





III B. Tech II Semester Regular/Supplementary Examinations, April- 2017 GEOTECHNICAL ENGINEERING – II

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)

2. Answering the question in **Part-A**is compulsory

3. Answer any THREE Questions from Part-B

PART -A

1	a)	How do you decide the number of boreholes to be made in the soil investigation?	[3M]
	b)	Define infinite and finite earth slopes.	[4M]
	c)	Discuss the factors affecting bearing capacity of shallow foundations.	[4M]
	d)	List the causes and effects of settlement.	[4M]
	e)	What are the methods for the installation of piles? Discuss briefly.	[3M]
	f)	Briefly explain the construction procedure of floating caisson.	[4M]
		<u>PART –B</u>	
2	a)	What are the different corrections to be made to SPT field values?	[4M]
	b)	Discuss about methods of Boring.	[8M]
	c)	Describe split spoon sampler.	[4M]
3	a)	Explain the Culmann's graphical method.	[8M]
	b)	Discuss the uses of stability charts. A cutting of depth 10 m is to made in soil which has c	[8M]
		= 30 kN/m ² , $\gamma = 19$ kN/m ³ and $\phi = 0$. There is a hard stratum below the original soil surface at a depth of 12 m. Find the safe slope of cutting if the factor of safety is 1.5. For $D_f = 1.20$; $S_n = 0.143$ for i = 30 ⁰ ; $S_n = 0.101$ for i = 15 ⁰ .	
4	a)	Explain different types of shear failures of soil with neat sketch.	[6M]
	b)	Compute the safe bearing capacity of a continuous footing 1.5 m wide, at a depth of 1.5 m, in a soil with $\gamma = 18 \text{ kN/m}^3$, $c = 18 \text{ kN/m}^2$, and $\phi = 25^\circ$. Terzaghi's factors of $\phi = 25^\circ$ are Nc = 25, Nq = 12.5, and N $\gamma = 10$. What is the safe load per metre run if the factor of safety is 3?	[10M]
5	a)	Describe the procedure to conduct the plate load test with a sketch and state its limitations.	[10M]
	b)	A 1.8 m square column is founded at a depth of 1.8 m in sand, for which the	[6M]

b) A 1.8 m square column is founded at a depth of 1.8 m in sand, for which the [6M] corrected N-value is 24. The water table is at a depth of 2.7 m. Determine the net allowable bearing pressure for a permissible settlement of 40 mm and a factor of safety of 3 against shear failure.





- 6 a) List various types of pile foundations. What are the conditions where a pile [6M] foundation is more suitable than a shallow foundation?
 - b) Explain Indian standard method of conducting a pile load test with a sketch. How [10M] do you estimate safe load carrying capacity from the results of pile load test?
- 7 a) Describe the various components of pneumatic caisson with the help of a sketch. [8M]
 - b) Discuss the various kinds of forces likely to act on a well foundation. [8M]



Time: 3 hours



SET - 2

III B. Tech II Semester Regular/Supplementary Examinations, April- 2017 GEOTECHNICAL ENGINEERING – II

(Civil Engineering)

Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)

2. Answering the question in Part-Ais compulsory

3. Answer any **THREE** Questions from **Part-B**

PART -A

1	a)	How do you decide the depth and lateral extent of exploration?						
	b)	Describe different types of slope failures. [4						
	c)	State the factors affecting location of footing.						
	d)	What are the components of settlement? Distinguish between them?						
	e)	What is negative skin friction?	[4M]					
	f)	What do you understand by grip length? What is its importance in well foundations?	[4M]					
		PART –B						
2	a)	Enumerate the various methods of subsoil exploration. Describe the procedure to [10M] conduct the Standard Penetration Test and corrections to be applied						
	b)	Explain pressure meter test. [6M]						
3	a)	Explain the Rankine's theory for various backfill condition to calculate active and [10M]						
	b)	Discuss the Swedish arc method for the stability analysis of slopes. [6M]						
4	a)	Differentiate the terms (i) Gross pressure and net pressure (ii) Ultimate bearing [6M] capacity and net ultimate bearing capacity and (iii) Safe bearing pressure and allowable bearing pressure.						
	b)	A square footing carries a load of 800kN. The depth of the footing is 1.5m. The [10M] properties of the soil are c=0, φ =38 ⁰ , and γ =18.5kN/m ³ . Determine the size of the footing for a factor of safety of 3 against shear failure. What will be the changes in the size of the footing, if the water table rises to ground level? (for φ =38°, the Nc=52, Nq=49 and N γ =64).						
5	a)	The corrected blow count from SPT in a medium sand, observed at an average depth of 2.5 m was 22 blows/30 cm. Laboratory tests conducted on the sample revealed the following physical properties: $c'= 0$, $\phi'= 30^0$ and $\gamma_t= 18.5$ kN/m ³ . The water table was located at 4.5 m from the ground level. It is planned to place a 2 m wide square footing at depth of 2 m. Estimate the allowable gross bearing pressure for the soil if the factor of safety against shear failure is 2.5 and limiting settlement is 25 mm	[10M]					

