

ROCK MECHANICS GLY 364

SEMESTER SICK TEST 2

1 November 2011

TIME: 1½ hours
ANSWER ALL THE QUESTIONS

MARKS: 90

Question 1

[25]

Explain the process of shear failure along a rough joint plane using Patton's bilinear failure model. Use graphs of shear stress vs shear displacement as well as shear strength vs normal stress.

Question 2

[20]

Write short notes on:

- 2.1 Basic friction angle (3)
- 2.2 JMC (3)
- 2.3 RQD (4)
- 2.4 Rock mass strength (5)
- 2.5 Influence of joints on rock mass permeability (5)

Question 3

[20]

Draw a stereographic projection for the following data from an open pit mine.

	Dip	Dip direction	Friction Angle
Pit slope:	50	130	
Joint Set 1:	50	160	35
Joint Set 2:	70	180	25

- 3.1 Determine the possibility of failure taking place and discuss the type of failure(s) that may occur. Assume the average friction angle on the intersection of the two joint sets to be 30°.
- 3.2 Determine the factor of safety of the above joints based on friction only using the attached charts.

Question 4

[25]

A joint set in a rock mass has the following properties:

Area of 100 m²

JRC = 10

Waviness = 9°

True cohesion = 120 kPa

Basic friction angle of rock material = 35°

Wall strength is 45 MPa.

Calculate the force required to induce shear failure along the plane by means of the Barton & Chouby equation at different normal stresses of i) 10 kPa and ii) 5 MPa are to be applied.