PAKISTAN ENGINEERING COUNCIL

Sample MCQs

Civil Engineering (Geotechnical)

1. Please read all the instructions carefully and do not start the paper unless asked to do so.
2. Fill in your particulars (Name, Roll Number, PEC Registration Number, CNIC and Discipline) in BLOCK letters in the space provided.
3. You are not allowed to change your seat during the test.
4. Hand over your answer sheet to the invigilator at the end of each part and keep seated until allowed to leave the centre.
5. The examination is divided into three Parts viz Part-I, Part-II and Part-III, with 30 minutes break.
6. All questions are to be attempted and carry equal marks.
7. Passing marks for each part is 60%, and passing all three parts is mandatory to qualify EPE.
8. Use only the provided pencil to fill completely the correct choice circle on answer sheet.
9. Programmable calculator, laptop, mobile phone, iPod, and any storage device/electronic gadget are not allowed.
10. No extra sheet will be provided; any calculation may be worked out on the back of the paper.
11. No candidate is allowed to indulge in any Law and Order situation to affect the exam process, and responsible(s) will be disqualified.
12. Use of unfair means will also lead to disqualification.

Instructions for Part-I

This part is common to all disciplines, comprising 30 multiple choice questions of one mark each (Total Marks=30) with the duration of two hours.

Instructions for Part-II

This is a discipline based open book breadth examination, comprising 30 multiple choice questions of one mark each (Total Marks=30), with the duration of two hours.

Instructions for Part-III

This is a discipline based open book depth examination comprising 40 multiple choice questions of one mark each (Total Marks=40), with duration of three hours. The candidates will be allowed only for the specialized filed / area of practice, for which already applied at the time of application.

Civil Engineering (Geotechnical)

Part-I

Total Marks: 30 **Total Time: 2 hours**

Name:	**S/o, D/o, w/o:**
Roll Number:	**PEC Reg#:**
CNIC:	**Discipline:**

Q.1: Quality control is aimed at:

a. Maintaining the desired quality
b. Exceeding the desired quality
c. Continuously improving the quality
d. Following the quality

Q.2: Which of these is correct with respect to a product developed or a service performed?.

a. Bad quality is acceptable, but bad grade is not.
b. Bad grade is acceptable, but bad quality is not.
c. Neither bad grade nor quality is acceptable.
d. Grade and quality is the same thing.

Q.3: Project A has an internal rate of return (IRR) of 21 percent. Project B has an IRR of 7 percent. Project C has an IRR of 31 percent. Project D has an IRR of 25 percent. Which of these would be the BEST project?

a. Project A
b. Project B
c. Project C
d. Project D

Q.4: What characteristic best describes the cost baseline?

a. Total budget for the project
b. Time phased budget for the project
c. Total budget for the project including the contingency budget

d. Total budget for the project including the contingency budget and the management reserve.

Q.5: Present worth is:

a. The discounted future cash flows to the present
b. The compounding present cash flows to the future
c. The current market value of the investment
d. The opportunity cost at the present value.

Q.6: The first preferred way to resolve a dispute between the contracting parties is:

a. Arbitration
b. Litigation
c. Negotiation
d. Mediation

Q.7: Following document define the legal rights and obligations of the parties and may be described as the regulations under which the contract will be performed.

a. Specifications
b. General Conditions of Contract
c. Special provisions
d. Bill of Quantities

Q.8: The minimum notice period for National Competitive bidding is:

a. 30 days
b. 45 days
c. 35 days
d. 15 days

Q.9: Tsunamis' is generated by:

a. Earthquake
b. Air currents
c. Tidal waves
d. Large Ocean waves

Q.10: Globalization has direct impact on:

a. National security
b. Economy
c. Society
d. All above

Q.11: The passive voice for the sentence "He is writing a letter" is;

a. A letter is wrote by him
b. A letter is written by him
c. A letter is being written by him
d. A letter is been written by him

Q.12: Choose the correct sentence

a. He is elder than me
b. He is older than me
c. He is ager than me
d. He is older than I

Q.13: Effective communication is

a. The transfer of message from sender to receiver
b. Sending of massage
c. Receiving of message
d. The transfer of message from sender to receiver and get the desired response.

