Sample Questions
Geosynthetic Designer Certification Program (GDCP)

Chapter 1 - Geosynthetics: It is well known that welding medium density polyethylene (as in HDPE geomembranes) to high density polyethylene (as in HDPE pipe) is difficult and requires excellent workmanship. The reason is that the melt behavior is different as shown in Figure 1.5, pg. 21. What is the approximate overlap "window" of the two different polyethylenes for proper welding?

a. 70 to 107°C
b. 80 to 107°C
c. 110 to 120°C
d. 120 to 137°C

Chapter 2 - Geotextiles: Calculate the factor-of-safety against sliding of a MSE wall 5.0 m high with uniform reinforcement of 3.5 m length. The soil subgrade beneath the reinforced earth mass has a friction angle of 20° and cohesion of 6.0 kN/m^2. The soil within the reinforced mass has properties of γ = 19 kN/m^3, ϕ = 27° and the angle of active lateral pressure is 20° with the horizontal.

a. FS = 1.2
b. FS = 1.7
c. FS = 2.1
d. FS = 2.5

Chapter 3 - Geogrids: Design the spacing (S_v) and length (L_R) of geogrids for a reinforced solid waste slope at 65° to the horizontal and 7.5 m high using the Jewell chart of Figure 3.15 on pg. 418. The waste material properties are γ = 17 kN/m^3, ϕ = 25°; c = 0 and zero pore pressure (r_U). The geogrid properties are T_{ult} = 150 kN/m; ΣRF = 3.4; FS = 1.3.

a. Spacing = 1.0 Length = 4.1
b. Spacing = 1.2 Length = 4.7
c. Spacing = 1.4 Length = 5.4
d. Spacing = 1.6 Length = 5.9

Chapter 4 - Geonets: What is the factor-of-safety of a biplanar geonet (q_{ult} = 0.018 m^3/min-m and ΣRF = 7.0) used as a leak detection layer between two geomembranes of a landfill liner system which is 200 m long at 3% slope based on a leakage rate of 1200 ℓ/ha-day?

a. FS = 5
b. FS = 50
c. FS = 100
d. FS = 150

Chapter 5 - Geomembranes: What liquid volume in liters can be contained in a geomembrane lined surface impoundment measuring 150 × 175 m at the ground surface, with 3(H)-to-1(V) side slopes and a depth of 6.0 from the base of the spillway.

a. V = 100 M liter
b. V = 125 M liter
c. V = 150 M liter
d. V = 175 M liter

Chapter 6 - GCLs: Compare the flow rates (in units of m^3/sec) on a square meter basis through a 8 mm thick GCL at 7 × 10^{-11} m/sec permeability versus a 0.50 m thick CCL at 1 × 10^{-9} m/sec permeability, both being under 0.30 m of hydraulic head.

a. GCL = 2.1 ×10^{-9} m^3/s and CCL = 1.0 × 10^{-9} m^3/s
b. GCL = 2.4 ×10^{-9} m^3/s and CCL = 1.3 × 10^{-9} m^3/s
c. GCL = 2.7 ×10^{-9} m^3/s and CCL = 1.6 × 10^{-9} m^3/s
d. GCL = 3.5 ×10^{-9} m^3/s and CCL = 2.0 × 10^{-9} m^3/s

Chapter 7 - Geofoam: Compare the settlements of a soil embankment fill (3.0 m high at 18 kN/m^3) versus a geofoam fill (3.0 m high at 0.18 kN/m^3) when placed over a compressible soil which is 12 m thick at 14.5 kN/m^3 with a compression index (C_c) of 0.81 and an initial void ratio (e_o) of 0.69.

a. Soil = 0.8 m Geofoam = 1.0 m
b. Soil = 0.9 m Geofoam = 0.4 m
c. Soil = 1.0 m Geofoam = 0.2 m
d. Soil = 1.2 m Geofoam = 0.02 m

Chapter 8 - Geocomposites: Calculate the amount of flow in ℓ/min that a single wick drain, i.e., a PVD, must handle (note the variation shown on Table 8.4 on pg. 872) if the soil it is to dewater is 13.4 m deep with an initial void ratio (e) of 0.71. The drain itself has a zone of influence 2.0 m diameter and has settled (i.e., shortened) 1.27 m during its consolidation period of 50 days.

a. q = ℓ/min 0.50
b. q = ℓ/min 0.25
c. q = ℓ/m 0.10
d. q = ℓ/min 0.04