b) What is the significance of permissible settlement? State the permissible [6M] settlements for isolated and raft foundations in clays and Sandy Soils.



Code No: RT32012 **SET - 2 R13**

- 6 a) A pile is driven with a single acting steam hammer of weight 15 kN with a free [4M] fall of 900mm. The final set, the average of the last three blows, is 27.5mm. Find the safe load using the Engineering News formula.
 - b) What are different types of piles and their functions? Explain with sketches. [12M]
- 7 a) Briefly explain the procedure adopted in well sinking and bring out the problems [8M] that are encountered in open sinking?
 - b) Under what circumstances is a Pneumatic Caisson preferred? What are the safety [8M] Precautions to be followed in working with a Pneumatic Caisson?

www.firstRanker.com



Time: 3 hours



III B. Tech II Semester Regular/Supplementary Examinations, April- 2017 GEOTECHNICAL ENGINEERING – II

(Civil Engineering)

Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)

2. Answering the question in **Part-A**is compulsory

3. Answer any **THREE** Questions from **Part-B**

PART –A

1	a)	List out the various methods of subsoil exploration.	[3M]
	b)	Compare Rankine's theory and Coulomb's theory.	[4M]
	c)	State the circumstances to go for combined footing.	[3M]
	d)	What are allowable settlements of structures?	[4M]
	e)	What are the limitations of the dynamic pile formulae?	[4M]
	f)	Sketch and describe the various components of a well foundation.	[4M]
		<u>PART –B</u>	
2	a)	Enumerate the types of soil samples and distinguish them.	[4M]
	b)	Write briefly about the dynamic cone penetration test.	[8M]
	c)	State the objectives of soil exploration.	[4M]
3	a)	Explain the Coulomb wedge theory with neat sketches.	[6M]
	b)	Explain the active and passive states of earth pressure acting on a retaining wall.	[6M]
	c)	What is a stability number? What is its utility in the analysis of stability of slopes?	[4M]
4	a)	Differentiate between general shear failure, punching shear failure, punching shear failure	[6M]
	b)	A strip footing, 1 m wide, rests on the surface of a dry cohesion less soil having $\varphi = 25^{\circ}$ and $\gamma = 18$ kN/m ³ . What is the ultimate bearing capacity? What is the value, if	[6M]
		there is complete flooding? Assume $N\gamma = 10$. Explain Tarzachi's analysis of baaring capacity of sail in general shear failure.	[4]
	C)	Explain Terzagin's analysis of bearing capacity of son in general shear failure.	[411]
5	a)	How would you determine the bearing capacity from plate load tests? What are the limitations of the plate load test?	[10M]
	b)	A rectangular footing $(3m\times2m)$ exerts a pressure of 100 kN/m ² on a cohesive soil (Es=5×104 kN/m ² and μ = 0.5). Determine the immediate settlement at the centre, assuming	[6M]
		i) the footing is flexible and	
		ii) the footing is rigid	
		Take I_f for the flexible footing is 1.36 and I_f for rigid footing is 1.06	
6	a)	In a 16 pile group, the pile diameter is 50 cm and centre to centre spacing of square group is 1.8 m. If $c=40 \text{ kN/m}^2$, determine whether the failure would occur with a pile acting individually or as a group? Neglect the end bearing resistance of the piles. All piles are 11 m long. Take mobilization factor α for given cohesion is 0.7	[12M]
	1 \		E 4 N /E 1

b) How would you estimate the load carrying capacity of a pile in cohesion less soils? [4M]

