resistance will be

(a) $15 + \frac{(N+15)}{2}$

(b) $15 - \frac{(N+15)}{2}$

(C) $15 + \frac{(N-15)}{2}$

(d) $15 + \frac{(15-N)}{2}$

3. A good quality undisturbed soil sample is one which is obtained using a sampling tube having an area ratio of

(a) 8%

(b) 16%

(c) 24%

(d) 32%

4. Consider the following statements:
The standard Penetration Test (SPT) in soils is the most commonly used field test, SPT is used to determine.

1• Consistency of clay
2• Undrained shear strength of soft sensitive clays.
3• Relative density of sands.
4• Drained shear strength of fine loose sand.

Of these statements

(a) 1 & 2 are correct

(b) 2 & 4 are correct

(c) 1 & 3 are correct

(d) 3 & 4 are correct

5. A soil sampler has inner and outer radii of 25 mm and 30 mm respectively. The area ratio of the sampler is

(a) 24%

(b) 34%

(c) 54%

(d) 44%

6. The correct sequence of the increasing order of disturbance to soil samples obtained from chunk, piston, split spoon and remoulded sampler is

(a) Piston sampler, chunk sampler, split spoon sampler, remoulded sampler

(b) Chunk sampler, piston sampler, split spoon sampler, remoulded sampler

(C) Piston sampler, chunk sampler, rernoulded sampler, split spoon sampler

(d) Chunk sampler, piston sampler, remoulded sampler, split spoon sampler

7. Match List-I (Sampler) with List-II (Use) and select the correct answer :

List – I		List – II
A• Split spoon sampler	1•	To obtain representative samples in all types of soil.
B• Stationary piston sampler	2•	To obtain undisturbed samples of sand below water table.
C• Rotary sampler	3•	To obtain undisturbed samples in clay and silts
D• Compressed air sampler	4•	To obtain approximately undisturbed samples of hard cemented cohesive soils

Codes :
A• A – 1, B – 3, C – 2, D – 4
B• A – 3, B – 1, C – 4, D – 2
C• A – 1, B – 3, C – 4, D – 2
D• A – 3, B – 1, C – 2, D – 4

8. A sampling tube with a cutting edge is used for extracting the samples. The sampling tube has the following dimensions:

Inner diameter of cutting edge = Dc
Outer diameter of cutting edge = Dw
Inner diameter of the sampling tube = Ds
Outer diameter of the sampling tube = Dt
What is the area ratio Ar of the sampling tube?

A. $Ar = \frac{D_W^2 - D_C^2}{D_c^2} \times 100\%$

B. $Ar = \frac{D_t^2 - D_C^2}{D_c^2} \times 100\%$

C. $Ar = \frac{D_t^2 - D_W^2}{D_W^2} \times 100\%$

D. $Ar = \frac{D_t^2 - D_S^2}{D_S^2} \times 100\%$

9. Consider the following statements:

1• Undisturbed samples may be obtained with the help of augers.
2• Auger drilling is most effective in clayey soils
3• Hollow stem augers are sometimes used to drill holes in silty sand.

Which of these statements are correct?

(a) 1, 2 and 3

(b) 1 and 2 only

(c) 2 and 3 only

(d) 1 and 3 only

10. A wet, cohesive subgrade is most effectively stabilised by the addition of

(a) Cement

(b) Fly ash

(c) Bitumen

(d) Lime

11. Consider the following statements:

1• Increase in volume of a soil sample without external constraints on submergence in water is termed as the 'free swell of soil'
2• Clay soil rich in montmorillonite exhibits very low swelling characteristic.
3• Generally, free swell of soil sample ceases
4• when its water content reaches the plastic limit.

Of these statements.

(a) 1 and 2 are correct

(b) 1 and 3 are correct

(c) 2 and 3 are correct

(d) 1, 2 and 3 are correct

12. Consider the following statements On addition of lime to swelling soils

1• Their liquid limit increases
2• Their plastic limit increases
3• Their shrinkage limit increases
4• Their swelling potential decreases

Which of the statements given above are correct?

(a) 1 and 3 only

(b) 1, 2 and 4 only

(c) 2, 3 and 4 only

(d) 1, 2, 3 and 4

13. Consider the following statements:

1• A differential free swell value of 40% indicates a soil with a high degree of expansiveness.
2• A swelling pressure of less than 20 kN/m2 is not of much consequence.
3• The swelling pressure is a unique parameter for a swelling soil and is not influenced by other factors.

Which of the above statements is/are correct?

(a) 1, 2 and 3

(b) 1 and 2 only

(c) 2 and 3 only

(d) 1 only

14. Consider the following statements relating to foundations on expansive soils:

1• Strength should be improved and
2• compressibility should be reduced.
3• Compressibility should be increased
4• No stabilization should be done.

Which of these statements is/are correct?

(a) 1, 2 and 3

(b) 2 only

(c) 1 only

(d) 3 only

15. Consider the following statements: Lime stabilization of soil leads to

1• Decrease in shrinkage limit
2• Increase in plastic limit
3• Decrease in liquid limit
4• Flocculation of clay particles

Which of the above statements are correct?

(a) 1, 2 and 3

(b) 1, 2 and 4

(c) 1, 3 and 4

(d) 2, 3 and 4

16. Which of the following tests are essential for designing a foundation on expansive soils?

1• Swelling pressure test
2• Free swell test
3• Estimation of differential free swell
4• Shrinkage limit test

(a) 1, 2 and 3 only

(b) 1, 2 and 4 only

(c) 1, 2, 3 and 4

(d) 2, 3 and 4 only

17. If an infinite slope of clay at a depth 5 m has cohesion of 1 t/m2 and unit wt. of 2 t/m3, then the stability number will be

(a) 0.1

(b) 0.2

(c) 0.3

(d) 0.4

18. Consider the following statements associated with stability of slope:

1• Stability number is inversely proportional to cohesion and directly proportional to height
2• Swedish method of analysis is based on circular failure surfaces.
3• The Culmann method assumes that rupture will occur in a plane.

Which of these statements are correct?

(a) 2 and 3

(b) 1 and 3

(c) 1..and 2

(d) 1, 2 and 3

19. Taylor's stability number SN is given by which one of the following expressions ? (C is cohesion, Fe is factor of safety y is density of soil and H, the height of the slope)

(a) C / Fc . Y

(b) C / y. H

(c) C / Fc . Y. H

(d) C / F c (y + H)

20. Consider the following statements:
Dewatering increases the slope stability of a cohesion less soil mainly because

1• It causes change in pH.
2• It reduces pore water pressure.

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