

1. The starter dyke of a tailings impoundment is observed to have wetness on the downstream surface up to mid-height of the dyke. Depict the remedial measures you will undertake to make the dyke safe. Mark all components. (3)
 2. How does the pore water drain out of an ash pond when there is no liner at the base? If a liner is installed, how can it be ensured that we do not have a bath-tub effect? (3)
 3. Under what conditions would waterlogging occur around a slurry pond? What measures would be required to control it? (3)
 4. Pond ash from a local thermal power station is going to be used to raise the ground level of a low-lying area by 1.5m where a residential complex is to be constructed. What extra precautions would you take in comparison to raising the ground level using local soil. (3)
 5. By means of diagrams, depict how you will install a multiport ground water sampling system. (3)
 6. How does the vacuum sampling system work along with a CPT device? (2)
 7. A hazardous volatile solid waste is being disposed in a well-designed landfill. The owner is worried that the harmful gaseous emissions can occur through the cover and wants a fool-proof system for leak detection. What monitoring system would you suggest? (3)
 8. List the steps involved in construction of a slurry wall around a leaking underground tank in a square area of 1600 sq. m, to a depth of 12m. What construction equipment is required? (3)
 9. 240 tons of chromium sludge has been disposed, in one year, on the surface of a low lying area 25m x 40m underlain by clay. The local panchayat has filed a complaint with the high court and you, as an engineer of the pollution control board, have been directed to clean-up the site and hand it back to the panchayat in its original condition within a year. What strategy would you adopt to remediate the site? (3)
 10. In which of the following areas are conditions favourable for use of shallow geothermal energy for buildings: Kargil, Srinagar, Delhi, Mumbai, Kolkatta, Bangalore? Why? (3)
 11. Landfill fires have been reported from Deonar Landfill at Mumbai and Bhalaswa Landfill at Delhi causing severe air pollution. List two steps you will take to prevent occurrence of these fires. (2)
 12. Ghazipur landfill in East Delhi has reached its maximum height of 45m. It has steep side slopes. It receives 2000 tons of waste per day. Additional land is not available. One waste-to-energy plant of 1000 tons per day has been set up at Ghazipur. How can we solve the waste disposal problem of East Delhi? (3)
 13. Two above ground landfills have identical waste heights of 16m. Landfill A has MSW and Landfill B has HW. The waste has a cover on top and a liner beneath it. (a) Show the components of the cover and liners including geosynthetics for both landfills. Landfill B has double liner system. Mark the dimensions or any other specification of the components; (b) compute the cost of placing the waste + liner + cover per unit area for both landfills; (c) compare the costs computed in (b) per ton of waste, assuming MSW is biodegradable and HW is inorganic. (6)
- 0.8-12
- Cost per cu. m. : (i) Waste placement = X, (ii) Local soil = 2X, (iii) drainage media, clay = 4X
 Cost per sq. m. : (i) Geomembranes = 4X, (ii) Geotextiles = 2X