Q.14: Body language is form of;

a. Personality and attitudes
b. Non verbal communication
c. Individual preference for expression
d. The body expression

Q.15: Project feasibility report is aimed at;

a. Informing the people
b. Attracting the customer
c. Justifying the investment
d. Giving details of resources

Q.16: Research Proposal synopsis is developed at;

a. Final stage of research
b. Initial stage of research
c. Before approval of research proposal
d. In the middle of research

Q.17: Project monitoring is required:

a. Before commencement of the project
b. During implementation of the project
c. After completion of the project
d. At any stage of the project deemed necessary

Q.18: Re-appropriation Statement is form of

a. Progress report
b. Budget report
c. Financial report
d. Normal report

Q.19: PC-III (A) is used for

a. For weekly progress report of public sector projects
b. Monthly progress report of public sector projects
c. Yearly progress report of public sector projects
d. Quarterly progress report of public sector projects.

Q.20: Acquiring management and leadership skills are _____ for a Professional Engineer

a. Wastage of time
b. Not important
c. Highly important
d. Not necessary

Q.21: Engineering ethics refers to:

a. The rules and standards given by an institution for Engineering practice
b. The rules and regulation relating to obligations and rights of others.
c. The professional regulation
d. The rules and standards which govern the conduct of Engineers as professional Engineers.

Q.22: How many commandments are given in PEC Code of Ethics?

a. 20
b. 30
c. 10
d. 05

Q.23: As per PEC Code of Conduct a member shall report unethical professional practices of an engineer or a member with substantiating data to

a. Court of Law
b. Concerned Department
c. Pakistan Engineering Council
d. Law enforcing Agency

Q.24: When a member uses designs, plans, specifications, data and notes supplied to him by a client or an employer or are prepared by him in reference to such client or the employer's work such designs, plans, specifications, data and notes shall remain the property of the _____and shall not be duplicated for any use without the express permission of the _____.

a. Member, Member
b. Client, Client
c. Member, Client
d. Client, Member

Q.25: As per PEC Code of Conduct to maintain, uphold and advance the honor and dignity of the engineering professional, a member shall do following except:

a. uphold the ideology of Pakistan
b. be honest, impartial and serve the country, his employer, clients and the public at large with devotion.
c. Uphold personal interest first
d. use his knowledge and skill for the advancement and welfare of mankind

Q.26: Conflicts are faced when:

a. There are more than one expected outcomes
b. There are more than one expected benefits and losses
c. There is choice between two or more moral values each having its own merits.
d. There are opposing outcomes.

Q.27: An example of a conflict of interest would be:

a. As a responsible official you make a decision about a contract award that will benefit you personally
b. You and a functional manager disagree with a task cost estimate
c. Your sponsor decides to cancel your project because it no longer supports the company strategy
d. Your personality conflicts with that of a key member of your project team.

Q.28: Adherence to professional ethics is _____ an engineer to society.

a. Not obligation of
b. An obligation of
c. Optional for
d. None of above

Q.29: While designing a project by an engineer, _____should be taken into account to protect cultural heritage

a. All possible alternates
b. No protection
c. Minimum protection
d. No care

Q.30: Close interpersonal relationships are characterized by high intimacy whereas distressed relationships tend to involve reciprocation of _____behaviour.

a. positive
b. negative
c. normal
d. casual

Answers:

1. a
2. b
3. c
4. b
5. a
6. c
7. a
8. d
9. a
10. d
11. c
12. b
13. d
14. b
15. c
16. c
17. b
18. c
19. b
20. c
21. d
22. c
23. c
24. b
25. c
26. c
27. a
28. b
29. a
30. b