FirstRanker.com

Code No: RT32012

R13

SET - 3

- 7 a) An open caisson, 20 m deep, is of cylindrical shape, with external and internal [10M] diameters of 9 m and 6 m, respectively. If the water level is 2 m below the top of the caisson, determine the minimum thickness of the seal required. Assume $\sigma_c = 2400$ kN/m² and $\gamma_c = 24$ kN/m³, for concrete. Allowable perimeter shear stress = 650 kN/m².
 - b) What are the advantage and disadvantages of pneumatic caissons over open [6M] caissons?





SET - 4

III B. Tech II Semester Regular/Supplementary Examinations, April- 2017 GEOTECHNICAL ENGINEERING – II

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)

2. Answering the question in **Part-A**is compulsory

3. Answer any **THREE** Questions from **Part-B** *****

PART –A

1	a)	What are the di investigation? Exp	fferent lain bi	types iefly.	of samples	that can	be obtain	ed from so	il [4M]
	b)	Discuss the factors	s influe	encing the	e slope stab	ility.			[4M]
	c)	What are the assumptions made in the derivation of Terzaghi's bearing capacity [3] theory?							y [3M]
	d)	What are the reme	dial m	easures a	gainst harm	ful settleme	ents?		[4M]
	e)	What are the facto	actors consider while selecting the type of pile?						
	f)	What are the circu other types?	umstar	ices unde	er which a	well founda	ation is mo	re suited tha	n [4M]
					PART -B	<u>}</u>			
2	a)	State the points to	be con	sidered i	n preparatio	on of soil in	vestigation	report.	[6M]
	b)	Describe the procedure to conduct Static Cone Penetration Test. [6]						[6M]	
	c)	What are design features that affect the sample disturbance? [4N							[4M]
3	a)	What are the different factors of safety used in the stability of slopes? Also [6M] describe different types of slope failures.							o [6M]
	b) A retaining wall is 7 m high, with its back face smooth and vertical. It retain sand with its surface horizontal. Using Rankine's theory, determine active eart pressure at the base when the backfill is (a) dry, (b) saturated and (c) submerged, with water table at 2 m below the surface. Take $\gamma_t=18$ kN/m $\gamma_{sat}=21$ kN/m ³ and $\phi =30^0$.								ns [10M] h ³ ,
4	a)	List the types of foundations and explain how to select the suitable foundation for [6M] the given type of structure.							
	b)	What is a 'raft foundation'? When is it preferred? [4						[4M]	
	c)	(b) Give the approximate Terzaghi's formula you will use for the design of:(i) square footing; (ii) circular footing; and (iii) rectangular footing.							[6M]
5	a)	The following are the results of a load-settlement test carried out on a 30 cm×30						0 [10M]	
		cm plate inside a square pit at a depth of 1.2 m in sandy soil. Find the size of the							e
		square footing to carry a load of 700 kN at the specified settlement of 25 mm							
		Load, kN	0.4	1.0	1.5	2.0	2.5	3.0	
		Settlement, mm	1.5	3.8	5.1	/.4	11.5	14.2	

b) What are the types of foundation settlements? How is these determining?

[6M]

FirstRanker.com www.FirstRanker.com



Firstranker's choice

R13

SET - 4

- What is negative skin friction in piles? Explain the causes of negative skin 6 a) [6M] friction.
 - A pipe group consisting of 9 piles is arranged in 3 rows with 3 piles in each row. [10M] b) Diameter of each pile is 35 cm and spacing is 1.2 m. Length of pile is 10 m. The piles are driven completely in clayey soil having unconfined compressive strength of 100kN/m². The piles are designed as frictional. Determine the capacity of pile group. Take $\alpha = 0.7$
- 7 What are the advantages and disadvantages of a Pneumatic Caisson when a) [8M] compared with other types?
 - b) What are the problems that encountered in well sinking? What are the remedial [8M] measures to control?

2 of 2 con con ket. www. tirstRanket.