

**P.E.S. College of Engineering, Mandya - 571 401***(An Autonomous Institution affiliated to VTU, Belagavi)***Eighth Semester, B.E. - Civil Engineering****Semester End Examination; July / Aug. - 2022****Ground Improvement Techniques**

Time: 3 hrs

Max. Marks: 100

Course Outcomes*The Students will be able to:**CO1: Apply the knowledge of Geology & Geotechnical Engineering in Ground improvement techniques.**CO2: Analyze Mechanical Modification Techniques for soils.**CO3: Investigate chemical modification techniques for soils.**CO4: Select appropriate geo-synthetics and grouting methods for ground Improvements for sustainability.***Note: I) PART - A is compulsory. Two marks for each question.****II) PART - B: Answer any Two sub questions (from a, b, c) for a Maximum of 18 marks from each unit.**

Q. No.	Questions	Marks	BLs	COs	POs														
I : PART - A		10																	
I a.	Define ground improvement technique.	2	L1	CO1	PO1														
b.	Mention the different methods of dewatering.	2	L1	CO2	PO2														
c.	What is chemical modification?	2	L1	CO3	PO4														
d.	List the applications of Grouting.	2	L1	CO3	PO4														
e.	Mention the difference between woven and non-woven geo textile.	2	L1	CO4	PO7														
II : PART - B		90																	
UNIT - I		18																	
1 a.	Explain the effect of compaction on engineering properties of soil.	9	L2	CO1	PO1														
b.	Discuss the factors to be considered in the selection of most suitable ground modification technique.	9	L2	CO1	PO1														
c.	The results of compaction test on a soil are given below. Plot the dry unit weight versus moisture content curve and determine the maximum dry unit weight and corresponding optimum moisture content. If the particle specific gravity is 2.68, determine the air void percentage at maximum dry unit weight.	9	L3	CO1	PO1														
<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Moisture content (%)</td> <td>9.0</td> <td>10.2</td> <td>12.5</td> <td>13.4</td> <td>14.8</td> <td>16.0</td> </tr> <tr> <td>Buck unit Weight kN/m³</td> <td>19.23</td> <td>20.51</td> <td>22.20</td> <td>22.20</td> <td>21.79</td> <td>20.96</td> </tr> </table>		Moisture content (%)	9.0	10.2	12.5	13.4	14.8	16.0	Buck unit Weight kN/m ³	19.23	20.51	22.20	22.20	21.79	20.96				
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UNIT - II		18																	
2 a.	Discuss, how preloading and vertical drains influence the settlement in soil?	9	L3	CO2	PO2														
b.	What are all the essential steps involved in the designing of dewatering system?	9	L2	CO2	PO2														
c.	Define dewatering. With a neat sketch explain vacuum dewatering	9	L2	CO2	PO2														

UNIT - III		18
3 a.	With a neat sketch, explain soil-lime reaction mechanism.	9 L2 CO3 PO2
b.	Explain different construction methods adopted in cement stabilization.	9 L2 CO3 PO2
c.	Explain how the engineering properties of soil are changed by the process of bituminous stabilization. Mention its merits and demerits.	9 L2 CO3 PO2
UNIT - IV		18
4 a.	With a neat sketch, explain jet grouting.	9 L2 CO3 PO7
b.	Explain basic principle of reinforced earth.	9 L2 CO3 PO7
c.	Briefly discuss about rock bolts and soil nailing.	9 L2 CO3 PO7
UNIT - V		18
5 a.	Explain in details functions of Geo synthetics.	9 L3 CO4 PO2
b.	List the properties of geo synthetics and mention its applications.	9 L2 CO4 PO2
c.	Explain the types of Geo synthetics briefly.	9 L2 CO4 PO2

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