



UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2018/2019**

COURSE NAME : GEO SYNTHETIC DESIGN
COURSE CODE : BFG40403
PROGRAMME CODE : BFF
EXAMINATION DATE : DECEMBER 2018 / JANUARY 2019
DURATION : 3 HOURS
INSTRUCTION : ANSWER FOUR (4) QUESTIONS ONLY

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

- Q1**
- (a) Geosynthetics are a variety of man-made polymeric products that are used in a wide array of civil engineering applications. Determine the main functions of geosynthetics and explain in details their functions with some examples in civil engineering applications. (8 marks)
 - (b) The uniqueness of geosynthetics is that they ensure multifunctional performances and simple to use and provide great economical potential advantages.
 - i. Explain why we need to use geosynthetics at the back of a reinforced soil wall. (2 marks)
 - ii. Discuss the possibility of using geosynthetics to construct a steep slope. (4 marks)
 - iii. Explain the basic mechanism of geosynthetics to construct a steep slope. (4 marks)
 - (c) Determine the advantages and disadvantages of using geosynthetics in civil engineering. (7 marks)

- Q2**
- (a) Determine **TWO (2)** types of the polymers used to manufacture geosynthetics. (4 marks)
 - (b) List the types of geosynthetics manufactured from each of the polymers based on your answer in **Q2(a)**. (5 marks)
 - (c) Geotextile filtration is distinguished from drainage function. It can perform both drainage and filtration.
 - i. Describe these two functions and how they are different. (6 marks)
 - ii. Define permittivity and transmittivity and mention their units. (4 marks)
 - iii. Discuss the functions of both parameters (permittivity and transmittivity). (6 marks)

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- Q3**
- (a) Determine the design life of road and explain the role of geotextile to prevent reflection cracking (8 marks)
 - (b) List the types of geosynthetics used in pavement. (6 marks)
 - (c) Placement of geosynthetics over subgrade soil can substantially reduce the required fill thickness.
 - i. Discuss the benefits of geosynthetics placement over subgrade soil (4 marks)
 - ii. List **THREE (3)** main reinforcement mechanisms (3 marks)
 - iii. Is it possible to reduce the thickness of road by the introduction of geotextile. Explain. (4 marks)
- Q4**
- (a) Explain in details the role of geosynthetics in designing an embankment on soft soil? (3 marks)
 - (b) Discuss on how to prevent the excessive vertical and horizontal deformations of embankment on soft soil. Explain in details their design steps. (11 marks)
 - (c) Explain the construction procedures of reinforced soil slope and reinforced soil wall. (11 marks)
- Q5**
- (a) Define the prefabricated vertical drain (PVD) (5 marks)
 - (b) Explain the PVD's role in soft ground improvement (5 marks)
 - (c) Explain in details with sketches how to design an embankment on soft soil using prefabricated vertical drain (PVD) and discuss their design steps. (15 marks)

- END OF QUESTIONS -

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