Part-II (Breadth of discipline)

Total Marks: 30 **Total Time: 2 hours**

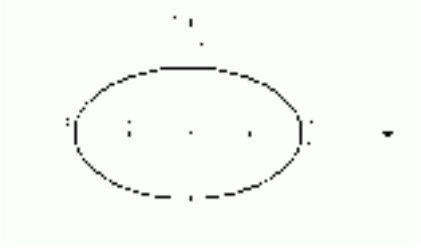
Q.1: An $n \times n$ matrix is said to be symmetric if;

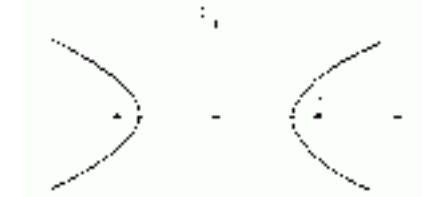
a. If it is equal to its transpose
b. If its determinant is equal to zero
c. If it is of 2nd order
d. None of the above

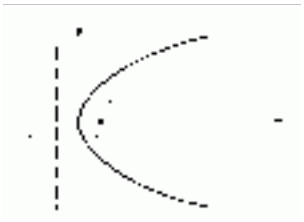
Q.2: Mathematically, what is a differential?

a. A technique used for mathematical modeling.
b. A method of directly relating how changes in an independent variable affect changes in a dependent variable.
c. A method of directly relating how changes in a dependent variable affect changes in an independent variable.
d. None of the above

Q.3: Which of the following is a hyperbola ?

a. 

c. 

b. 

d. None of the above

Q.4: Unit of force in SI system (System International) of units is equal to:

a. Pound
b. Newton
c. Kilogram
d. All

Q.5: Resultant of system of forces can be determined by:

a. Triangle law
b. Parallelogram law
c. $\sqrt{R_x^2 + R_y^2}$
d. All

Q.6: An automobile weighing 10,000N is driven down a 5° incline at a speed of 90 km/hr when the brakes are applied, causing a constant total braking force of 5000N. What will be the energy of automobile at initial position?

a. 318.55 kN. m
b. 553.18 kN. m
c. 813.55 kN. m
d. 855.13 kN. m

Q.7: The back sight reading on a BM of RL 500 m is 2.685 m and force sight reading on a point is 1.345 m, the RL of the point is:

a. 502.685 m
b. 501.340 m
c. 501.345 m
d. 504.030 m

Q.8: When R is the length of the curve (in meters), 'D' is the degree of the curve (in degree) and length of the chord 30 m, then the relation between 'R' and 'D' is:

a. R= 1520/D
b. R=1720/D
c. R=4500/D
d. R=5400/D

Q.9: The brick bond used in Government Sector construction projects in Pakistan is;

a. Flemish
b. Double Flemish
c. English
d. Fletcher

Q.10: If you planning a clearance in a slushy jungle strata for multistory resort, which equipment you will prefer for site clearance;

a. Bob cat

b. JCB
c. Dozer
d. Trailer

Q.11: Alloys having more than 2.1% carbon content are referred as:

a. Steel
b. Cast iron
c. Pig iron
d. Rought iron

Q.12: Minor losses in pipe flow are those

a. Which have a small magnitude
b. Which are caused on account of local disturbances produced by such fittings as valves, bends etc.
c. Caused by friction and are thus also called friction losses
d. Which depend on the length of pipeline

Q.13: In open channels the flow is under_____and in pipe flow under _____

a. atmospheric pressure, pressure higher than atmospheric
b. atmospheric pressure, pressure lower than atmospheric
c. atmospheric pressure, atmospheric pressure
d. hydrostatic, atmospheric

Q.14: Specific Energy is given by E =

a. $y - \frac{\alpha V^2}{2g}$
b. $y - \frac{V^2}{2g\alpha}$
c. $y + \frac{V^2}{2g\alpha}$
d. $y + \frac{\alpha V^2}{2g}$

