

Registration no:

--	--	--	--	--	--	--	--	--	--

Total Number of Pages: 02

B TECH
PECI 5411

8th Semester Reguar / Back Examination 2015-16

Ground Improvement Techniques

Branch: Civil

Time: 3 Hours

Max Marks: 70

Q.CODE: W242

Answer Question No.1 which is compulsory and any five from the rest.

Assume suitable data wherever necessary

The figures in the right hand margin indicate marks.

Q1 Answer the following questions; **(2 x 10)**

- Define critical void ratio. How does it affect the strength of the soil?
- What are the field conditions that generally favour swelling in an expansive soil?
- What measures should be taken to reduce the pavement damages?
- What is the difference between geo-net and geo-grid?
- For $\phi' = 30^0$ and $K_0 = 0.5$, calculate the grouting pressure.
- Name a few water repellants and water retaining agents
- What do you mean by dynamic compaction? How does it help you in dealing with earthquake forces?
- State the situation where vibroflotation technique is essential.
- What do you mean by freezing soil?
- List the types of soil reinforcement.

Q2 How do you identify, test and modify various soils for construction works? **(10)**

Discuss.

Using 300 mm diameter plate, additional settlement of 4 mm was recorded for a pressure increase of 100 kPa. Calculate the coefficient of subgrade reaction and corresponding Young's modulus.

Q3 What are various in-situ ground improvement techniques? Discuss each of **(10)**

them in brief.

The density of a 8 m deep loose sand deposit is to be increased by compaction piles. Estimate the amount of extra material that will have to be added to the soil per square meter of plan area if the dry density of the soil is to be increased from 12 kN/m² to 16 kN/m². If the material to be added costs Rs 250.00 per cubic meter and the cost of constructing the compaction pile is 125% of the cost of construction material, what is the cost of treatment per square meter of plan area.

Q4 Discuss the functions of geo-synthetics with neat sketches. **(10)**

A geosynthetic has to be selected to provide drainage behind a retaining wall with a vertical back face. The estimated vertical flow into the drain is $0.002 \text{ m}^3/\text{sec}$. Determine the required transmissibility of the geosynthetic.

Q5 a) Discuss cement stabilization in detail. **(5)**
b) What do you mean by preloading using sand drains? How stone columns help soil stabilize and gain bearing capacity? Discuss. **(5)**

Q6 Discuss the characteristics of a grout. Where and why grouting is required? What is permeation grouting? How is it done in the field? Discuss with neat sketches. Discuss the advantages and disadvantages of grouting. **(10)**

Q7 a) A soil profile has an active zone of expansive soil of 2.5 m. The liquid limit and average natural moisture content during the construction season are 50% and 20% respectively. Determine the free surface swell. **(5)**
b) What measures you will take before you start constructions in an expansive soil, a soft soil and a collapsible soil? Explain in brief. **(5)**

Q8 Explain any **FOUR** of the following **(2.5 x 4)**
a) Reinforced soil embankments
b) Displacement grouting
c) Geo-membrane dams
d) Wick drains
e) Lime column
f) Aspect ratio and its significance
g) Electro-osmosis