Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1724303 **Date: 10/07/2012**

Subject Name: Geosynthetics & Reinforced Earth

Time: 10:30 am – 13:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Define geotextile. Give detail classification of geotextile. **07**

(b) Draw and explain in detail the flow chart of design procedure for reinforced soil walls using anchored earth method and Tie back wedge method. **07**

Q.2 Attempt the following: **14**

(i) Sketch the various types of reinforced earth walls and various facing panels used in practice.

(ii) Design reinforced earth retaining wall of 9m height with backfill reinforced with metal strips. Also sketch tension line, failure plane and pressure distribution diagram. Consider all stability checks. Take the following data:

width of strips = 120mm, thickness of strips = 6mm, f_y = 240MPa, FOS for steel = 1.67, FOS on soil friction = 1.5, Ø = 35°, γ = 17.5 kN/m^3, δ = 26°, h x s= 1m x 1m. Consider first strip at 0.5 depth from top.

OR

Q.2 Figure.1 shows section of a retaining wall with geotextile reinforcement. The wall is backfilled with granular soil having Ø = 34, γ = 18 kN/m^3. A woven slit-film geotextile with warp direction ultimate wide-width strength of 50kN/m and having δ = 24° is intended to be used in its construction. The orientation of the geotextile is perpendicular to the wall face and the edges are to be overlapped to handle the weft direction. A factor of safety of 1.4 is to be used along with site specific reduction factors. Determine (i) spacing of the individual layers of geotextile (ii) length of fabric layers (iii) check for overlap (iv) check for external stability. The backfill carries a uniform surcharge dead load of 10kN/m^2.Assume C_r = 0.8 and C_i = 0.75. **14**

Q.3 **(a)** Write brief note on testing and evaluation of geosynthetics. **14**

OR

Q.3 **(a)** Write field application of geotextile as separation of dissimilar materials. **07**

(b) Write advantages of using geosynthetics in pavement. **07**

Q.4 Answer in three-four lines with proper reasons/justifications: **14**

(i) In case of soil reinforced element if vertical stress σ_1 is increased what change will take place in $\Delta\sigma_3$ and why?

(ii) Explain the role of soil reinforcement interaction criteria in limit state of collapse and limit state of serviceability as per BS8006.

(iii) What is the disadvantage of metallic reinforcement and why?

(iv) Why polymeric reinforcements are avoided in RE wall?

(v) What environmental considerations are considered in design of RE wall as per BS 8006?

OR

Q.4	**(a)**	Explain the external stability of RE wall as per BS8006. Also show bearing and tilt failure and sliding along the base.	**07**
Q.4	**(b)**	Explain how reinforcement is used to control embankment stability resting on soft soils. State various limit states considered for embankment stability and define with neat sketch rotational stability.	**07**
Q.5	**(a)**	Explain in detail various functions of geotextile, requirement and relevant properties of geotextile in tubular form.	**10**
	(b)	Write note on use of geotextiles in railway work as reinforcement.	**04**
		OR	
Q.5		Write functions of geosynthetics in water resources project in detail.	**14**

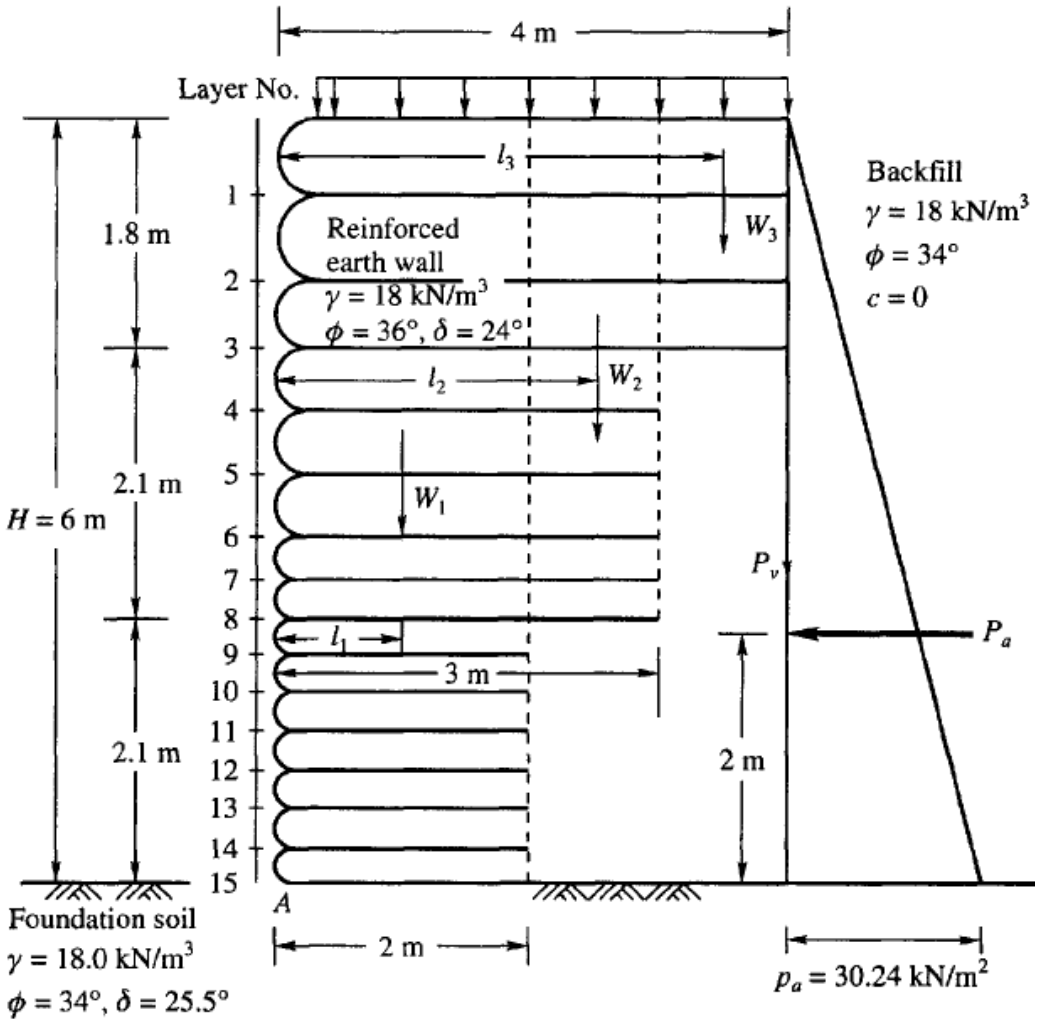

Figure .1