

CONFIDENTIAL



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2012/2013**

COURSE NAME : GEOSYNTHETICS DESIGN

COURSE CODE : BFG 4043/40403

PROGRAMME : 4 BFF

EXAMINATION DATE : JUNE 2013

DURATION : 3 HOURS

INSTRUCTION : ANSWER ONE (1) QUESTION IN PART A AND **THREE (3)** QUESTIONS IN PART B.

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

CONFIDENTIAL

PART A

- Q1** (a) Explain briefly the definition of geosynthetics. (10 marks)
- (b) Based on the functions and applications of geosynthetics, choose three (3) types of geosynthetics which are considered suitable for landfill construction and explain your reasons for the selection of these geosynthetics. (12 marks)
- (c) Using geomembrane sheets for a landfill construction which will be excavated to 5 meters depth with the dimensions of 50 meters wide and 80 meters long,
- (i) Sketch a layout by showing the embedded geomembrane
 - (ii) Explain briefly your reasons for choosing the different types of layers in this design with appropriate assumptions. (18 marks)

PART B

- Q2** (a) Describe briefly the following types of geosynthetics with appropriate sketches.
- (i) Geonet
 - (ii) Geogrids
 - (iii) Geosynthetic Clay Liner (GCL) (6 marks)
- (b) Explain the design application of geosynthetics in erosion and sediment control agent. Include sketches in your explanation. (6 marks)
- (c) Choose the type of geosynthetics that is suitable for a problematic slope and produce a design that will stabilize the slope from sliding effect. (8 marks)
- Q3** (a) Explain the three (3) concepts of testing for geosynthetics (6 marks)
- (b) Explain the mechanisms and design principles of geosynthetics reinforced bearing layers by relating the shear and punching failures. (6 marks)
- (c) Degradation of material will deteriorate the properties of geosynthetics. Explain the following different degradation types:

- (i) Temperature degradation
- (ii) Hydrolysis degradation
- (iii) Sunlight degradation
- (iv) Biological degradation

(8 marks)

Q4 (a) Describe the geosynthetics design requirements based on the two categories of fundamental values for soils.

(6 marks)

(b) Explain briefly the limit state concepts in geotechnical pertaining to geosynthetics design requirements.

(6 marks)

(c) Given a reinforced fill slope,

(i) Explain the design procedures and alternatives based on the BS 8006:1995 recommendations.

(ii) Similarly, give your comments on the prEN 14475 code of practice classification for the same type of slope.

(8 marks)

Q5 (a) Explain the differences, advantages and disadvantages of using geosynthetics and organic fibers as reinforcement materials in soils.

(6 marks)

(b) Based on an article by Ryan Berg & Associates (2013) in TRB Bulletin, USA, it was mentioned about impregnating geotextile barriers in asphalt layers. Explain and give your comments.

(6 marks)

(c) Given a project to supervise,

(i) List down at least five (5) geosynthetics tests that will determine the suitability of geosynthetics for a specific purpose or project application.

(ii) Explain the aims of the geosynthetics tests and the expected results.

(8 marks)

- END OF QUESTION -