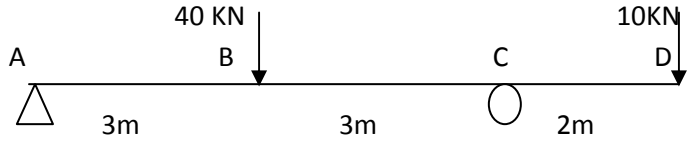
Q.15: Every direct stress is always accompanied by a strain in its own direction and an opposite kind of strain in every direction at right angles to it. Such a strain is known as:

a. Linear strain
b. Lateral strain
c. Volumetric strain
d. Shear strain

Q.16: Which of the following has highest Poisson's ratio?

a. Rubber
b. Steel
c. Aluminum
d. Copper

Q.17: For beam loaded as shown in figure below, what will be the location of point from A where bending moment will change sign:



a. 2.2
b. 3.0
c. 5.2
d. 5.8

Q.18: A plot between rainfall intensity *vs* time is termed as

a. hydrograph
b. mass curve
c. hyetograph
d. isohyte

Q.19: A barrage across a river is mainly used for:

a. river diversion
b. storage
c. river diversion and storage
d. recreation

Q.20: A mean annual runoff of 1 m^3 /second from a catchment of area 31.54 km^2 represents an effective rainfall of:

a. 100 cm
b. 1.0 cm
c. 100 mm
d. 3.17 cm

Q.21: If the BOD_5 of waste water is 150 mg/l at 20^0C the rate constant value is K = 0.23 day^{-1}. The Ultimate BOD will be:

a. 102.5 mg/l
b. 473.7 mg/l
c. 219.5 mg/l
d. 47.5 mg/l

Q.22: Pakistan's Review of IEE and EIA Regulations, 2000; includes the listing of projects requiring IEE or EIA in its:

a. Schedules I and II
b. Schedules III and IV
c. Schedules V and VI
d. Schedules VII

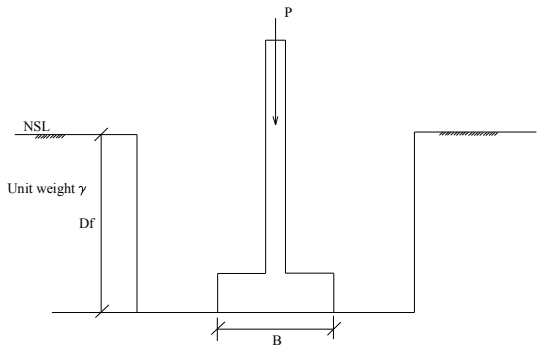
Q.23: The dry density of a moist soil is:

a. Greater than the bulk density
b. Equal to the bulk density
c. Less than the bulk density
d. There is no specific relation

Q.24: Boussinesq theory is applicable if

a. Stress in soil is proportional to strain
b. Stress in soil is independent of strain
c. Stress in soil is inversely proportional to strain
d. Stress in soil is proportional to square of the strain

Q.25: The figure shows a footing placed in an excavation which is not backfilled. The net allowable bearing pressure of the soil is qa. The gross allowable bearing pressure is:



a. qa
b. qa + γDf
c. qa - γDf
d. None of above

Q.26: Railway Stations at which a railway line or one of its branch lines terminates are called:

a. Terminal Stations
b. Junction Stations
c. Halt Stations
d. None of the above

Q.27: An Airport Site should be selected having the property:

a. It should be proximity to residential areas and schools
b. Smoke and haze should be present
c. The presence of several airports in a metropolitan area is preferred
d. None of the above

Q.28: A beam is attached with three fix supports, what will be the degree of indeterminacy of the beam

a. 0
b. 3
c. 6
d. 9

Q.29: If crushing strength of concrete cylinder is 5345 psi, its tensile strength will be

a. 1068.00 psi
b. 534.50 psi
c. 267.25 psi
d. 178.16 psi

Q.30: Under application of loads on a reinforced concrete member, if steel attains maximum stress prior to the concrete member is called

a. Over reinforced section
b. Balanced section
c. Under reinforced section
d. None

