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School of Engineering

Mid - Term Examinations - November 2024

Semester: 7th

Date: 05-11-2024

Course Code: CIV3029

Time: 02.00pm to 03.30pm

Course Name: Ground Improvement Techniques

Max Marks: 50

Program: B. Tech

Weightage: 25%

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

5Qx2M=10M

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|---|---|---------|----|-----|
| 1 | List any four problematic soils of India. | 2 Marks | L1 | C01 |
| 2 | List any four purpose of ground improvement techniques. | 2 Marks | L1 | C01 |
| 3 | List any two objectives of field compaction control. | 2 Marks | L1 | C02 |
| 4 | List various methods of drainage and dewatering. | 2 Marks | L1 | C02 |
| 5 | List any two disadvantages of sand drains. | 2 Marks | L1 | C02 |

Part B

Answer ALL Questions. Each question carries 10 marks.

4QX10M=40M

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|---|---|----------|----|-----|
| 6 | Selection of ground improvement technique depends upon various factors and is challenging for the geotechnical Engineers. List the various factors affecting the selection of ground modification techniques. | 10 Marks | L1 | C01 |
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OR

- 7 Problematic soil causes serious distress to the structures found on them. Explain soft and sensitive soil, waste deposits and karst deposits which are problematic soils. **10 Marks** **L2** **C01**
- 8 Soil properties get modified due to compaction. Explain the effect of compaction on various properties of soil. **10 Marks** **L1** **C01**
- OR**
- 9 Determination of water content of compacted soil can be done by Proctor's Needle Method. Explain with a neat sketch the Proctor needle method of finding the field density of soil. **10 Marks** **L1** **C01**
- 10 Soil is to be excavated from a borrow pit which has a density of 1.75 g/cc and water content of 12%. The specific gravity of soil particles is 2.7. The soil is compacted so that the water content is 18% and dry density is 1.65 gm/cc. For 1000 cubic meter of soil in fill, compute the quantity of soil to be excavated from the pit in cubic meter and the amount of water to be added. Also determine the void ratios of the soil in borrow pit and fill. **10Marks** **L3** **C02**
- OR**
- 11 Drainage and dewatering is one of the method of ground improvement techniques. With a neat sketch explain the electro osmosis method of ground modification. **10 Marks** **L2** **C02**
- 12 Sandy soil in a borrow pit has unit weight of solids as 26.3 kN/m³, water content equal to 11% and bulk unit weight equal to 16.4 kN/m³. How many cubic meter of compacted fill could be constructed of 3500 m³ of sand excavated from the borrow pit if the required value of porosity in the compacted fill is 30%, Also compute the change in degree of saturation. **10 Marks** **L3** **C02**
- OR**
- 13 Vibroflotation is a technique for in situ densification of thick layers of loose granular soil deposits. Explain the vibroflotation technique with a neat sketch. **10 Marks** **L2** **C02**