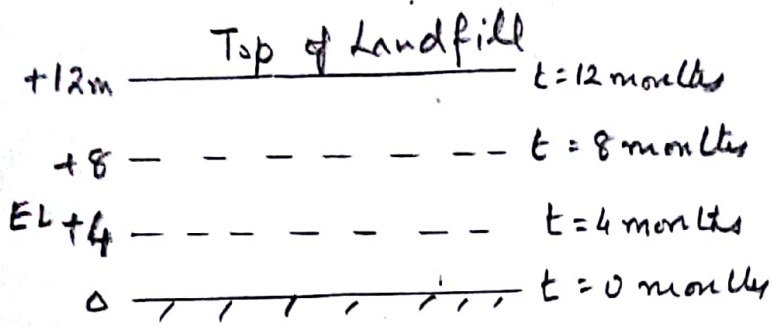


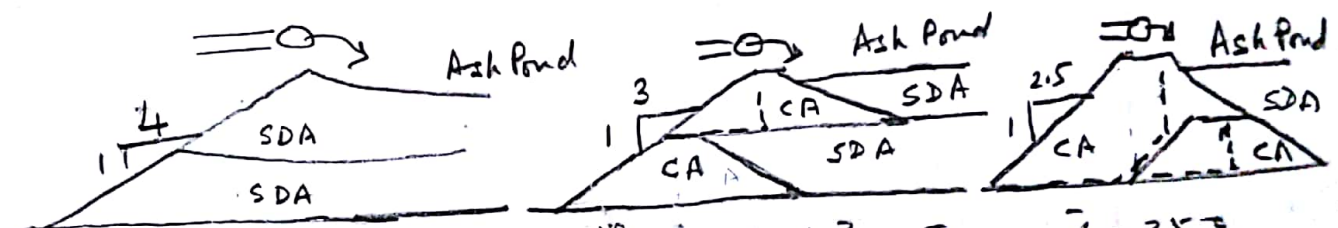
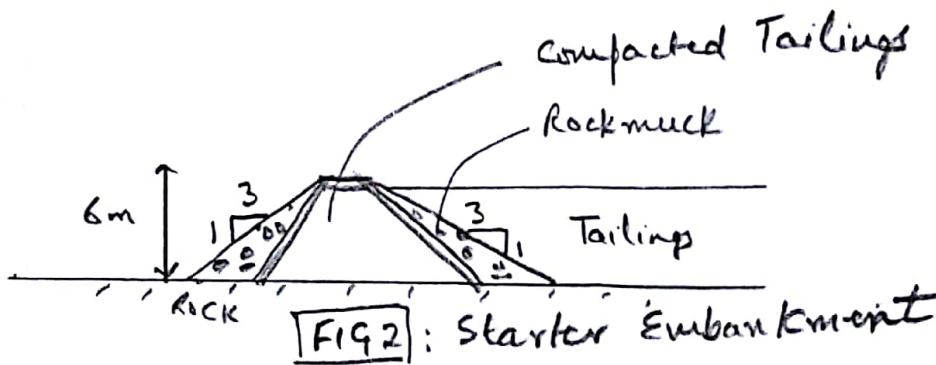
1. Compute the total settlement of the top of the landfill after 2 years of placement (Fig.1). (4)  
(Analysis can be done in 3 layers; neglect settlement of base).
2. A waste dump is in a remote location which is 2 km from habitation and 10 km from a surface water body. You have been asked to undertake closure of the dump. Under what conditions would the following closure alternatives be chosen: (a) nominal cover of single layer of 45 cm thick local soil; (b) HW cover with gas collection and (c) HW cover with vertical cut-offs. (3)
3. Compare the advantages and disadvantages of high concentration slurry disposal versus dry disposal of coal ash. (1)
4. Fig. 2 shows the starter embankment of mine tailings Pond B, which has been constructed using tailings from Pond A and rock muck from mine excavation. The height of the starter dyke is to be increased by 4m, by the downstream method, using tailings and rock muck. Please draw a diagram showing the proposed section for the raising. The preliminary slopes and sizes of all elements may be indicated on the diagram. (4)
5. Give your best estimate of the factor of safety of the embankment sections shown in Fig 3. (3)
6. Draw the components of remedial measures you will take for re-constructing the embankment shown in Fig 4 with minimum earthwork in cutting. → cut (3)
7. What are the disadvantages of locating a decantation well close to the starter embankment? (1)
8. How can one solve the problem of water logging observed adjacent to an operational slurry pond? (2)
9. List the equipment required to construct slurry cut-off walls. (3)
10. What technique will you adopt for each of the following: (i) remediation of soil contaminated by leaking underground petrol tanks; (ii) ground water contaminated by excessive dissolves salts and (iii) fine grained soil contaminated by recent dumping of limited quantity of chromium sludge on the ground surface (3)
11. List the special measures which have to be adopted when considering the use of coal ash for filling low lying area at a site where residential buildings will come up. (2) W.H.W.
12. In your opinion, what pre-treatment is required before aged municipal solid waste from Indian landfills can be used in earthworks. Which particle size fraction would be most suitable? (2)
13. State the conditions under which the following number of zones will be observed in a contaminated ground water plume beneath a solid waste dump: (a) none; (b) one; (c) two; (d) three. (2)
14. Compute the total mass flux of chlorides due to advective and diffusive flow of chloride ions under steady state condition through the clay wall shown in Fig 5. (3)
15. What will be the reduction in tension in geomembrane if the drainage layer in Fig 6 is replaced by a geocomposite. Neglect weight of geomembrane and geocomposite.  $\delta(\text{GM-Sand}) = 24$ ,  $\delta(\text{GM-Clay}) = 14$ ,  $\delta(\text{GM-Geocomp.}) = 20$  deg. (4)