Answers:

1. a
2. c
3. c
4. b
5. d
6. a
7. b
8. c
9. c
10. c
11. b
12. b
13. a
14. d
15. b
16. a
17. c
18. c
19. a
20. a
21. a
22. a
23. c
24. a
25. a
26. a
27. d
28. c
29. b
30. c

Part-III (Depth: Geotechnical)

Total Marks/ MCQs: 40 **Total Time: 3 hours**

(Sample MCQs = 20)

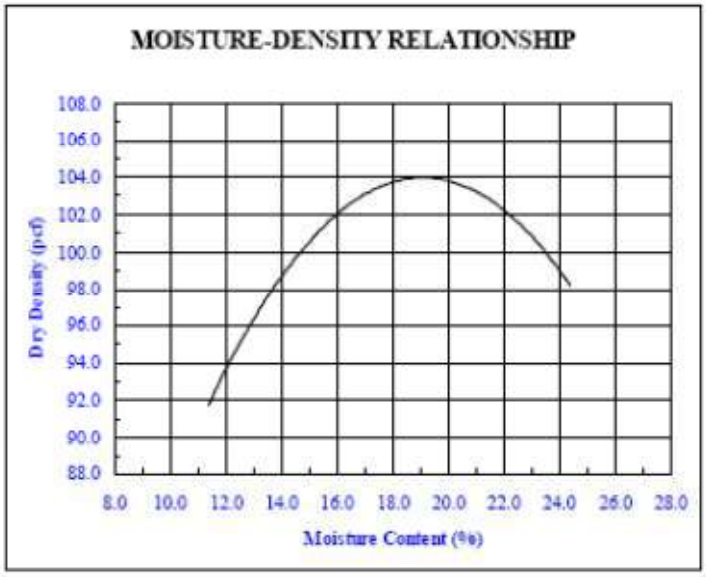
Q.1: A SPT test is performed in a borehole where bottom discharge bit was used for drilling.

a. It will not affect the result
b. SPT value will be decreased
c. SPT value will be increased
d. Not possible to say whether SPT value will be increased or decreased

Q.2: In conducting SPT, refusal is declared if:

a. number of blows of the hammer are more than 50 during any one of the three 6 inch penetration
b. number of blows of the hammer are more than 100 for 12 inch penetration
c. there is no advancement of the sampler for 10 successive blows of the hammer
d. any one of the above conditions is achieved.

Q.3: The figure shows the curve obtained after a Standard Proctor Compaction Test on a soil. What density is required for 95% compaction:



a. 99 psf
b. 96 psf
c. 104 psf
d. 102 psf

Q.4: Classify the following soil using AASHTO Classification System.

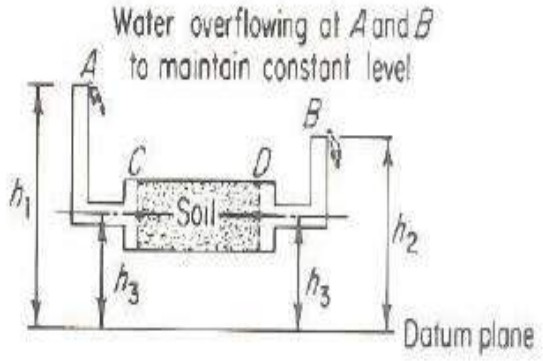
%age Finer than			Atterberg Limits	
No. 10	No. 40	No. 200	LL	PI
18	9	4	NP	NP

a. A-3
b. A-2-4
c. A-1-a
d. A-2-5

Q.5: A sample of clay is found to have a liquid limit of 50% and plastic limit of 20%. The natural moisture content is 21% with OCR=3:

