Total No. of Printed Pages:2

SUBJECT CODE NO:- H-157
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil)
Geotechnical Engineering
(OLD)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B   1) Q.1 & Q.6 are compulsory. Solve any two questions from remaining questions in each section.
             2) assume suitable data if required state it clearly.

Section - A

Q.1   Attempt any five.   10
       a) What is the value of plasticity for sandy soil? Explain briefly.
       b) Define compaction & consolidation.
       c) Following are the symbols, what they represent?
          - SS & CS
          - SM & CS

       d) Co-relate relation between grain size & voids ratio.
       e) When deposition is takes place with flocculated structure?
       f) State the different modes of soil water.
       g) Define coefficient of compressibility & coefficient of volume change.

Q.2   a) Describe square root time fitting method.   07
       b) Explain highway research board classification.   08

Q.3   a) Discuss laboratory consolidation test.   07
       b) Sketch the plasticity chart. Explain its use in engineering classification of fine grained   08
          soil with reference to IS classification.

Q.4   a) A laboratory compaction test on a soil having specific gravity 2.71 gave a maximum dry   08
          density of 1.99 gm/cm^3 & water content of 18.5%. Determine the degree of saturation, air
          content and percentage air voids at the maximum dry density.
       b) Discuss mechanical stabilization of soil.   07

Q.5   Short notes. (Any three)   15
       a) Assumptions made in Terzaghi's theory & its limitation.
       b) Falling head method to find 'K'.
       c) Atterberg's limit.
       d) Compaction of soil on field.
       e) Spring analogy of consolidation.

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Section - B

Q.6   Attempt any five.   10
   a) Define earth pressure due to backfill.
   b) Draw diagram showing vertical pressure distribution under uniformly distributed load.[for circular area]
   c) Draw contact pressure distribution under rigid footing for saturated clay and cohesion less sand.
   d) Find the value of K_p & K_a if $\Phi = 45°$.
   e) Write down the expression to calculate factor of safety against sliding for cohesion less & cohesive soil for infinite slopes.
   f) Define finite and infinite slope.
   g) Enlist the test used to determine shear strength in laboratory.

Q.7   a) Design a gravity retaining wall 5m height with vertical back to retain a dry cohesion less   10
      backfill of unit weight $\frac{18\ KN}{ms}$ & angle of shearing resistance 30°. Find factor of safety
      against sliding also. Assume friction between base of the wall & the foundation soil as
      30°. The wall is to be 1m wide at top, & to be constructed of brick masonry having unit
      weight 20KN/m^3 use Rankine's theory –
                                                                                                              05
   b) Assumptions made in Rankine's theory.

Q.8   a) Enlist type of failure of finite slope may occurs. Discuss $C - \Phi$ analysis of Swedish slip   08
      circle method.
   b) Explain Newmarks's influence chart.   07

Q.9   a) Two point loads P & Q act on the ground surface 8m apart. The magnitude of P is 100KN   10
      & that of Q is 80KN. Point A is at a depth of 6m directly below P and point B is at a
      distance of 4m from P. Point C lies at a depth of 3m below the ground surface. Calculate
      the increase in vertical stresses at A,B & C due to the point l load.
   b) Discuss general principle of drained, consolidated un-drained & drain tests.   05

Q.10   Attempt any three   15
   a) Explain friction circle method.
   b) What are the factor affecting the slope failure?
   c) Differentiate between finite & infinite slope.
   d) Draw the sketch represents the earth pressure
   e) When do you use the following shear tests and give reasons briefly.
      • Shear box
      • Vane shear test
      • Unconfined compression test