Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (OLD).EXAMINATION – WINTER 2016

Subject Code: 160606 Date: 25/10/2016

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)**	Describe anyone dynamic formulae.state its limitations. Enumerate various I S code methods to determine safe load by performing pile load test	**07**
	(b)	Design a friction pile group embedded in uniform clay having cohesion=0.4kg/cm2 to transmit a load of 450 metric tons including pile cap. Each pile has diameter of 60 cm with pile length=10m, consider spacing of pile=3 times the diameter, Take FS=2.	**07**
Q.2	**(a)**	Explain Swedish slip circle method for (i) angle of internal friction zero condition of soil (ii) soil having cohesion and angle of internal friction.	**07**
	(b)	A canal 6m deep runs through a soil having cohesion = 1.8 t/m2, angle of internal friction = 10 degree & G=2.72 the angle of slope of bank is 45degree. Determine the factor of safety with respect to cohesion when the canal is full up to top of the banks. What is the change in factor of safety in case of sudden drawdown? Take Sn=0.108 and 0.137 for angle of internal friction=10degree and 4.88degree respectively	**07**
		OR	
	(b)	Explain the following terms : weighted friction angle ; depth factor Stability analysis by Swedish method of slices gave the values per running meter for 10m high embankment (i) total shearing force=480 kN, (ii) total normal force= 1950kN, (iii) total neutral force= 250kN (iv) length of arc= 22m. Properties of soil: cohesion =24 kN/m2; angle of internal friction=6 degree. Compute FS with respect to shear strength.	**07**
Q.3	**(a)**	Write a note on Newmark's influence chart with its concept and its utility	**07**
	(b)	Two footings P and Q, carry a concentrated loads. Centre to centre distance between footings is 4m. If footing P carries 30t and vertical stress under its depth of 5m below is 0.904 t/m2, find the load carried by footing Q. Also find the vertical stress at 5m depth below footing Q. **Influence factor, Kb = 3/2 [1/ 1+ (r/z)2] 5/2**	**07**
Q.4	**(a)**	Write short notes on Rankine's earth pressure theory for cohesion less backfill and its Bell's modification for cohesive soils	**07**
	(b)	A retaining wall 4m high has a smooth vertical back. The backfill has a horizontal surface in level with the top of the wall. There is uniformly distributed surcharge 36kN/m2 over the backfill. The unit weight of soil =18kN/m3. The angle of internal friction = 30 degree and cohesion is zero. Determine magnitude & point of application of active pressure per m length of wall. What will be the change in magnitude of earth pressure if full back fill is submerged with water? Take submerged density=12kN/m3.	**07**
		OR	

Q.4	**(a)**	Sketch active pressure distribution diagram for cohesive soil and show that critical height in an unsupported cut in pure clay is 4c/r, c- cohesion, r-unit weight of soil.	**07**
	(b)	A retaining wall, 4m high supports a backfill (c=20kN/m2; angle of internal friction=30 degree; r =20kN/m3) with horizontal top, flush with top of the wall the backfill carries a surcharge of 20kN/m2. If the wall is pushed towards the backfill, compute **total passive pressure** on the wall and its point of application.	**07**
Q.5	**(a)**	Name the various types of foundations. Explain the factors affecting selection of type of foundations.	**(07)**
	(b)	A strip footing 2.5 m wide at its base is located at a depth of 1.5 m below the ground surface. Foundation soil: r=1.8 t/m3; c=3t/m2and angle of internal friction= 20degree. Determine the bearing capacity using FS=3. Considering the same soil, compute the depth at which square footing of 2.5m x2.5m should be located. Take for angle of internal friction=10 degree, Nc'=10; Nq'=4; Nr'=1	**(07)**
		OR	
Q5	**(a)**	Write a brief note on factors affecting the bearing capacity of shallow foundation. How will you ascertain whether the foundation is likely to fail in local shear or general shear ?	**(07)**
	(b)	A strip footing 1.2 m wide is to be laid at a depth of 1m below the ground surface in deposit of very fine sand having bulk density = 1.8t/m3 ; angle of internal friction=27degree. Find the safe bearing capacity if FS= 3. What width of footing is required to lay it at a depth of 0.5 m from ground surface? take Nq'=7; Nr'=5.	**(07)**