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## 7th Semester Regular / Back Examination 2016-17
### FOUNDATION ENGINEERING
### BRANCH: CIVIL
**Time: 3 Hours**
**Max Marks: 70**
**Q.CODE: Y194**
**Answer Question No.1 which is compulsory and any five from the rest.**
**The figures in the right hand margin indicate marks.**

**Q1**    **Answer the following questions:**                           **(2 x 10)**

**a)** Distinguish between 'active' and 'passive' earth pressure.

**b)** Differentiate between Rankine and Coulomb theories of earth pressure.

**c)** What are the criteria for deciding the depth of foundation?

**d)** Write down the Vesic's bearing capacity equation defining each of the terms.

**e)** Sketch an uplift pile. What is its function?

**f)** Write the Seiler-Kinny formula. How is it used?

**g)** Write a critical note on 'negative skin friction' in piles.

**h)** If N value is 35, what is the corrected N value?

**i)** One sampler has an area ratio of 27% while another has 14%; which of these samplers you would prefer and why?

**j)** What is a reverse fault? Sketch it.

**Q2 a)** A retaining wall with a smooth vertical back is 10 m high and retains a two layer sand backfill with following properties:     **(5)**

$$0 - 5 \text{ m depth: } c' = 0, \ \phi' = 32^0, \ \gamma = 20.71 \text{ kN/m}^3$$

$$\text{Below 5 m depth: } c' = 0, \ \phi' = 31^0, \ \gamma = 22.54 \text{ kN/m}^3$$

Show the active earth pressure distribution assuming that the water table is at 5 m below the top of the retaining wall. Assume that the top of the backfill is horizontal.

**b)** Discuss Culmann's graphical solution for active earth pressure.     **(5)**

**Q3** **a)** A square footing located at a depth of 1.5 m below the ground surface **(5)** has to carry a safe load of 900 kN. Find the size of the footing if the desired factor of safety is 3. The soil has the following properties:

Voids ratio (e) = 0.52, degree of saturation = 53%, specific gravity (G) = 2.66, cohesion (c) = 7 kPa, angle of internal friction ($\phi$) = $26^0$. Use Terzaghi's analysis.

**b)** Write brief notes on 'Standard Penetration Test' and discuss how you **(5)** can obtain the bearing capacity of a soil from a standard penetration test.

**Q4** **(a)** How is the settlement of footings estimated? **(5)**
**(b)** What are the general conditions in the choice of foundation type? **(5)** Explain various foundation types.

**Q5** **a)** Design a square pile group to carry 500 kN in clay with unconfined **(5)** compression strength of 65 kPa. The piles are 35 cm diameter and 6 m long. Adhesion factor may be taken as 0.6.

**b)** Write brief critical note on bearing capacity of piles. How is skin friction **(5)** and point resistance of a pile computed?

**Q6** **a)** Sketch a well foundation showing all its component parts. How do you **(5)** estimate the bearing capacity and depth of a well foundation?
**b)** Enumerate various geophysical methods of site investigation. Discuss **(5)** the seismic refraction method in brief.

**Q7** **a)** How would you fix the depth of boring for various civil engineering **(5)** constructions? Discuss the IS guidelines.
**b)** Write a brief critical note on 'vane shear test'. **(5)**

**Q8** **Write brief notes on any five** **(2 x 5)**
**a)** Various corrections to SPT- N value
**b)** Bedding planes
**c)** Batter piles
**d)** S-Joint
**e)** RQD
**f)** $N_{60}$
**g)** Sowers and Sowers (1970) guidelines
**h)** Differential settlement
**i)** Defects in a rock mass