

4. a) Compare the disadvantages of Ascending stage and Descending stage grouting. (8)
- b) Amongst the grouting methods, which method allows high output, good control over grouted zone around the grout hole and maximum versatility? Would you use this technique for small sized work such as densification of some loose pockets of soil? (12)
5. In which case is requirement of low elongation of reinforcement most important & why?
- a) Vertical reinforced soil wall (10)
- b) Reinforced soil slope in soft clay (10)
6. a) Can one use a geomembrane as a separator instead of geotextile beneath a road? (6)
- b) For a 12m high zoned embankment, the seepage estimated using flownets is $12.5 \times 10^{-7} \text{ m}^2/\text{sec-m}$ for k of $5 \times 10^{-8} \text{ m/sec}$ for the core. It is proposed to provide a non-woven geotextile to act as a filter between the shell and the core. The geotextile is 10 mm thick, 2000 gsm geo-synthetic with an allowable permittivity of 0.05 sec^{-1} and O_{95} of 0.04 mm. The soil of the core is clayey silt with $D_{85} = 0.03\text{mm}$. Will the geosynthetic be satisfactory as a filter? (14)
7. a) Briefly discuss the factors affecting Mechanical Stabilization. (10)
- b) Write a note on soils amenable to Lime stabilization. (10)
8. a) What are different types of chemicals used in stabilization? (8)
- b) Give principle and types of ground anchors in detail. (12)

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