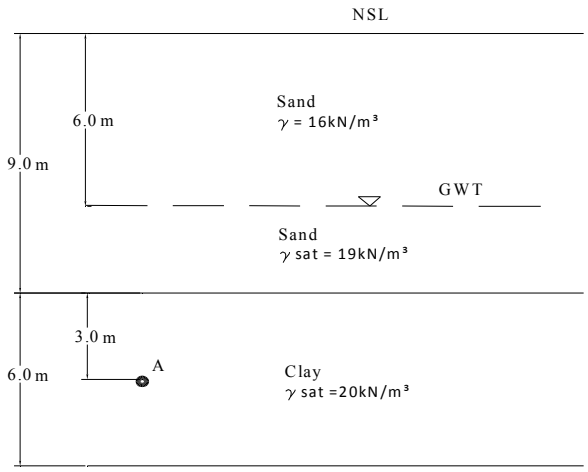
a. The clay is likely over consolidated
b. The clay is likely normally consolidated
c. The clay is likely under consolidated
d. None of the above

Q.6: In the figure, h1-h2=1ft and h1-h3=2.5ft. If the length of the soil sample is 2 ft, it's cross-sectional area 0.3 ft2 and the water flow is 3 in3/min, what is the permeability of the soil:



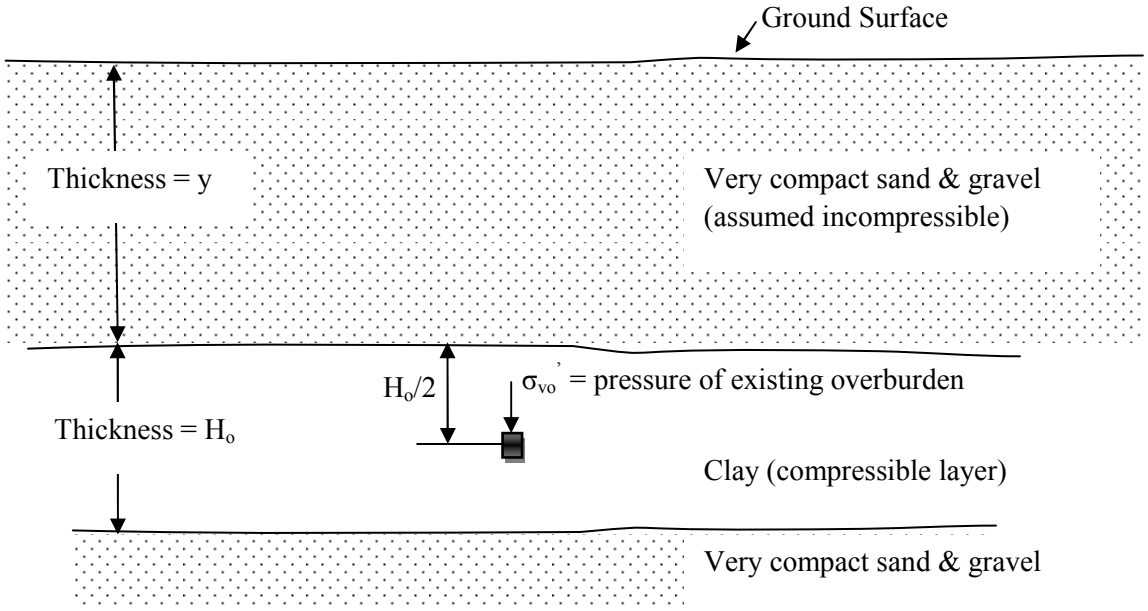
a. 0.004 ft/min
b. 0.012 ft/min
c. 0.019 ft/min
d. 0.009 ft/min

Q.7: A layer of sand 9 m thick overlies a layer of clay 6 m thick. The water table is at a depth of m below NSL. Over a short period of time the water rises by 3 m. The effective vertical stress at A immediately after the rise of water table is:



a. 146.1 kN/m2
b. 133.7 kN/m2
c. 154.1 kN/m2
d. 167.8 kN/m2

Q.8: The figure shows a clay layer sandwiched between two sand layers:



