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UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2018

Program: M.Tech. (SE)
Semester – II
Subject (Course): Foundation of Structures — **Max. Marks : 100**
Course Code : MSEG 726 — **Duration : 3 Hrs**
No. of page/s : 02

Instruction:

(i) **Solve all question from section A,B & C**
(ii) **Assume suitable data if necessary**
(iii) **Draw neat sketches whenever required**

Section A

Q1.a Discuss the factor affecting the safe bearing capacity of soil.. (CO1) **06**

b. State the importance of contact pressure. (CO3) **04**

Q2. a What stress consider in the pile foundation design. (CO2) **07**

. **b**. Define Pile efficiency. State its significance in Pile designing (CO2) **03**

Section B (20x2=40)

Q3 In a sport complex building , the floor level of swimming pool varies -1.2 m to -2.8 m. The ground level being 0.0 m. On one side a wall is provided to retain the earth for3.5 m and on other side pool water. The free board is 0.2 m.. The soil behind the wall is a well drained medium dense sand . Unit weight of soil and water are 18 kN/m^3 & 10 kN/m^3 respectively , angle of internal friction = 35^0. The material under the wall base is the same as above with allowable bearing pressure of 150 kN/m^2 at 1m depth. The coefficient of friction between the base and soil is 0.6. Design the suitable foundation for the retaining wall to retain earth and water under full and empty condition of pool. Using , M25 concrete and Fe 413 steel . The stem of retaining wall is 250 mm at top and 500 mm at bottom. Base slab is also 500 mm and 3.5m width with 1.5 m

for heel and toe part. (CO1 &CO2) 25

Q4 . Design the foundation for the column size 400x400 carrying an axial load under working condition of 800 kN. The BM Mx =120 kNm and My = 60 kNm. The safe bearing capacity of soil = 150 kN/m^2 (CO1) 15

Section C

Q5. A building rests on six columns 400x400 mm 5 m equally distance 3no in one row. Each central column carries a load of 750 kN and end columns carry 480 kN each. Design a raft foundation for the column. The design shall also allow for a wind load moment of 1000 kNm about the base of the raft.
SBC =100 kN/m^2. (CO1 &CO2) 20

Q6. A R.C. column 500x500mm carrying a load of 900 kN, is supported on three piles 400x400 mm in section. The c/c distance between the piles is 2.0m.
Design a suitable pile cap. (CO1 & CO2) 20

Or

Q7. A well is required for 10 m internal diameter. Compute the outer diameter required for the well sink 8 m in the ground. The SBC of soil 120 kN/$m^{2.}$
Suggest the sinking stage if upper soil of 3m is dry and below3m is wet.
Assume others suitable data . (CO1&CO3) 20