Question Paper Code **13612**

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025
Fifth Semester
Civil Engineering
20CEPC501 - FOUNDATION ENGINEERING
Regulations - 2020

Duration: 3 Hours   Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)
Answer ALL Questions

		Marks	K–Level	CO
1.	Exploratory borings in general exploration is carried out by using _____ (a) Auger (b) Bore equipment (c) Well curb (d) All of the mentioned	1	K1	CO1
2.	Hand auger can be used for depths up to _____ (a) 7 m (b) 6 m (c) 2 m (d) 10 m	1	K1	CO1
3.	Local shear failure generally occurs in _____ (a) Dense sand (b) Non-cohesive soil (c) Loose sand (d) All of the mentioned	1	K1	CO2
4.	Which of the following are original Terzaghi values for Nγ? (a) 34° and 48° (b) 60° (c) None of the mentioned (d) All of the mentioned	1	K1	CO2
5.	The influence factor for rigid square footing is _____ (a) 0.88 (b) 0.82 (c) 1.06 (d) 1.70	1	K1	CO3
6.	The influence factor IW for rigid rectangular footing with L/B=1.5 is (a) 0.88 (b) 0.82 (c) 1.06 (d) 1.70	1	K1	CO3
7.	Machine foundation is subjected to? (a) Static load (b) Dynamic load (c) Both static and Dynamic (d) None of the above	1	K1	CO4
8.	The penetration resistance N for designing of raft should be taken at _____ intervals. (a) 75mm (b) 25mm (c) 30mm (d) 45 mm	1	K1	CO4
9.	Which of the following piles is used to compact loose granular soil? (a) Friction piles (b) End bearing pile (c) Compaction piles (d) Tension piles	1	K1	CO5
10.	A retaining wall with a factor of safety of less than one means: (a) The wall is stable (b) The wall is at risk of failure (c) The wall is over-designed. (d) The wall is unaffected by external loads.	1	K1	CO6

PART - B (12 × 2 = 24 Marks)
Answer ALL Questions

		Marks	K–Level	CO
11.	Show the merits and demerits of wash boring.	2	K1	CO1
12.	List the different objectives of site investigation.	2	K1	CO1
13.	Distinguish between gross bearing capacity and net bearing capacity.	2	K2	CO2
14.	Describe the different modes of shear failure.	2	K2	CO2
15.	Define secondary compression settlement.	2	K1	CO3
16.	What are the components of settlement?	2	K1	CO3
17.	Where can be the raft or mat foundation adopted?	2	K1	CO4
18.	Illustrate the principle behind floating foundation.	2	K2	CO4
19.	List the methods for estimating the load–carrying capacity of a pile.	2	K1	CO5
20.	Where are the deep foundations employed?	2	K1	CO5
21.	Write about surcharge angle.	2	K1	CO6
22.	Elaborate about the earth pressure at rest.	2	K2	CO6

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **13612**

PART - C (6 × 11 = 66 Marks)
Answer ALL Questions

23. a) Explain in detail the standard penetration test .Examine also the corrections to be applied on the observed SPT 'N' Value.   *11*   *K2*   *CO1*

OR

b) Illustrate with neat sketch about the geophysical method of soil exploration.   *11*   *K2*   *CO1*

24. a) Compute safe load of a square footing 1.5mx1.5m located at a depth of 1m below ground level in a soil whose unit weight is 20 kN/m^2. Take C = 20kN/m^2 and φ = 20°, Nc= 17.7, Nq = 7.4, Nγ = 5.0 determine the factor of safety with respect to shear failure for the following cases of location of water table.   *11*   *K3*   *CO2*
     (i) WT is 3m below GL
     (ii) WT is at GL itself

OR

b) Determine the depth at which a circular footing of 3m diameter be found to provide FOS of 3, if it has to carry a safe load of 1500kN. The foundation soil has C = 10 kN/m^2 , γ = 18 kN/m^3 factors for φ = 30° are Nc = 37.2 and Nq = 22.5 and Nγ = 19.7. Use Terzaghi's analysis.   *11*   *K3*   *CO2*

25. a) The load settlement curve data from a plate load test on a sandy soil areas under :   *11*   *K3*   *CO3*

Load,t/m^2	10	20	30	40	50	60	70	80
Settlement,mm	4.5	10	15.5	22	29	38.5	50	64

The size of the plate used was 0.3mx0.3m. Find the size of the square column footing to carry an load of 250t with a maximum settlement of 25mm.

OR

b) The plate load were conducted in a C- Φ soil on plate of 2 different sizes and the following results were obtained.   *11*   *K3*   *CO3*

Load   Size   Settlement
40kN   0.3X0.3 m   25mm
100kN   0.6X0.6 m   25 mm
Find the size of the square footing to carry a load of 800kN at same specified settlement of 25mm.

26. a) Explain the conventional methods of proportioning of raft foundation.   *11*   *K2*   *CO4*

OR

b) Show the procedure for proportioning and designing of the Strap footing with neat sketch.   *11*   *K2*   *CO4*

27. a) Construct the following in detail,
Under reamed piles.
Negative skin friction.   *11*   *K3*   *CO5*

OR

b) A group of nine piles of 300mm diameter spaced at 1m. Find the efficiency of pile group using Felds rule and Converse-Labarra formula.   *11*   *K3*   *CO5*

28. a) Construct coulomb's wedge theory for soil pressure distribution with neat sketch.   *11*   *K3*   *CO6*

OR

b) A retaining wall 10 m high retains cohesion less soil having an angle of internal friction of 30^0. The surface of the soil is level with the top of the wall. The top 3 m of the fill has a unit weight of 20 kN/m^3 and that of the rest is 30kN/m^3. Find the magnitude per meter run and point of application of the resultant active thrust. Assume φ the same for both the strata.   *11*   *K3*   *CO6*