Dr Saurabh

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST - 1 EXAMINATION - February 2018

B.Tech IV Semester

COURSE CODE: 10B11CE411 MAX. MARKS: 15

COURSE NAME: GEOTECHNICAL ENGINEERING

COURSE CREDITS: 04 MAX. TIME: 1Hr

***Note:** All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume data wherever necessary.*

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[1] Distilled water was added to 60 gm of dry soil to prepare a suspension of 1 litre. What will be the reading of a hydrometer in the suspension at $t = 0$ sec, if the hydrometer could be immersed at that time? Assume specific gravity of solids = 2.70. **[5]**

[2] A 4m high embankment, with a top width of 5m and side slopes of 1:1 has to be constructed by compacting soil from a nearby borrow pit. The unit weight and natural moisture content for the soil are 1.8 t/m^3 and 8% respectively. Determine:

a) The volume of earth to be excavated from the borrow pit (in m^3)

b) The quantity of water (volume in m^3) to be added to it for every km of finished embankment, if the required dry density and moisture content of the embankment soil be 1.82 gm/cc and 18% respectively. Given, $G = 2.70$. **[3+2 = 5]**

[3] Derive the relationship for dry unit weight of soil 'γ_d' as given below: **[3]**

$$\gamma_d = \frac{(1 - n_a)G\gamma_w}{1 + wG}$$

[4] Considering the clay particle interaction, explain why natural clay deposits are generally flocculated in structure? **[2]**