Full marks: 80                                                                                          Time: 3 hours

Answer any Five questions including Q No. 1&2

1.  Answer all questions:                                                                    2x10

a)  What do you mean by OMC & MDD.
b)  Define consolidation.
c)  Define quick sand condition.
d)  What do you mean by ZERO AIR VOID LINE?
e)  Define bearing capacity of soil.
f)  Define air content and porosity.
g)  Define sensitivity of soil.
h)  What do you mean by Mohr Couloumb failure criterion?
i)  Define active and passive earth pressure.
j)  Define shallow and deep foundation.

2. Answer any SIX questions:                                                         5x6

a)  Write down the difference between standard proctor test and modified proctor test.
b)  Write down the differences between compaction and consolidation.
c)  Explain Darcy's law and factors affecting permeability.
d)  Explain particle size distribution curve and its uses in detail.
e)  Explain different type of shallow foundations in detail.
f)  Explain Mohr coulomb failure theory in detail.
g)  Discuss about direct shear test with diagram.

3. Calculate the coefficient of permeability of soil sample 6cm height and 50 cm$^2$ in sectional area, if a quantity of water equal to 430 cc passed down in 10 minutes under a constant head of 40cm. on oven drying, the specimen weighed 4.98 N. Taking G = 2.65, calculate the seepage velocity.            10

4. What are the types of shear failures? Describe with neat sketches.                           10

5. Calculate the safe bearing capacity of sand having Φ = 36 degrees and effective unit weight 1.8 tonnes/m$^3$ under the following cases:

a)  1m wide strip footing              b) 1mx1m square footing

 Consider the depth of footing as 1m from ground surface and neglect the effect of water table. Assume a factor of safety of 3.0. Use terzaghis theory and $N_q$ = 47 and $N_y$ = 43.                           10

6. Explain IS soil classification system of soil.                                              10

7. Explain the process of origin and formation of soil.                                        10