PAPER ID-310461

Subject Code: NCE033

Roll No: | | | | | | | | | | | | | |

B. TECH.
(SEM VII) THEORY EXAMINATION 2020-21
ENVIRONMENTAL GEOTECHNOLOGY

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a.	What do you mean by laterally loaded piles?
b.	Define ultimate bearing capacity of soil.
c.	Define the term grouting.
d.	Differentiate between active earth pressure and passive earth pressure.
e.	What is ash pond?
f.	What do you mean by presumptive bearing pressure?
g.	Differentiate between toxic waste and hazardous waste.
h.	Define Geo-environmental engineering.
i.	Enlist the various techniques available for identifying a contaminated geo-media
j.	What is ion exchange?

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a.	What two forces are acting on an ion in the Gouy-Chapman model of the double layer? How does ionic strength and charge affect the double layer thickness and flocculation dispersion behavior of a colloidal system?
b.	Define the term ecosystem and how the ecosystem relates to environmental geotechnology.
c.	Consider a waterway revetment system with the following parameters: Wave height, H = 1.0 m Unit weight of protective covering material (free concrete blocks), Y_C = 24 kN/m^3. Assume that the permeability of the geotextile is greater than the permeability of soil to be protected. Determine the minimum depth of the protective covering required to protect the soil. Take unit weight of water, Y_w = 10 kN/m^3.
d.	What do you understand by slurry? How can you dispose it off? Explain its operation.
e.	What do you mean by the clay and synthetic clay liners? List the various advantages and disadvantages of geosynthetic clay liners over a compacted clay liner.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a)	How are the earth pressure coefficients, according to Rankine's Theory, computed under the condition of incipient (plastic) failure of the backfill?
(b)	What are the different methods used for laying foundations under water? Explain your answer by taking the example of foundation of bridge pier.

Roll No: | | | | | | | | | | | | | |

4. Attempt any *one* part of the following: 10x 1 = 10

(a)	What are the effects on the natural environment by the 'Sinkhole'? Also write how you will minimize its effect on the natural environment.
(b)	Discuss isolation of hazardous waste sites through grouting techniques. Make a note of different grouting materials used with regard to their suitability for a type of hazardous site. How the grouting techniques are different from other techniques used for the same purpose?

5. Attempt any *one* part of the following: 10 x 1 = 10

(a)	Comment on the current concepts and approaches of soil mechanics related to ground pollution problems.
(b)	What are environmental cycles and how they are interacted with geotechnology?

6. Attempt any *one* part of the following: 10 x 1 = 10

(a)	What are the objectives of engineered landfill systems? Discuss major features of the most common set of landfill component layers.
(b)	What special precautions are required for the construction of composite liner systems for the side slopes of a landfill? Discuss in detail.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a)	What are the basic characteristics of dust? Also write the impact of dust in the environment and also clarify that dust is either good or bad for the natural environment.
(b)	Write the various procedures of the site investigation for the detection of sub-surface contamination. Compare these methods with the help of their respective advantages and disadvantages.