A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 55102

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Fifth Semester

Civil Engineering

15UCE502 - FOUNDATION ENGINEERING

(Regulation 2015)

(IS 6403-1981 is permitted)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. A soil sampler has inner and outer radii of 25 and 30mm, respectively, the area ratio of the sampler is CO1- R

   (a) 24% (b) 34% (c) 44% (d) 54%

2. Why is it necessary to carry out corrections for the N value when SPT is conducted in fine sands below the water table? CO1- R

   (a) Sand gets densified (b) Liquefaction of sand occurs

   (c) Excess pore water pressure is developed (d) Sand adheres to the sampler

3. In case of footing on the surface or shallow depth if it is very dense sand, which one of the failure is likely to occur? CO2- R

   (a) Punching shear failure (b) Local shear failure

   (c) General shear failure (d) Any of the above

4. As per IS :1904-1986, the maximum permissible settlement for isolated footings of RCC structures in plastic clay is CO2- R

   (a) 50mm (b) 60mm (c) 75mm (d) 100mm

5. Negative skin friction in a soil is considered when the pile is constructed through a CO3- R

(a) Fill material (b) Over consolidated clay

(c) Dense coarse sand (d) Dense fine sand

6. In under reamed pile construction, the ratio of shaft diameter to bulb diameter is CO3- R

(a) 1/1.5 (b) 1/2 (c) 1/2.5 (d) 1/4

7. The depth of tension crack in soft clay is CO4- R

(a) $4c_u/\gamma$ (b) $2c_u/\gamma$ (c) c_u/γ (d) $c_u/2\gamma$

8. If the coefficient of active earth pressure is 1/3, then what is the value of the coefficient of passive earth pressure CO4- R

(a) 1/9 (b) 1/3 (c) 3 (d) 1

9. Well foundatons are commonly used as foundations for the following structures CO5- R

(a) Water tanks (b) Bridges

(c) Buildings (d) Reciprocating machines

10. Permissible amplitude for low speed machine (500 rpm) CO5- R

(a) 0.2 to 0.25mm (b) 1 to 1.2mm (c) 0.02 to 0.03mm (d) 0.04to 0.05mm

PART – B (5 x 2= 10Marks)

11. What are the factors influencing in depth of exploration of sub soil? CO1- R

12. What are the requirements of good foundation? CO2- U

13. Give the classification of piles based on their functions. CO3- R

14. What do you understand by plastic equilibrium in soils? CO4- U

15. Define grip length in well foundation CO5- R

PART – C (5 x 16= 80Marks)

16.	(a)	Explain standard penetration test in detail with neat sketch. What are the different corrections to be applied?	CO1-U	(16)
		Or		
	(b)	(i) Describe the salient features of a good sub soil investigation report.	CO1-U	(6)
		(ii) Explain the arrangements and operation of stationary piston sampler. State its advantages over other samplers	CO1-U	(10)
17.	(a)	(i)Discuss in detail about the plate load test with suitable sketch.	CO2-U	(12)
		(ii) List the various methods of minimizing the settlement.	CO2-U	(4)
		Or		
	(b)	A strip footing of 1.5m wide , resting on a sand stratum with its base at a depth of 1m.The properties of sand are γ=17kN/m^3,ϕ=38^o and c'=0.Determine the ultimate bearing capacity of the footing using Terzaghi's theory if the ground water table is locate at depth of 0.5m below the base of the footing and compare the results with IS code method. IS 6403-1981 is permitted.	CO2-App	(16)
18.	(a)	A square group of 25 piles extends between depths of 3m and 10m in a deposit of 20m thick stiff clay which is underlained by rock.The diameter of the pile is 0.5m and the c/c spacing of piles is 1m. The undrained shear strength of a clay at the pile base level is 150kPa and the average value of the undrained shear strength over the depth of the pile is 100kPa. Calculate the capacity of the pile group if Nc=9, α=0.7 and factor of safety is 3.	CO3- App	(16)
		Or		

	(b)	(i) Write short notes on a) Drag down phenomenon b) Under-reamed piles	CO3- U	(8)
		(ii) Explain the dynamic formulae for estimating the load carrying capacity of a single driven pile.	CO3- U	(8)
19.	(a)	Explain Culmann's graphical method to evaluate active thrust	CO4- U	(16)
		Or		
	(b)	(i) Compute the active earth pressure distribution and the total lateral force for a smooth vertical wall of 5m with clay backfill (a) For the short term: $c=45kN/m^2$, $\gamma=18kN/m^3$ and $\phi=0^o$ (b) For the long term: $c=5kN/m^2$, $\gamma=18kN/m^3$ and $\phi=20^o$	CO4- App	(12)
		(ii) Compare Coulomb's theory and Rankine's theory of earth pressure	CO4- U	(4)
20.	(a)	(i) Discuss the various forces acting on well foundations	CO5-U	(6)
		(ii) Briefly discuss the machine foundation and it types with neat sketches	CO5-U	(10)
		Or		
	(b)	(i) Explain how to prevent and minimizing the tilts and shifts during well sinking?	CO5-U	(8)
		(ii) Discuss how to find out the ultimate safe bearing capacity of a foundation well	CO5-U	(8)