KADI SARVA VISHWAVIDYALAYA

B.E. SEMESTER-V EXAMINATION November -2016

Subject Code: CV-503 Subject Name: Geo Technical Engineering-I

Date:15 /11/2016 TIME: 10.30 am To 1.30pm Total marks: 70

Instruction:

1. Answer each section in separate Answer Sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate **clearly** the options you attempted along with its respective question number
5. Use the last page of supplementary for rough work.

Section-1

Q.1 (A) Explain three phase diagram of soil. [05]

(B) List out types coloumb's failure envelop. Draw and explain coloumb's failure envelop for c-soil, φ-soil & c-φ soil. [05]

(C) What is Particle size distribution Curve? Explain it in detail. What is its use in soil engineering? [05]

OR

(C) Derive relation between e, w, g, & Sr. [05]

Q.2 Answer the following Questions.

(A) What is flow net? Explain it with sketch. What are its characteristics? Give the application of it. [05]

(B) The following data are recorded while performing the standard compaction test. [05]

Water content (%)	6	12	15	20	24
Bulk density kN/m^3	17.5	20.0	20.9	21.8	21.7

Plot the MDD-OMC curve and obtain the optimum water content and maximum dry density. At MDD find the water content for full saturation. Take G=2.70.

OR

Q.2 (A) Differentiate between compaction and consolidation. [05]

(B) A falling head parameter accommodates a soil sample 10 cm high and 50 cm^2 in cross sectional area. The permeability of the sample is expected to be 1 x 10^{-5} cm/sec. If it is desired that the head in the stand pipe should fall from 40 cm to 10 cm in 30 minutes, determine the size of the standpipe which should be used. If on the same soil sample a constant head of 150 cm is maintained for 2 hrs, then how much quantity of water will flow? [05]

Q.3 Answer the following Questions.

(A) Enlist and explain Shear tests based on Drainage conditions. [05]

(B) During consolidation test, the void ratio is determined to decrease from 0.90 to 0.50 under the stress increment of 100kPa to 200 kPa. Compute Coefficient of volume compressibility, Coefficient of compressibility and compression Index. [05]

OR

Q.3 (A) Describe the spring analogy theory for primary consolidation. What are its uses? [05]

(B) Two identical specimen of soil were tested in the Triaxial test apparatus. First specimen failed at deviator stress 700 kN/m^2 when the cell pressure was 180 kN/m^2.Second specimens failed at deviator stress 1300 kN/m^2 under cell pressure 360 kN/m^2.Determine the value of C and Ø analytically. [05]

Section-2

Q.4 (A) What is the scope of Geotechnical Engineering in the field of Civil Engineering? [05]

(B) Explain physical and chemical weathering in detail. [05]

(C) Explain adsorbed water and diffuse double layer of water. [05]

OR

(C) Classify the soil with the following properties as per IS classification system. % Passing 4.75mm sieve =100%, % passing 75 micron sieve =75%, Liquid limit=58%, Plastic limit=14%. [05]

Q.5

(A) What do you mean by sensitivity of soil? What is its importance in soil engineering? [05]

(B) Determine effective stress and neutral stress at a depth of 15 m below ground surface For the following condition: e =0.7 ,G= 2.65 ,Average water content of the soil 5%.Water table at 3m below ground surface. [05]

OR

(A) What is soil classification? Give the basic requirements of soil classification. [05]

(B) Define: (i) Liquid limit (ii) Shrinkage Limit (iii) Toughness Index (iv) Activity of soil(v) Shrinkage Limit [05]

Q.6 Answer the following Questions.

(A) State the factors affecting Permeability and explain any four in detail. [05]

(B) With schematic diagram explain single grained and Dispersed structure. [05]

OR

(A) Explain effects of compaction on any five properties of soil. [05]

(B) Define: Compression Index, Co-efficient of compressibility, co-efficient of volume change, Degree of consolidation, Pre consolidation pressure. [05]

------All the Best------

KADI SARVA VISHWAVIDYALAYA

B.E.(CIVIL ENGINEERING) SEMESTER-V EXAMINATION NOVEMBER-2015

Subject Code:CV503 Subject Name: Geotechnical Engineering-I

Date: 23/11/2015 TIME: 10:30AM TO 1:30PM Total marks: 70

Instruction:

1. Answer each section in separate Answer Sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate clearly the options you attempted along with its respective question number
5. Use the last page of supplementary for rough work.

