



Code: 9D12106a

M.Tech I Semester Regular & Supplementary Examinations February 2016

GEO-ENVIRONMENTAL ENGINEERING

(Geotechnical Engineering)

(For students admitted in 2011, 2012, 2013, 2014 & 2015 only)

Time: 3 hours

Max Marks: 60

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Explain the different zones of contaminant plume beneath a waste dump with neat sketch.
(b) Write a short note on geotechnical attenuation capacity of soil.
- 2 (a) How does the site characterization for contaminated sites differ from standard geotechnical site characterization?
(b) List advantages and disadvantages of drive methods for site characterization.
- 3 Explain in detail the 3 stage waste characterization scheme.
- 4 Explain the large direct shear test for in-situ testing of Municipal solid waste land fill sites.
- 5 (a) What is meant by Leachate and how does one manage leachate?
(b) A drinking water tube well is located 1.5 km away from the liquid waste injection well on the downstream side. The subsoil consists of medium sand with coefficient of permeability of $2 \times 10^{-4} \text{ m/sec}$ and a porosity 35%. The hydraulic gradient causing ground water flow is 0.007. Once the liquid waste percolates vertically down to the ground water table, how much time it will take to reach the drinking water tube well? Consider only advective flow and assume one dimensional flow condition.
- 6 (a) How do one estimate sorption?
(b) What are the difficult aspects of in-situ electro kinetic remediation?
- 7 (a) What are the limitations of in-situ bioremediation?
(b) Write a short note on emerging remediation technologies.
- 8 (a) Write short notes on Soil – Bentonite slurry trench wall.
(b) For a liner system, the side slope of 1.3H:1V and 7m height exists for a liner system. Self weight of geo-membrane is 1.41 kg/m^2 . Angle of shearing resistance between HDPE and clay liner is 100° . Tensile strength of HDPE at yield is 22 kN/m . Analyze the stability of HDPE under self weight and design the anchorage if required. Assume thickness of cover soil as 30 cm and density as 17 kN/m^3 .

