

Code No: RT32012

**R13**
**SET - 1**

**III B. Tech II Semester Supplementary Examinations, November -2018**  
**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**

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**PART -A**

- 1
  - a) What is Percussion drilling? [3M]
  - b) Write the formula to determine the factor of safety of a dry infinite slope made of cohesion less soil, and explain the terms in it. [4M]
  - c) Explain the situations in which a combined footing is adopted? [4M]
  - d) What are the types of settlements? [3M]
  - e) Classify pile foundations. [4M]
  - f) Draw the typical vertical cross section of a well foundation and label its parts? [4M]

**PART -B**

- 2
  - a) Explain the direct, semi-direct and indirect methods of soil exploration? [12M]
  - b) Compute the area ratio of a thin walled tube sampler having an external diameter of 6cm and a wall thickness of 2.25mm. Would you recommend the sampler for obtaining undisturbed soil samples? Why? [4M]

- 3
  - a) Derive the expression to determine the stability number of a slope? [8M]
  - b) A canal 3m deep runs through a soil having the following properties  $c_u=10\text{kPa}$ ,  $\Phi_u=100$ ,  $e=0.80$ ,  $G=2.72$ . The angle of slope of the banks is  $\beta=45^\circ$ . Determine the factors of safety with respect to cohesion, when the canal is full up to the top of the banks, and when there is a sudden drawdown? [8M]

$\beta$	$\Phi$	Taylor's Stability number
$45^\circ$	$10^\circ$	0.11
	$4.89^\circ$	0.15

- 4
  - a) Explain the IS code method to determine the bearing capacity? [8M]
  - b) Calculate the safe bearing capacity of a strip footing, 1m wide, in a soil with  $\gamma=18\text{kN/m}^3$ ,  $c = 20\text{kN/m}^2$ , and  $\phi = 20^\circ$ , at a depth of 1m. Terzaghi's bearing capacity factors may be assumed as  $N_c=8.682$ ,  $N_q=2.256$ ,  $N_\gamma=4.16$ . Factor of safety against shear failure=3.0 [8M]
- 5
  - a) Explain the Load-Settlement curves or pressure-settlement curves from the plate load test? [8M]
  - b) Two load tests were conducted at a site, one with a 0.50m square test plate and the other with a 1.0m square test plate. For a settlement of 25mm, the loads were found to be 55kN and 190kN, respectively in the two tests. Determine the allowable bearing pressure of the sand and the load which a square footing, 2m x 2m, can carry with the settlement not exceeding 25mm. [8M]



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- 6 a) Explain the procedure to determine the load carrying capacity of a pile group using the static formula? [8M]  
b) Discuss the types of Piles and their structured characteristics with uses. [8M]
- 7 a) Write a note on the components of a well foundation? [8M]  
b) A bridge 120m long, is to be constructed over a river having  $Q_{\max} = 2418\text{m}^3/\text{s}$ , HFL = 81.17m; LWL = 73.00m and existing bed level = 72.00m. The subsoil consists of loose silty sand layer ( $N_{\text{corrected}} = 10$ ), 3.50m thick, underlain by a thick stratum of medium to coarse sand ( $N_{\text{corrected}} = 24$ ). Determine the founding level of a 4.50m diameter abutment well. The weighted mean diameter of the bed material up to relevant depth is 0.275mm, and permissible settlement is 45mm. [8M]

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