

Roll No.

Total No. of Questions : 09]

[Total No. of Pages : 02

B.Tech. (Sem. - 7th/8th)

FOUNDATION ENGINEERING

SUBJECT CODE : CE - 412

Paper ID : [A0629]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

Section - A

Q1)

(10 × 2 = 20)

- a) Define the ultimate bearing capacity and allowable bearing capacity. What are the factors affecting bearing capacity.
- b) Differentiate between general shear failure and local shear failure.
- c) Explain about the Newmark's chart and its use.
- d) What do you mean by floating foundation?
- e) Explain the free vibrations for a single degree system.
- f) Differentiate between open drive sampler and rotary sampler.
- g) What is the difference between precast concrete pile and cast-in-situ pile. What do you mean by under-reamed pile.
- h) What are the various types of pile driving hammer and briefly mention their comparison.
- i) Briefly explain the settlement analysis of pile group in clay.
- j) What are the advantages and disadvantages of open box and pneumatic caissons.

Section - B

(4 × 5 = 20)

- Q2)** Discuss briefly about standard penetration test. What is its importance. What are the various corrections applied.

- Q3)** Discuss the limitations of elastic formulae used for finding the stress distribution in soil.
- Q4)** A footing $3\text{m} \times 1.5\text{m}$ in plan transmits a pressure of 160kN/m^2 on a cohesive soil having $E = 8 \times 10^4\text{kN/m}^2$ and $\mu = 0.48$. Determine the immediate settlement at the centre, assuming the footing to be
- Flexible and
 - Rigid ; given $I_w = 1.52$ for flexible footing and 1.22 for rigid footing.
- Q5)** A raft foundation 10m wide and 12m long is to be constructed in a clayey soil having a shear strength of 12kN/m^2 . Unit weight of soil is 16kN/m^3 . If ground surface carries a surcharge of 20kN/m^2 . Calculate the max depth of foundation to ensure a factor of safety of 1.2 against base failure. N_c for clay is 5.7.
- Q6)** Discuss the geophysical exploration by resistivity method.

Section - C

(2 × 10 = 20)

- Q7)** Discuss the situation where provision of rafts are most suitable. Explain the proportioning of rafts in sands and clays. Name various methods of designing raft.
- Q8)** (a) How to determine the C_u by Block vibration test. What is the correlation between C_u and other dynamic properties of soil.
- (b) Assuming resonance to have occurred at a frequency of 30 cycles/sec. in a vertical vibration of a test block $1\text{m} \times 1\text{m} \times 1\text{m}$. determine the value of C_u . The weight of the oscillator is 800 Newton and force produced by it after 15 cycles is 1500N. Compute the max. amplitude in the vertical direction at 15 cycles/sec. Weight of test block is 24kN/m^3 .
- Q9)** (a) A square pile group of 16 piles penetrates through a filled up soil of 3m depth. The pile diameter is 250mm and pile spacing is 0.75m. The unit cohesion of the material is 18kN/m^2 and the unit wt of soil is 15kN/m^3 . Compute the negative skin friction on the group.
- (b) Draw the section of a well foundation and mention the components of a well foundation. What is the criteria for selecting the depth of a well.

