

**B.TECH SEM – V (2007 COURSE) (CIVIL ENGG.) : SUMMER -  
2018**

**SUBJECT : GEOTECHNICAL ENGINEERING**

Day : **Monday**  
Date : **21/05/2018**

**S-2018-2654**

Time : **10.00 AM TO 01.00 PM**  
Max. Marks : 80

**N.B.**

- 1) Q.1 and Q.5 are **COMPULSORY**. Out of the remaining attempt any **TWO** questions from Section I and Section – II.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.
- 4) Use of non-programmable calculator is allowed.

**SECTION – I**

- Q.1**
- a) Describe applications of geotechnical engineering. **(05)**
  - b) Explain the procedure to determine the water content by calcium carbide method. **(05)**
  - c) Describe soil structures. **(04)**

- Q.2**
- a) Draw a typical three phase and two phase diagram and explain it. **(07)**
  - b) Prove the relation  $\gamma = \gamma_d + S(\gamma_{sat} - \gamma_d)$  **(06)**

- Q.3**
- a) The following data were observed from a liquid limit test conducted on a soil sample : **(07)**

No. of blow	20	25	31	35	48
Water Content	64.0	63.1	61.9	60.5	58.7

Determine the liquid limit of soil and calculate flow index.

- b) Describe shrinkage limit test and write the formula for it. **(06)**
- Q.4**
- a) What is the need for soil classification and what are the desirable features of engineering soil classification. **(07)**
  - b) Describe the Indian standard classification of soil. **(06)**

P.T.O.

**SECTION – II**

- Q.5** a) What is a flow net and what are its applications? (05)  
b) Differentiate between modified and standard protector test. (05)  
c) Explain the salient features of Mohr Coulomb failure theory. (04)
- Q.6** a) Derive the Laplace equation for 2 D flow through soil. (07)  
b) Describe falling head permeability test. Derive the formula for  $k$ . (06)
- Q.7** a) Describe effect of compaction on soil properties. (07)  
b) Derive the expression for at rest earth pressure. (06)
- Q.8** a) Describe Triaxial compression test with drainage conditions. (07)  
b) A direct shear test was performed on a dry sandy soil. Normal stress and shear stress at failure are given below. Determine shear parameters of sand. (06)

Normal Stress (KN/m <sup>2</sup> )	Shear Stress (KN/m <sup>2</sup> )
50	35
100	80
200	150

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