



**Q.2 Answer the following questions. (Attempt any three) (15)**

(a) Draw 3 phase diagram and derive **5**

$$\gamma_b = \gamma_w (G + e S_r) / (1+e)$$

(b) Differentiate Standard Proctor test from modified Proctor test **5**

(c) Differentiate Compaction and Consolidation **5**

(d) Describe IS classification system of Soil. **5**

**Q.3 Answer the following questions.(Attempt any two but (a) is compulsory) (15)**

(a) Write down assumption considered in Boussinesq analysis. Write Boussinesq equation for finding out the vertical stress under a single concentrated load. **7**

(b) Explain Core cutter method to find field density of soil. **8**

**OR**

(b) What is earth pressure? Explain three types of earth pressure and coefficient of earth pressure. **8**

**Q.4 Answer the following questions.(Attempt any two but (b) is compulsory) (15)**

(a) A sample of sand above water table was found to have a natural water content of 18% and a unit weight of 18.75 kN/m<sup>3</sup>. Laboratory tests on a dried sample indicated values of 0.5 and 0.85 for minimum and maximum void ratios respectively, for densest and loosest states. Calculate the degree of saturation and relative density. Assume G=2.65. **7**

**OR**

(a) For a construction project, a site is selected where geotechnical exploration reveals that first layer from surface is graded soil of unit weight 24 KN/m<sup>3</sup> and it is upto 2.8 m. It is underlain by 2 m thick silty clay of unit weight 19 KN/m<sup>3</sup> and further there is 2 m layer of gravel of unit weight 20 KN/m<sup>3</sup>. The water table is at the surface of silty clay. Draw the total stress, Pore pressure and effective stress diagram and also show the value of each at bottom of silty clay and at the bottom of gravel layer. **7**

(b) Explain the one dimensional consolidation theory with Terzaghi's spring analogy concept for different drainage conditions **8**