

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)

CLASS: M.TECH  
BRANCH: CEE

SEMESTER : I  
SESSION : MO/18

SUBJECT: CE554 ENVIRONMENTAL GEOTECHNICS

TIME: 3.00 HOURS

FULL MARKS: 50

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Discuss the role of soil in geo environmental applications. [5]  
Q.1(b) Describe one case history of a geo environmental problem. [5]
- Q.2(a) Analyze the different components of soil-water potential. [5]  
Q.2(b) A tube has a semi-permeable membrane at the centre with water and NaCl on either sides at a room temperature of 27°C. There is a rise in solution level by 6cm. Estimate the molar concentration of NaCl solution.  $R = 0.0820 \text{ litre.atm/Kelvin. mole. } \rho \text{ of NaCl} = 1.2\text{g/cc (1 atm= 0.1 Mpa)}$ . [5]
- Q.3(a) Compare between a natural attenuation landfill and an engineered landfill . [5]  
Q.3(b) Explain the physical significance of sorption characteristics and its importance in contaminant transport modeling. [5]
- Q.4(a) Develop a flow chart on various processes involved in the planning of site remediation. [5]  
Q.4(b) Write short notes on vacuum extraction method of in situ treatment. [5]
- Q.5(a) Differentiate between steady state and transient state method of thermal resistivity measurement. Explain one method of measurement of thermal resistivity of soil from each category. [5]  
Q.5(b) With respect to permeability of soil, demonstrate mathematically how accelerated physical modeling is useful in studying any seepage induced phenomena. [5]

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