Final Examination: Semester II	Academic Year: 2004
Date: February 21st, 2005	Time: 01.30-04.30 p.m.
Subject: 235–402 Geotec. Min. Eng.	Room: R 300

Instructions

1. Attempts question (6) in 8 pages.

2. Answer all questions in this given papers and do rear papers allowed

3. All books and materials are allowed

4. Write your name in each page and returned all papers to controllers

5. Total marks are 130 or 30 % of subject.

Part	Full Scores	Assigned Scores
1	10	
2	10	
3	25	
4	25	
5	30	
6	30	
Total scores	130	

"ทุจริตในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น และพักการเรียน 1 ภาคการศึกษา สูงสุด ให้ออก"

Name .... Surname .... ID ....

Bonne Chance et bon courage
Danupon Tonnayopas
Instructor
16 February 2005

Calculation questions

1. On December 26, 2004, the world's largest Asia coasts was destroyed by a tsunami in the Andaman sea which has a wave length of 50 km.
   a) What is its velocity?   (5 points)

   b) If this wave breaks in 10 m water, what is its velocity?   (5 points)

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2. Assume the seismogram for the Andamen earthquake was recorded by PSU seismometer 600 km from the epicenter. The magnitude 9 Asia earthquake.
   a) Determine the earthquake acceleration?   (5 points)
   b) If focus of this earthquake 30 km, determine the earthquake acceleration   (5 points)

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3. Refer to the seismic refraction data in a table below. If upper zone is unsaturated alluvium and lower zone is saturated alluvium. Construction of travel-time graph and determine the depth to the water table?   (25 points)

Geophone #	Distance, m	Time, sec.
1	3	0.002
2	7	0.004
3	10	0.006
4	13	0.008
5	17	0.010
6	20	0.0115
7	23	0.0125
8	27	0.0135
9	30	0.0145
10	33	0.0155

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4. The data below is from a resistivity survey at a golf course in Hat Yai. The survey consists of Wenner configuration.
   a) Draw a cross-sectional profile with this data   (10 points)
   b) Based on your interpretation of the data, how depth to drill a water well..   (15 points)

A spacing, m	App. resisitivity, ohm-m
10	1476
15	1443
20	1201
25	1043
30	964
35	909
40	866
45	866
50	840
55	925
60	879
65	810
70	761
75	725
80	646
85	577
90	574
95	541
100	485

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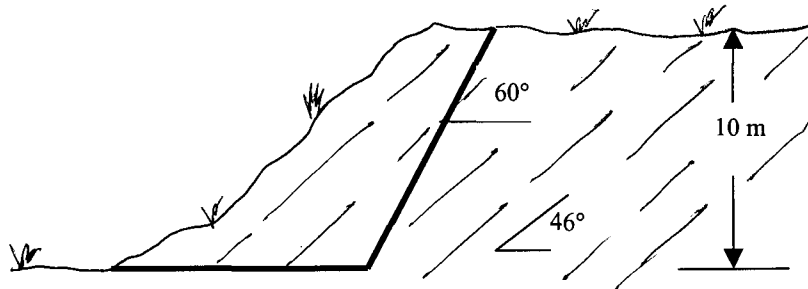..

5. Assume a proposed 10 m deep limestone quarry is proposed in hard sedimentary rocks where the bedding planes strike parallel to the burden and dip at 46 toward the burden. Laboratory tests on core containing bedding plane discontinuities show that the friction angle (ϕ) is 41° and cohesion is 34,500 N/m^2. The density of the rock is 2800 kg/m^3.

a.   Assume no tension crack exists, and the slide is all above the water table. Determine the factor of safety for a 60° road cut.   (10 points)
b.   Suppose the contractor uses explosives (acceleration of 0.1g) to excavate the quarry, and in so doing destroys any cohesion in the bedding planes. Determine the factor of safety. (10 points)
c.   An alternative road cut design is to increase the resisting force by using rock bolt. Determine the rock bolts required per m of road cut for a F.S. = 1.5 (Assume no cohesion).   (10 points)

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6. Assume a 300 m high cut is to be made in massive, argillaceous rocks. The rock has two well defined joint sets.

   Joint Set A: 348°/72°;
   Joint Set B: 168°/78°;
   Joint Set C: 253°/80°;

In addition, bedding planes dip direction 135° and dip into the slope at 16°. Assume the cut slope is over 1 km in length, is essentially straight, and trend 010°.

a) Determination the dip direction and plunge of the line made by the intersection of the critical planar anisotropics which could form a wedge failure?   (15 points)

b) The road will cut into the bluff of rock has ϕ = 30° so that the one side of the road cut need be analyzed. Design a safe road cut for this highway in same trend?   (15 points)

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