



Sanjay Ghodawat University, Kolhapur

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2018-19
EXM/P/09/01

Year and Program: 2018-19

School of Technology

Department of S. Y. B. Tech

Course Code: CET217

Course Title: Soil Mechanics

Semester - II

Day and Date Saturday

End Semester Examination

Time: Max Marks: 100

01/06/2019

(ESE)

10.30 am to 1.30 pm.

Instructions:

- 1) All questions are compulsory.
- 2) Assume suitable data wherever necessary.
- 3) Figures to the right indicate full marks.

Q.1 Solve any Two

a) Discuss a note on classification of soil.

OR

a) A soil sample is partially saturated. Its natural water content was found to be 22% and bulk unit weight 20 kN/m^3 . If specific gravity of soil solids is 2.65, estimate degree of saturation and void ratio.

b) State and explain Darcy's law of permeability. Write validity.

OR

b) In falling head permeameter test, falling results were obtained:
Sample length = 12 cm, sample diameter = 80 mm, initial head = 1200 mm, final head = 400 mm, time for fall of head = 6 minutes, stand pipe diameter = 4 mm. Find coefficient of permeability of soil in mm/sec.

Q.2 Solve any Two

a) Differentiate between standard Proctor test and Modified Proctor test.

OR

a) An undisturbed sample of clay, 24 mm thick consolidated 50% in 20 minutes, when tested in laboratory under drainage allowed at top and bottom. The clay layer from which sample was obtained is 4 meter thick in field.

i) How much time will it take to consolidate 50%, with double drainage?

ii) If the clay stratum has only single drainage, calculate the time

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required to consolidate 50%. Assume uniform distribution of consolidation pressure.

- b) A concentrated load of intensity 20 kN acts at a point in soil. Find intensity of normal and shear stress at depth of 4 m directly below the load. Also find the intensity of pressure at a point which is 2 m horizontally away from the load and at a depth of 4 m? Use Boussinesq's theory. 08 L₃ CO4

OR

- Q.3 b) Write approximate methods for calculation of stresses in soils. 08 L₃ CO4
Solve any Two
- a) Write a note on following terms 08 L₁ CO1
 1. Unit weight of soil 2. Specific gravity of soil solids 3. Water content 4. Void Ratio
- b) Describe flow net in detail. 08 L₁ CO2
- c) Define following terms 08 L₁ CO3
 1. Coefficient of consolidation 2. Coefficient of compression
 3. Coefficient of volume change 4. Coefficient of compressibility
- d) Write assumptions in Boussinesq's theory for point load. 08 L₂ CO4

- Q.4 **Solve any Two**
- a) What do you understand by shear strength of soil. List methods to determine the same. Explain direct shear strength in detail. 09 L₃ CO5
- b) Following results were obtained from a series of a consolidated undrained tests on a soil. 09 L_{1, L3} CO5

Sample No.	Confining pressure (σ_3) kN/m ²	Deviator stress (σ_d) kN/m ²
1	100	600
2	200	750
3	300	870

Plot failure envelope and find out value of shear strength parameters of soil

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- c) A soil mass is retained by a smooth backed vertical retaining wall of 6 m height. The soil has a bulk unit weight of 20 kN/m^3 and $\phi = 16^\circ$, $c = 0$. The backfill carries a surcharge of 4.5 kN/m^2 . Determine the total active earth thrust in kN/m and its point of application

09 L₃ CO5

Q.5 Solve any Two

- a) Explain how different types of rocks are formed. 09 L₂ CO6

- b) Explain following terms with respect to rocks with neat sketches:
i) Joints ii) faults iii) folds 09 L₂ CO6

- c) Explain in detail how a site is selected for a tunnel based on the geology of the site. 09 L₂ CO6

Q.6 Solve any Three

- a) Explain in detail: Active, passive and at rest earth pressure 06 L₂ CO5

- b) Write a note on UU, CU and CD types of shear tests. 06 L₂ CO5

- c) Explain stresses and strains in rocks. 06 L₂ CO6

- d) Explain importance of geology in site selection. 06 L₂ CO6

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