For upper sand and bottom sand stratum, y = 3.66 m, γ = 21.2 kN/m3

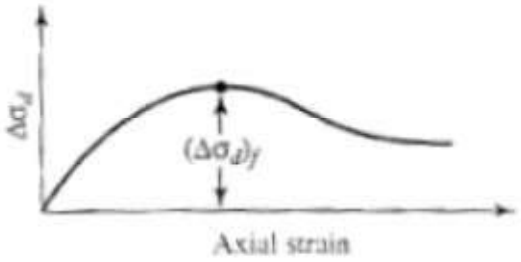
For compressible clay layer, Ho = 2.44 m, γ = 17.27 kN/m3, cc = 0.20, eo = 1.20

The stress increase at the centre of clay is 28.8 kN/m2. The water table is deep. The settlement of clay is:

a. 5.17 cms
b. 6.42 cms
c. 2.46 cms

d. 3.10 cms

Q.9: The figure shows strain vs deviation stress response of a soil tested in CU (Consolidated Undrained) test. The soil is likely to be:



a. Dense sand
b. Loose sand
c. Normal consolidated clay
d. None of above

Q.10: For over-consolidated soils, the at rest lateral earth pressure coefficient:

a. Is always great than 1
b. Does not depend on the over consolidated ratio
c. Decrease as the over consolidation ratio increases
d. Increases as the over consolidation ratio increases

Q.11: The upstream face of the dam has a factor of safety F1 when reservoir is full and F2 after drawdown:

a. F1>F2
b. F1<F2
c. F1=F2
d. Not possible to say

Q.12: A plate (0.3 x 0.3 m plate size) load test performed on clayey soil gives ultimate settlement of 2.2 mm. The ultimate settlement of 2 x 2 m isolated footing will be:

a. 18.65 mm
b. 12.50 mm
c. 14.67 mm
d. None of the above

Q.13: Settlement of a group of frictional piles when compared with that of a single pile:

a. increases with the increase in the number of piles
b. decreases with the increase in the number of piles

c. remains unaltered with the increase or decrease in the number of piles
d. sometimes increases and sometimes decreases with the increase in the number of piles, depending on soil type.

Q.14: The city of Karachi falls in seismic zone:

a. 2A
b. 2B
c. 3
d. 4

Q.15: Pore pressures for stability analysis of downstream slope can be:

a. Neglected
b. Estimated by drawing a flow net
c. Cannot be estimated
d. None of above is true

Q.16: A loose sand deposit about 20 m deep from the ground surface is to be densified. Which method will be most suitable:

a. Using a heavy vibratory roller at the surface
b. Dynamic compaction
c. Vibro compaction
d. None of above

Q.17: One method of reducing differential settlement of a building on sand is to:

a. Decrease the size of the smallest footing
b. Increase the size of the smallest footing
c. Decrease the size of the largest footing
d. None of the above methods will reduce differential settlement

Q.18: From a site, 10 m overburden had been removed in the past. The soil at this site is the example of:

a. Normally consolidated
b. Over consolidated
c. Under consolidated
d. None of the above

Q.19: The pumping out test in a confined aquifer measures mainly the:

a. Horizontal coefficient of permeability
b. Vertical coefficient of permeability
c. Average of horizontal and vertical permeability
d. The square root of the product of horizontal and vertical permeabilities

Q.20: The total weight to be arranged for a pile load test in compression should be:

a. equal to the anticipated maximum test load
b. at least 100% greater than the anticipated maximum test load
c. at least 50% greater than the anticipated maximum test load
d. at least 10% greater than the anticipated maximum test load

Answers:

1. c
2. d
3. a
4. c
5. a
6. b
7. c
8. c
9. a
10. d
11. a
12. c
13. a
14. b
15. b
16. c
17. a
18. b
19. a
20. d