

Roll No. _____

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST - 1 EXAMINATION – February, 2020

B.Tech. IVth 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.

- [1] Five different particle sizes are mixed in proportion shown below and water is added to make volume of soil suspension exactly equal to 1000 cc.

Particle size, (mm)	Mass, (gm)
0.060	5
0.020	15
0.010	20
0.005	4
0.001	6

The particles have a specific gravity of 2.65 and $\eta = 0.00895$ poise. The temperature of the soil suspension is 25°C. The density of water can be taken as 1.0 g/cc. The suspension was thoroughly shaken and sedimentation allowed.

- What is the largest size present at a depth of 10 cm after 8 minutes of the start of sedimentation?
- What is the specific gravity of the soil suspension at a depth of 10 cm after 8 minutes of the start of sedimentation?
- How long after the start of sedimentation will all particles have settled down below a depth of 10 cm? [2+3+2 = 7]

- [2] What is 'diffuse – double layer'? How does 'Clay – water interaction' affect the soil structure? [1+2 = 3]

[3] A compacted fill is to be constructed using one of the two potential borrow areas A and B. The in – situ properties of soil at these sites are as follows:

Borrow area A: $e_n = 0.80$; $w_n = 17.5\%$; $G_s = 2.65$

Borrow area B: $e_n = 0.68$; $w_n = 14.0\%$; $G_s = 2.65$

The compacted volume of the embankment will be $50,000 \text{ m}^3$, its unit weight 20 kN/m^3 at a placement water content of 20%. Soil from the borrow area is to be excavated and transported to the site in trucks of 10 m^3 capacity. During excavation and dumping of soil in the trucks, the soil increases in volume by 10%. At the site, required additional amount of water is added to the soil and compacted to desired extent by pneumatic rubber tyred rollers. The cost of excavation, transportation and compaction is Rs. 400 per truck for borrow area A and Rs. 500 per truck for borrow area B. Water charges per truck is Rs. 150. Which of the two borrow areas is more economical? [5]

WINTER EXAMINATION - FEBRUARY 2019