| Seat No. | |
|---|---|

## B.E. (Civil Engineering) (Semester - VII) (New) Examination, May - 2017
## ADVANCED FOUNDATION ENGINEERING (Elective - I)
### Sub. Code : 67564

**Day and Date : Friday, 19 - 05 - 2017**          **Total Marks : 100**
**Time : 2.00 p.m. to 5.00 p.m.**

**Instructions :**    1)    **All questions are compulsory.**
   2)    **Figures to the right indicate full marks.**
   3)    **Use of non-programmable calculator and relevant I.S. Codes is allowed.**
   4)    **Assume suitable data if required and mention it clearly.**

## SECTION - I

**Q1) a)** Explain criteria to decide depth and location of shallow foundation in detail.    **[8]**

   **b)** A trapezoidal footing is to be designed for two columns which are at a distance of 6.0 m(c/c). Loads acting on the columns are 2000 kN and 1500 kN. Sizes of both columns are 0.5 m × 0.5 m. Proportion the footing such that the edges of the columns are in line with edges of footing. Take allowable bearing capacity of soil as 200 kN/m$^2$.    **[8]**

OR

   **b)** Explain following terms:    **[8]**

   i)    Immediate settlement.

   ii)    Consolidation settlement.

**Q2) a)** Explain types of raft foundation with figures.    **[9]**

   **b)** A building consists of 12 columns. Each column is of size 400 × 400mm. These columns are arranged in three rows of four columns in each row. Distance between the columns is 5 m in both ways. Each column at the corner carries 500 kN load, each exterior column carries 700 kN load while each interior column carries 900 kN load. Calculate soil pressure below each column. Allowable soil pressure is 90 kN/m$^2$.    **[9]**

**Q3)** a) Explain classification of pile in detail. **[8]**

b) A square group of 9 piles was driven into soft clay extending upto large depth. The diameter and the length of the pile are 0.3 and 9m respectively. If the unconfined compressive strength of the clay is 90 kN/m², and the pile spacing is 0.9m (c/c), what is the capacity of this pile group? Assume factor of safety of 2.5 and adhesion factor of 0.75. **[8]**

## SECTION - II

**Q4)** a) Resonance occurred at a frequency of 22 cycles per second in a vibration test of block 1m × 1m × 1m. Determine the coefficient to elastic uniform compression of soil. The mass of the oscillator is 65 kg and the force produced by it at 12 cycles/second is 981 N. Also compute the amplitude in vertical direction at 12 cycles/second. **[8]**

b) Define following terms w.r.t. machine foundations: **[8]**
   i) Degree of freedom.
   ii) Free vibration and forced vibration.
   iii) Frequency.
   iv) Resonance.

### OR

b) List provisions of IS code for the design of foundations for reciprocating machines. **[8]**

**Q5)** a) Explain free earth support and fixed earth support method. **[9]**

b) Explain types and uses of cofferdam and its applicability. **[9]**

**Q6)** a) Explain the problems associated with ground water while installing foundation. Also explain ground water lowering. **[8]**

b) Write short notes on: (Any two) **[8]**
   i) Cement stabilization.
   ii) Lime stabilization.
   iii) Shoring and underpinning.