B.E.(with Credits)-Regular-Semester 2012 - Civil Engineering Sem VI

CE604 - Geotechnical Engineering-II

P. Pages : 2 **GUG/W/16/5334**

Time : Three Hours * 3 5 2 3 * Max. Marks : 80

Notes : 1. All questions carry equal marks.
2. All questions are compulsory.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.

1. a) Explain standard penetration test. Explain factor affecting blow count 'N' and correction. **8**

b) Discuss planning of subsurface explorations programme. **8**

OR

2. a) Explain Geosynthesis and its applications. **8**

b) Enlist geophysical methods of soil explorations and explain any one with its limitations. **8**

3. a) Derive the relation for F.O.S. of an infinite slope made of cohesionless soil subjected to seepage parallel to the slope. **8**

b) An embankment is made of a soil having cohesion of 20 KN/M^2, angle of internal friction of 30º & unit wt. Of 18 KN/M^3. The slope is 45º & 8 m high. Locate the centre of rotation. Assume toe failure. Determine F.O.S. Use Fellunious method. α a = 26º,. α b = 35º. Solve it by Swedish circle method. **8**

OR

4. An embankment is made of a soil having cohesion of 20 KN/M^2, angle of internal friction of 30º & unit wt. 18 KN/M^3 . The slope is 1.6:1& 8 m high. Locate the Centre of rotation, Assume toe failure. Determine F.O.S. Use Fellunious method. α a = 26º,. α b = 35º. Solve it by Swedish circle method. Consider the effect of W.T. The W.T. is at 4 m from the top. Consider rsat = 20.5 KN/M^3 . **16**

5. a) Find the safe distance of footing from the back face of the vertical retaining wall. If the horizontal backfill subjected to a line load of 18 KN/M at a distance of 2 m from the back of the wall. The details are given below. **10**

Height of retaining wall = 5 m
Angle of internal friction = 30º
Unit wt. Of backfill = 18.5 KN/M^3
Angle of wall friction = 20º

b) How would you consider the effect of tension crack in earth pressure analysis. **6**

OR

6. a) Two layer cohesive horizontal backfill is supported by a 10 m high vertical smooth wall. Determine by Rankine:s theory the active pressure and the point of applications of the resultant pressure for the data given below. The ground surface is horizontal in level with the top of the wall. **10**
The top layer 0-5m , Effective cohesion 12 KN/M^2, angle of internal friction of 0º & unit wt. Of 17.0 KN/M^3.
The bottom layer 5-10m, effective cohesion 35 KN/M^2, angle of internal friction of 10º & unit wt. Of 18.0 KN/M^3.

b) Discuss the Poncelets construction when i is nearly equal to angle of internal friction (I nearly equal to Φ). **6**

7 a) Explain various types of bearing capacity & also discuss factors affecting bearing capacity. **8**

b) A square footing 2.5 m * 2.5 m , located at a depth of 1.5 m from ground surface. The supporting soil is compressible and has shear parameters with r = 18.5 KN/M^3 , Ccu = 32 KN/M^2 for $\emptyset$cu = 30º Take Nc = 37.2 Nq = 22.5 Nr = 19.7. The W.T. is at a greater depth. Compute the safe load that can be carried by the square footing. Adopt a FOS of 3.0 Use Terzaghis analysis. **8**

OR

8. a) Explain limitations of plate load test. **6**

b) A square footing located at a depth of 1.3 m below GL, has to carry a safe load of 800 KN. Find the size of the footing if desired FOS is 3. The soil having void ratio of 0.55 Degree of saturation 50%,, Specific graviry = 2.67, c=8 kpa, For $\emptyset$=30º take Nc = 37.2, Nq = 22.5, Nr = 19.7. Use Terzaghis analysis. **10**

9. a) Explain Under-reamed pile with suitable sketches. **8**

b) A n piles group has to be proportioned in uniform pattern in soft clay with equal spacing in all directions. Assuming the value of c, Determine the optimum value of spacing of piles in the group. Take n = 25, and The adhesion factor is 0.80., neglect the end bearing effect and assume that each pile is circular in section. **8**

OR

10. a) A In a two layer cohesive soil, bored piles of 400 mm dia. are installed. The top layer has a thickness of 5 m and the bottom one is of considerable depth. The clay has average unconfined compressive strength qu = 80 KN/M^2 upto a depth of 5 m & 100 KN/M^2 that of bottom. The adhesion factor is 0.80 Determine the length of the bored pile required to carry a safe load of 400 KN, allowing a FOS of 2.0 **10**

b) Explain Felds rule. **6**

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