Section-1

Q.1 (A) Differentiate Physical weathering and Chemical weathering. [5]

(B) Derive using usual notations (i) $\gamma_d = (G \gamma_w / (1+e))$. [5]

(C) What do you understand about index properties? What is their importance? [5]

OR

(C) What is relative density ? How is it determined? What is its importance for a coarse grained soil? [5]

Q.2 Answer the following Questions:

(A) Distinguish between: [5]
(i)Percentage air voids and air content.
(ii)Bulk density and Saturated density.

(B) The total unit weight of a soil is 18.8 kN/m^3 , G = 2.67, & moisture content = 12 %. Calculate the dry unit weight, void ratio and the degree of saturation. [5]

OR

Q.2 (A) Distinguish between: [5]
(i)Transported soil and residual soil.
(ii)void ratio and porosity

(B) A sample of dry soil weighs 68 gms. Find the volume of voids if the total volume of the sample is 40ml and specific gravity of solids is 2.65. Also determine the void ratio. [5]

Q.3 Answer the following Questions:

(A) Differentiate between flocculated and single grained structure. [5]

(B) Explain shrinkage limit of soil. [5]

OR

Q.3 (A) Describe the method for determination of liquid limit of a soil. [5]

(B) What is plasticity index? How soil is classified based on plasticity index? [5]

Section-2

Q.4 (A) Explain IS classification of soil? [5]

(B) Explain the method for determination of specific gravity in laboratory. [5]

(C) Explain "quick sand "condition. [5]

OR

(C) Explain factors affecting permeability of soil? [5]

Q.5 Answer the following Questions.

(A) Write note on standard Proctor test. [5]

(B) Explain field vane shear test? [5]

OR

Q.5 (A) What is unconfined compression test? Sketch the apparatus used. What is its advantage over a triaxial test? [5]

(B) Explain factors which affects compaction of soil? [5]

Q.6 Answer the following Questions.

(A) A series of shear tests were performed on a soil. Each test was carried out until the sample sheared and the principal stresses for each test were: [5]

TEST NO	σ_3 (KN/M^2)	σ_1 (KN/M^2)
1	300	875
2	400	1160
3	500	1460

Plot the Mohr's circle and determine the shear strength parameters.

(B) What are the different methods of compaction adopted in field? How would you select the type of roller to be used. [5]

OR

Q.6 (A) A stratum consisting of fine sand, is 2 meters thick. Under what head of water, flowing in upward direction, will a quick condition develop? [5]

(B) Explain how constant head permeability test is performed in laboratory. [5]

----------All the Best----------

KADI SARVA VISHWAVIDYALAYA

B.E. SEMESTER-V EXAMINATION NOV-DEC-2014

Subject Code:CV503 Subject Name: Geotechnical Engineering-1
Date: 18/11/2014 TIME: 10:30am To 1:30PM Total marks: 70

Instruction:

1. Answer each section in separate Answer Sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate clearly the options you attempted along with its respective question number
5. Use the last page of supplementary for rough work.

Section-1

Q.1	(A)	Distinguish between physical disintegration and chemical disintegration in process of formation of soil.	05
	(B)	Define Toughness Index, Activity, Sensitivity and Thixotropy.	05
	(C)	What are the various factors that affect the compaction of soil mass in the field? How will you measure the compaction in the field?	05
		OR	
	(C)	Explain Mohr – Coulomb strength envelope.	05
Q.2		Answer the following Questions	
	(A)	Derive using usual notations $\gamma_b = (G\,\gamma_w / (1+e))$.	05
	(B)	Write a note on various fields of soil mechanics.	05
		OR	
Q.2	(A)	Derive using usual notations $\gamma_d = (G + e\,S_r)\,\gamma_w / (1+e)$.	05
	(B)	Define phase diagram and draw phase diagrams in terms of void ratio 'e' and porosity 'n'.	05
Q.3		Answer the following Questions.	
	(A)	Define following terms: (i) void ratio (ii) porosity (iii) air content (iv) water content	05
	(B)	An undisturbed soil sample has volume 200 cm^3 and mass 320gm.After oven	05

drying for 24 hours, the mass reduced to 280 gm. Determine water content, bulk density and dry density of soil.

OR

Q.3 (A) Define: 05
(i) Degree of saturation, (ii) Dry density, (iii) Bulk density (iv) Submerged density.

(B) The percentage voids in soil sample is 30% . If maximum and minimum dry density of soil sample are 2.0 gm/cc and 1.5 gm/cc respectively, determine density index of soil, when specific gravity of soil is 2.4. 05

Section-2

Q.4 (A) Write a short note on sedimentation analysis for particle size distribution. 05

(B) Differentiate Flocculated structure and Honeycombed structure. 05

(C) State the assumption made in Terzaghi's theory on one dimensional consolidation. Explain laboratory test for consolidation. 05

OR

(C) Explain 'Quick Sand' condition. 05

Q.5 Answer the following Questions.

