CIVIL ENGINEERING MOCK EXAMINATION (2023)-FOUNDATION ENGINEERING-II

Q.1. Which one of the following is **FALSE** about Steel Piles

A. High level of noise during pile driving
B. High load carrying capacity
C. Can penetrate Hard layers such as dense gravels and soft rocks
D. Can be subjected to hard driving

Q.2. Piles foundations are deep foundations and mostly fails in shear mode of;

A. Punching
B. Local
C. General
D. None

Q.3. Which one of the following is **TRUE** about frictional resistance of piles in sands?

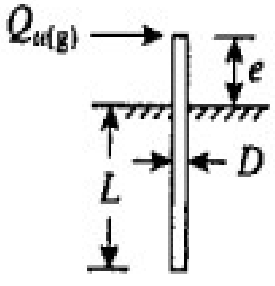
A. At similar depths, unit skin friction in loose sand is higher for a high displacement pile, compared with a low-displacement pile.
B. At similar depths, bored and jetted piles will have a lower skin friction compared with driven piles.
C. The unit skin friction increases with depth more or less linearly to a critical depth of 15 to 20 pile diameter and remains constant thereafter.\
D. All the above

Q.4. How long is a friction pile length is required to carry the 500 kN axial load for the pile-soil system. (Use; diameter of pile = 500mm; cohesion of medium stiff clay soil stratum= 50kPa; parameter, $\alpha = 0.85$ and factor of safety = 3.0).

A. 20.0 m
B. 18.5 m
C. 22.5 m
D. 25.0 m

Q.5. Which one of the following is TRUE about lateral load resistance of free headed piles as per Brom's solution shown in fig.1.

A. If (e/L) increases, the ultimate lateral load resistance ($Q_{u(g)}$) increases
B. If (e/L) increases, the ultimate lateral load resistance (Qu(g)) decreases



Free-headed pile

C. If (e/L) decreases, the ultimate lateral load resistance (Qu(g)) increases

D. None

Fig. 1

Q.6. The site core drilling was conducted to install a pile in to an underlying layer of rock. The laboratory tests have been conducted on sample cores of underlying rock; the design unconfined compression strength of rock was found to be 20Mpa and drained angle of internal friction is 45°. The allowable point bearing capacity of a pile for a factor of safety, F.S = 3.0 is.

A. 50.0 Mpa

B. 40.0 Mpa

C. 45.5Mpa

D. 55.5Mpa

Q.7. Under-reamed piles are:

A. Driven piles

B. Displacement piles

C. Cast-in-situ piles

D. Pre-cast piles

Q.8. How much is a group efficiency of a pile group having an ultimate load of the group of 120kN and three individual piles each having an ultimate load of 50kN.

A. 60%

B. 80%

C. 40%

D. 90%

Q.9. As per EBCS-7, 1995; a permissible total settlement of foundation structure on clayey soils is?

A. 45mm

B. 50mm

C. 60mm

D. 75mm

Q.10. Which of the following soil types is responsible for negative skin friction in piles?

A. A cohesive fill placed over a cohesionless soil

B. A cohesionless fill placed over a compressible, cohesive deposit
C. Lowering of the groundwater table with resulting ground subsidence
D. All of the above

Q.11. It is a known fact that the clay minerals are crystalline hydrous aluminosilicates. Of these clay mineral groups which one mostly presents most of the foundation problems?

A. Montmorillonite
B. Illite
C. Kaolinite
D. None of above

Q.12. Which type of foundation is commonly used to resist uplift forces caused by the swelling of soils?

