Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 Level 1st Semester Examination – May/July 2017
MRT 316-3 Engineering Geology

Uva Wellassa University

Instructions to candidates.
Answer All Questions.
Duration: 03 Hours
Number of questions: Five (05) Questions
Mark allocation: 300 marks

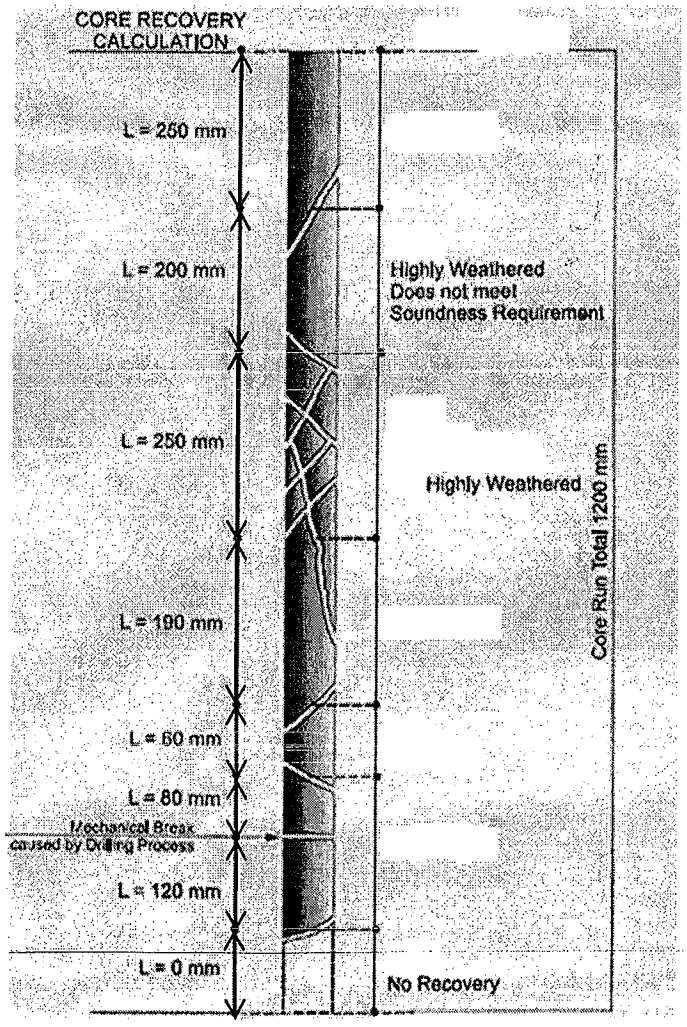
01)

a) **Breifly** explain the **three** steps of a Site Investigation. [12 marks]

b) What is SPT? How do you conduct a SPT? Explain. [20 marks]

c) RQD is used to assess the quality of the rock in a particular site. Calculate the

RQD value and the **Core recovery** for the following core sample. [18 marks]



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02)

a) What is a landslide? [05 marks]

b) **List** down the modes of failures according to Varnes. [05 marks]

c) What is Factor of Safety? Briefly explain. [10 marks]

d) You are asked to collect a soil sample to estimate its **confined** uniaxial strength test. If the result is going to be reffered to in a foundation design of a house, would you chose a day where the soil is saturated or dry? Explain.

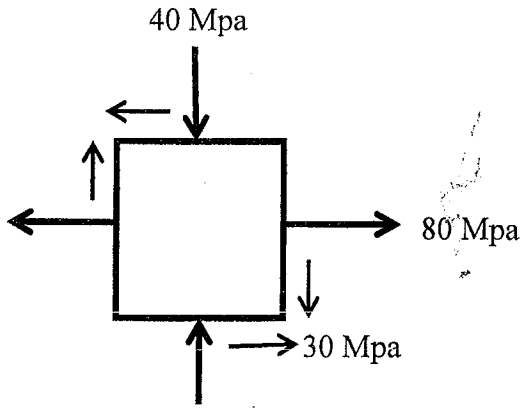
[30 marks]

03)

a) What are the three stresses acting on Rocks? [06 marks]

b) Write down the sign convention you would use in a Mohr circle. [04 marks]

b) Draw a Mohr circle for the following stress element. [25 marks]



i) What is the maximum NORMAL stress? [05 marks]
ii) What is the minimum NORMAL stress? [05 marks]
iii) What is the maximum SHEAR stress? [05 marks]

04)

A tunnel is to be driven through a slightly weathered granite with a dominant joint set dipping at 60° against the direction of the drive of the tunnel. Index testing and logging of diamond drilled core give average Point-load strength index value of 6 Mpa and average RQD of 78%.

The discontunities are spaced 300 mm and have a length of 1-3 m and the separation of discontinuities was found to be 0.1m-1.0 m. The surface of discontinuities is slightly rough and no filling material was found. Discontinuity surfaces were slightly weathered. Inflow of ground water is anticipated to be 10-25 L /m for 10 m of tunnel.

a) Calculate the RMR for the tunnel. [40 marks]
b) Recommend excavation and support per 10 m of tunnel. [10 marks]

05)

a) What criteria should be fullfilled for a slopc and wedge to fail under gravity? [30 marks]

b) The following data regarding a set of discontinuities were found in a site investigation where both sides of a road were to be cut.

- Pole concentrations of discontinuities were as follows,

A- 270/40
B- 032/30
C- 158/40

- The proposed cut slopes (cutslopes on the two sides of the road) have the following oreintations,

  Cutslope 01- 240/36

  Cutslope 02- 055/45

- The friction angle of the materal at the site is 30°.

i) Model the situation at the given site on a stereonet. [40 marks]
ii) Discuss the type of failures that could occur on the proposed cutslopes. [30 marks]