(A) Explain the factors affecting permeability of soils. 05

(B) The following data are obtained in a Compaction test: 05

Bulk density (KN/m^3)	12.62	13.19	15.6	17.2	17.5	17.0
Moisture content(%)	8.8	9.6	12	15	18	21

Determine OMC & MDD. Draw zero-air void line. Take G=2.7.

OR

Q.5 (A) How compaction will affect the various properties of soil. 05

(B) The constant water level tank is at height 340mm from the datum. The overflow spout is 140mm above the tank. If the sample has 100mm length and $800mm^2$ cross sectional area and K estimated is 2.5×10^{-2} mm/sec, estimate the quantity of water collected in 20 minutes of time. 05

Q.6 Answer the following Questions.

(A) State merits and demerits of 'Direct Shear Test' . 05

(B) From the Undrained Triaxial test results given below, determine the total 05

shear strength parameters c & φ by plotting conventional failure envelope or modified failure envelope. Also state that at normal stress of 500 kPa, what would be the shear strength?

Sr. No.	Cell Pressure (kPa)	Deviator Stress (kPa)
1	100	180
2	200	320
3	300	500

OR

Q.6 (A) Explain 'Laboratory Vane Shear Test'. 05

(B) Define the term 'pre-consolidation pressure' and briefly explain the method for determination of the same. 05

----------All the Best----------

KADI SARVA VISHWAVIDYALAYA

B.E. (CIVIL ENGINEERING) SEMESTER-V EXAMINATION APRIL-2015

Subject Code:CV503 Subject Name: Geotechnical Engineering-I

Date: 22/04/2015 TIME: 10:30am To 1:30PM Total marks: 70

Instruction:

1. Answer each section in separate Answer Sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate clearly the options you attempted along with its respective question number
5. Use the last page of supplementary for rough work.

Section-1

Q.1 (A) Write a note on various fields of soil mechanics. 05

(B) Derive the equation $e = \frac{wG}{Sr}$ 05

(C) Explain specific gravity determination by Pycnometer bottle. 05

OR

05

(C) What are the different types of soil stratum can occur in nature? Describe in brief.

Q.2 Answer the following Questions:

(A) Distinguish between: 05
(i)Void ratio and Porosity
(ii)Bulk density and Dry density

(B) The void ratio of a clay sample is 0.5 and degree of saturation is 70%. 05
Compute the water content, dry unit weight, wet unit weight of the soil.
Assume G=2.7

OR

Q.2 (A) Distinguish between: 05
(i)Water content and Degree of saturation
(ii)Air content and Percentage air voids

(B) A sampler with a volume of $45cm^3$ is filled with a soil sample. When the soil is poured into a graduated cylinder, it displaces $25cm^3$ of water. What is the porosity and void ratio of the soil? 05

Q.3 Answer the following Questions:

(A) Differentiate between flocculated and honeycombed structure. 05

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(B) What are the uses of consistency limits? 05

OR

Q.3 (A) What is plasticity index? How soil is classified based on plasticity index? 05

(B) Describe the method for determination of plastic limit of a soil. 05

Section-2

Q.4 (A) What are the purposes of soil classification? 05

(B) Differentiate between compaction and consolidation. 05

(C) What are the factors affecting permeability? 05

OR

(C) Explain "Boiling of sand" condition. 05

Q.5 Answer the following Questions.

(A) Write note on Proctor needle test. 05

(B) What are its merit and demerits of triaxial shear test? 05

OR

Q.5 (A) Define UU,CU,CD triaxial tests. 05

(B) What are the factors affecting compaction? Discuss in brief. 05

Q.6 Answer the following Questions.

(A) A series of shear tests were performed on a soil. Each test was carried out until the sample sheared and the principal stresses for each test were: 05

TEST NO	σ_3 (kN/M^2)	σ_1 (kN/M^2)
1	200	600
2	300	900
3	400	1200

Plot the Mohr's circles and determine the shear strength parameters.

(B) Define phase diagram and draw phase diagrams in terms of void ratio 'e' and porosity 'n'. 05

OR

Q.6 (A) The maximum dry density and optimum moisture content of soil from standard proctor test are 18kN/m^3 and 16% respectively. Compute degree of saturation of sample assuming G=2.68. 05

(B) What is time factor? How is it related to the average degree of consolidation? 05

----------All the Best----------