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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATIONS-2022

B.Tech. – 4th Semester (Civil)

COURSE CODE: 18B11CE411 MAX. MARKS: 15

COURSE NAME: Geotechnical Engineering

COURSE CREDITS: 3 MAX. TIME: 1 Hour

Note: *All questions are compulsory. Marks are indicated against each question in square brackets. Assume necessary data as per the SI codes wherever applicable.*

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1. A given soil mass has a moisture content of 10.5% and a void ratio of 0.67. The specific gravity of solids is 2.68. It is required to construct three cylindrical test specimens of diameter 3.75 cm and height 7.5 cm from this soil mass. Each specimen should have a moisture content of 15% and a dry density of 1.6 gm/cc. Determine:
   a) The total weight of the given soil to be used for this purpose.
   b) The volume of water to be mixed with it. **[3+2 = 5]**
2. Justify the statement "Isomorphous substitution increases the net negative charge on the surface of a clay crystal." **[2]**
3. Considering the clay particle interaction, explain why natural clay deposits are generally flocculated in structure? **[3]**
4. A Pycnometer test for the determination of water content of a soil sample having $G_s = 2.70$ yielded the following data:

   Wt. of moist soil = 230.75gms
   Wt. of Pycnometer full of water = 2965.20 gm
   Wt. of Pycnometer + soil + water = 3092.85 gm
   Calculate the water content of the soil. **[5]**