A. Pile
B. Pier
C. Caisson
D. Strip

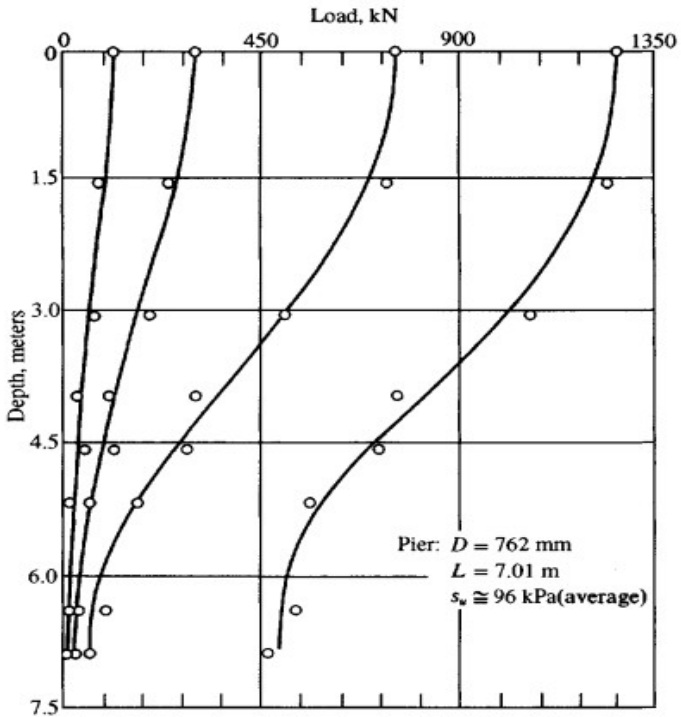
Q.13. Which one of the following is **FALSE** about pier foundations.

A. Single pier may be used instead of a group of piles and pile cap.
B. Piers have high resistance to lateral loads
C. Constructing piers in deposits of dense sand and gravel is easier than driving piles
D. Piles provide high resistance to the uplift load than piers.

Q.14. Changing the nature of the expansive soil is one of the most commonly used techniques for dealing with expansive soils. Which one of the followings is not a mechanism related the technique to change the nature of the expansive soils?

A. Compaction
B. Pre-wetting
C. Installation of moisture barriers
D. Replacement of expansive soil

Q.15. Considering the loading stages of drilled pier shown on fig. 2, the



estimated values of ultimate load resistance, tip resistance and shaft resistances respectively are:

A. 1250 kN, 760 kN, 490 kN
B. 760 kN, 1250 kN, 490 kN
C. 1250 kN, 490 kN, 760 kN
D. 490 kN, 1250 kN, 760 kN

Fig. 2 load distribution for drilled pier

Q.16. The most effective application of piled rafts occurs when the raft can provide adequate load capacity is in one of the following favourable soil conditions.

A. Soil profiles consisting of relatively dense sands
B. Soil profiles containing loose sands near the surface
C. Soil profiles containing soft clays near the surface
D. Soil profiles that contain soft compressible layers at relatively shallow depths

Q.17. The preliminary dimensions assumed for cofferdams should satisfy:

A. Resistance to sliding
B. Resistance to overturning
C. Resistance to shearing
D. All of the above

Q.18. Which one of the following is not the application of geotechnical engineering in protecting environment.

A. Protection against natural hazards such as; floods, landslides and earthquakes.
B. Design and construction of new waste containment facilities, such as; engineered landfills used for disposal of municipal solid waste and hazardous waste.
C. Raw materials savings with high potential for waste and recycled material utilization, such as; ash, slag, construction and demolition waste.
D. None of the above

Q.19. A free swell index of a soil having a volume height of soil read from a cylinder containing distilled water (V_d) and kerosene (V_k) of 105ml and 100ml respectively is?

A. 2.5%
B. 5%
C. 7%
D. 4%

Q.20. The minimum number of piles needed to support a column is:

A. 2
B. 3
C. 1
D. 4

ANSWER FROM ETCONP

Q.1. **D**:
Q.2. **A**:
Q.3. **D**:
Q.4. C:
Q.5. B:
Q.6. C:
Q.7. C:
Q.8. B:
Q.9. D:
Q.10. D:
Q.11. A:
Q.12. B:
Q.13. D:
Q.14. D:
Q.15. C:
Q.16. A:
Q.17. D:
Q.18. D:
Q.19. B:
Q.20. B;