FACULTY OF ENGINEERING

B.E. (Civil) VI – Semester (CBCS) (Backlog) Examination, November 2020
Subject: Soil Mechanics

Time: 2 Hours   **Max.Marks: 70**

Note: Answer any five questions form Part-A and any four questions from Part-B

PART – A (5x2 = 10 Marks)

1. Draw the block diagram of soil.

2. A saturated soil has a volume of 9.6 cm^3 and weight of 17.46 gm. After complete drying it has a volume of 5.22 cm^3 and weight of 11.58 gm. Determine the shrinkage limit.

3. "Capillary water is free water". Answer Yes or No and justify your answer.

4. Differentiate "Discharge Velocity" and "Seepage Velocity". Which of these is always higher than the other?

5. Explain the effect of water content on compaction characteristics.

6. Define compression index.

7. "The unconfined compression test is suitable for cohesionless soils only". Answer Yes or No and justify your answer.

8. In a direct shear test, a clean dry sand sample failed at a shear stress of 30kPa when the normal stress was 50kPa. Determine shear parameters of the soil.

9. Determine the depth of tension crack developed in a pure cohesive soil having c = 40 kPa and γ = 20 kN/m^3.

10. Explain Taylor's stability number.

PART – B (4x15 = 60 Marks)

11. a) Derive the relationship involving percentage air voids, specific gravity, water content and dry unit weight of soil.

    b) In a field exploration, a sample was collected in a sampling tube of internal diameter 5 cm. The length of the extracted sample was 10.2cm and its weight was 387 gm. If G = 2.7, and the weight of dried sample is 313 gm, find the porosity, void ratio, degree of saturation and dry density of the sample.

12. a) How the permeability of fine grained soils have determined in the laboratory? Derive the formula.

    b) A soil profile consists of a sand layer followed by a clay layer. Sand has a thickness of 4.5m. Clay also has a thickness of 4.5m. The water table is situated at a depth of 2m below the ground surface. Sand has a specific gravity of 2.68 and a porosity of 50%. Sand above the water table may be assumed as dry. The clay has a saturated unit weight of 9.8 kN/m^3. Draw total, neutral and effective stress diagrams.

13. a) What is Terzaghi's one dimensional consolidation theory? Derive it from fundamentals.

b) In a consolidation test the following results were obtained. When the load was changed from 50 kN/m^2 to 100 kN/m^2, the void ratio changed from 0.70 to 0.65. Determine the coefficient of volume change and compression Index.

14. a) Explain the procedure of "Triaxial compression Test" for determination of shear parameters and compare its merits over Direct shear test.

b) In a triaxial shear test conducted on a soil having cohesion of 12 kN/m^2 and angle of shearing resistance of 36°, the cell pressure was 200 kN/m^2. Determine the value of the deviator stress at failure.

15. a) Explain Swedish slip circle method and derive expression for factor of safety.

b) A 8m high retaining wall is supporting a backfill having $c = 40 \text{kN/m}^2$, $\phi = 24^o$,

$\gamma = 18.5 \text{ kN/m}^3$. Plot the distribution of passive earth pressure and determine the magnitude and point of application of it.

16. a) Discuss in detail about "Relative Density" of cohesionless soil.

b) Explain about the uses of flownets.

17. Write short notes on following

a) Compaction quality control

b) Rehbann's graphical construction

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FACULTY OF ENGINEERING
BE VI-Semester (Mech.)(CBCS) (Backlog) Examination, November 2020

Subject: Automobile Engineering (Elective – I)

Time: 2 Hours   **Max. Marks: 70**

Note: Answer any five Questions From Part – A, & Any four Questions From Part – B

PART – A (5x2=10 Marks)

1   What is the function of a clutch
2   State the advantages of (i) Magnesium alloy (ii) Aluminium alloy wheels.
3   Define the terms (i) Toe in and Toe out (ii) camber. With neat diagram.
4   State the principle of automobile brake?
5   What are helper springs?
6   What is a transfer box?
7   What is the function of a universal joint?
8   What is the purpose of catalytic converter? Explain with diagram
9   What is the function of fuel injector?
10 What are the various types of petrol injection system?

PART – B (4x15=60 Marks)

11 a. What are the limitations of simple carburettor?
   b. Explain the working of electronic fuel injection system. With a neat sketch

12 Explain with a neat sketch splash type lubrication system.

13 a. Explain with a neat sketch wish bone type suspension system, its advantages and disadvantages.
   b. Explain the working of torsion bar in suspension system.

14 Describe sliding mesh and constant mesh gear box.

15 Sketch and explain the working of simple plate clutch.

16 a. How to control air pollution in automobiles?
   b. Explain different types of catalytic converters.

17 Write short notes on :
    a. Hybrid vehicles.
    b. Euro Norms 2 & 3.
    c. Wheel balancing.

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