

**GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE - SEMESTER-VI(OLD) – EXAMINATION – SUMMER 2019**

**Subject Code:160606**

**Date:16/05/2019**

**Subject Name: Geotechnical Engineering - II**

**Time:10:30 AM TO 01:00 PM**

**Total Marks: 70**

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

**Q.1 (a)** Explain active earth pressure, passive earth pressure and earth pressure at rest. in detail. **07**

**(b)** What are the assumptions made in the theory of Terzaghi's analysis? **07**

**Q.2 (a)** Differentiate between strip footing and strap footing. **07**

**(b)** Describe with neat sketch wash boring method of sub- soil exploration. What are its merit and demerits? **07**

**OR**

**(b)** Explain briefly Boring Log and sub-surface profile **07**

**Q.3 (a)** Explain any one penetration tests and its outcomes. **07**

**(b)** Determine the size of square footing if it is placed at 1.8m depth on sandy soil has following property:  $\phi=37^\circ$ ,  $\gamma = 18\text{kN/m}^3$ . Neglect the water table effect. Footing has to carry 2000kN.Ultimate load use Terzaghi's equation. **07**

**OR**

**Q.3 (a)** A retaining wall of height 6.0 m has a horizontal backfill with  $C=22\text{ kPa}$ ,  $\Phi = 20^\circ$  &  $\gamma t = 19\text{ kN/m}^3$ . Compute the total passive thrust acting on the wall. **07**

**(b)** What are the graphical method available for the determination of active earth pressure? Explain any one in detail. **07**

**Q.4 (a)** Differentiate between Finite and Infinite slope. Explain the method of checking the stability of a finite slope by Swedish method of Slices for a Cohesive frictional soil. **07**

**(b)** The results of the plate load test conducted on a 0.3m square plate at a depth of 1.2m on dry sand is given below. **07**

Load intensity (kN/m <sup>2</sup> )	0	50	100	150	200	250	275	300	325	350
Settlement (mm)	0	3	5	10	13	19	22	28	39	65

Determine net allowable bearing capacity for footing of size 2.4m x 2.4m with factor of safety 3 and settlement not to exceed 50mm. Foundation is placed at 1.2m depth. Neglect water table effect.

**OR**

**Q.4 (a)** Define Under Reamed pile. Discuss its method of construction with help of a neat sketch and give criteria for bulb design. **07**

**(b)** Discuss various types of shallow foundation with neat figures. **07**

- Q.5** (a) A 30 cm diameter concrete pile is driven in normally consolidated clay 15m thick. Estimate the safe load Take  $C_u=70 \text{ kN/m}^2$   $\alpha=0.9$  and F.S. =2.5. **07**
- (b) A 10m long concrete pile is driven into a medium dense sand ( $\phi=30^\circ$ ,  $\gamma=20 \text{ kN/m}^3$ ,  $k=1.0$ ,  $\tan \delta=0.5$ ) Take  $D_c/B=10.0$ . Estimate the safe load (F.S. =2.5) **07**

**OR**

- Q.5** A reinforced concrete pile weighing 30 kN (inclusive of helmet and dolly) is driven by a drop hammer weighing 40 kN and having an effective fall of 0.8m. The average set per blow is 1.4 cm. The total temporary elastic compression is 1.8 cm. Assuming the co-efficient of restitution as 0.25 and a factor of safety of 2, determine the ultimate bearing capacity and the allowable load for the pile. **14**

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