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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Seventh Semester, B.E. - Civil Engineering

Semester End Examination; February - 2022

Advanced Foundation Design

Time: 3 hrs

Max. Marks: 100

Course Outcomes

The Students will be able to:

CO1: Apply the knowledge of Geology and geotechnics to differentiate shallow & deep foundation.

CO2: Analyze shallow and deep foundations for civil engineering structures.

CO3: Evaluate Design shallow and deep foundation for civil engineering structures.

CO4: Interpret data to select suitable foundation for expansive soil from safety consideration.

Note: I) PART - A is compulsory. Two marks for each question.

II) PART - B: Answer any **Two** sub questions (from a, b, c) for Maximum of 18 marks from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
I : PART - A		10			
1 a.	Define Uniform settlement and Differential settlement.	2	L1	CO1	PO1
b.	Write about engineering news formula and Hiley's formula.	2	L1	CO2	PO1
c.	Define tilts and shifts in well foundation.	2	L1	CO3	PO1
d.	Define free swell and differential free swell index on expansive soil.	2	L1	CO3	PO1
e.	Define degree of freedom.	2	L1	CO4	PO1
II : PART - B		90			
UNIT - I					
1 a.	Explain the different types of foundation settlements.	9	L2	CO1	PO1
b.	With neat sketch explain the types of shallow foundation.	9	L2	CO1	PO1
c.	A square footing is to be constructed on deep deposit sand at a depth of 0.9 m to carry load of 250 kN with factor of safety 2.5. The ground water level may rise to ground level during rainy season. Determine the size of footing. Assume saturated unit weight of sand as 20.5 kN/m ³ , $N_r = 32$, $N_q = 34$.	9	L3	CO1	PO1
UNIT - II					
2 a.	Explain how the pile load capacity is determined by using static formulas?	9	L2	CO2	PO1, 2
b.	Explain the classification of pile based on materials.	9	L2	CO2	PO1,2
c.	A 12 m long and 300 mm diameter pile is driven in a uniform deposits of soil having $\phi = 30^\circ$, water table is at greater depth and not likely to rise. The average dry unit weight soil is 18kN/m ³ . Take $N_q=13.5$ and $K = 2$ calculate safe load capacity with F.O.S. = 2.5.	9	L3	CO2	PO1,2

UNIT - III

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|---|---|----|-----|-------|
| 3 a. Describe the various components of well foundation with neat sketches indicating the function of each. | 9 | L2 | CO3 | PO1,4 |
| b. Discuss the various kinds of forces likely to act on a well foundation. | 9 | L2 | CO3 | PO1,4 |
| c. Explain in detail the sinking of well. | 9 | L2 | CO3 | PO1,4 |

UNIT - IV

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|---|---|----|-----|-------|
| 4 a. List the types of caissons and explain the advantages and disadvantages of pneumatic caissons. | 9 | L2 | CO3 | PO1,2 |
| b. What are the different methods of foundation treatment for structure on expansive soil? Explain any one. | 9 | L2 | CO3 | PO1,2 |
| c. Write a short note on; | | | | |
| i) Free swell | 9 | L2 | CO3 | PO1,2 |
| ii) CNS | | | | |
| iii) Swell pressure | | | | |

UNIT - V

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|---|---|----|-----|--------|
| 5 a. With a neat sketch, explain degree of freedom of a block foundation. | 9 | L2 | CO4 | PO1,2 |
| b. Explain the general criteria for design of machine foundation. | 9 | L2 | CO4 | PO1, 2 |
| c. Explain the types of machine foundation. | 9 | L2 | CO4 | PO1, 2 |

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