$$\frac{C_{\text{adv}}}{C_{\text{diff}}} = \frac{W_{\text{adv}}}{W_{\text{diff}}}$$

$$118 \text{ kN/m}^2$$

$$Y_2 = 12 \text{ kN/cm}^2$$
$$C'_1 = 0.05, C'_2 = 0.2$$
$$t_0 = 1 \text{ month}$$

(starting time)

FIG 1



0.71. CA : Compacted Ash,  $\gamma_{sat} = 17 \text{ kN/m}^3$ ,  $\bar{c} = 0$ ,  $\bar{\phi} = 35^\circ$   
 SDA : Slurry Deposited Ash,  $\gamma_{sat} = 15 \text{ kN/m}^3$ ,  $\bar{c} = 0$ ,  $\bar{\phi} = 28^\circ$

FIG. 3

0.865  
1.75

FIG. 3

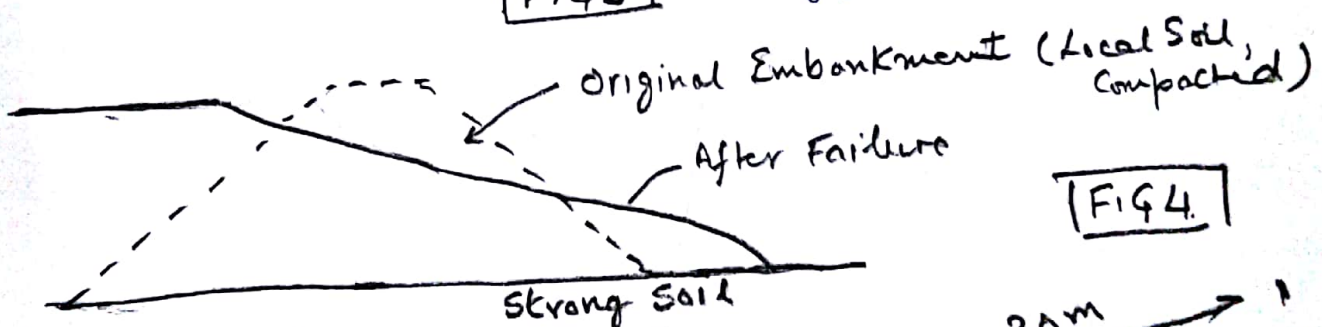
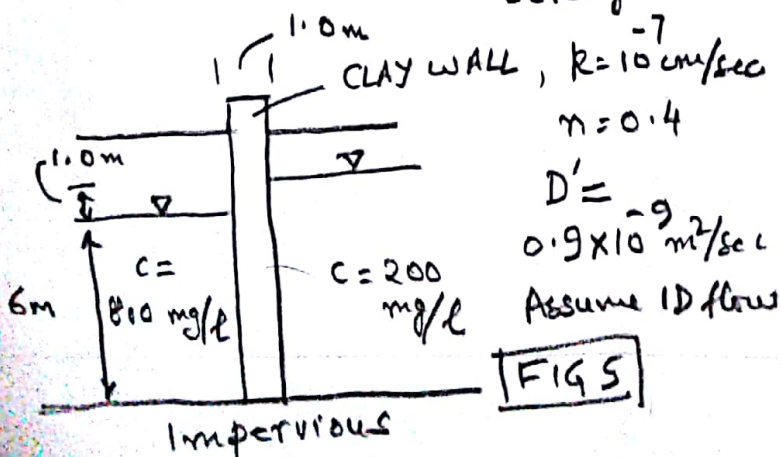


FIG 4.



FIGS

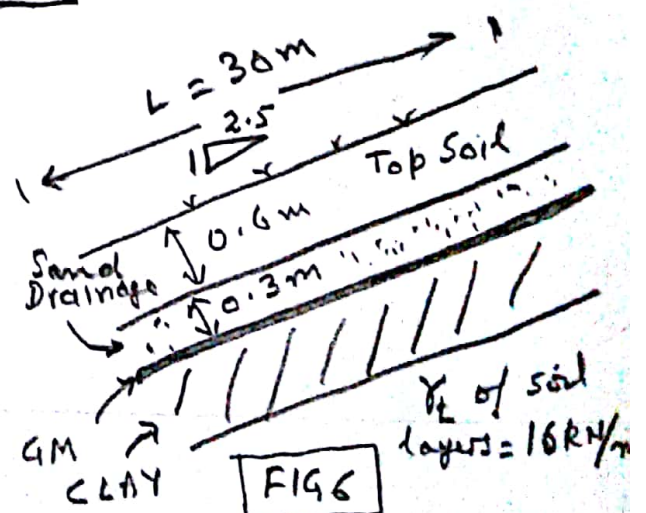


FIG 6