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Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2019/2020**

COURSE NAME : GEO SYNTHETIC DESIGN
COURSE CODE : BFG40403
PROGRAMME CODE : BFF
EXAMINATION DATE : DECEMBER 2019 / JANUARY 2020
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

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

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- 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 on 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 the polymers used to manufacture geosynthetics. (4 marks)
- (b) List the types of geosynthetics manufactured from each of the polymers. (5 marks)
- (c) Geotextile filtration is distinguished from drainage function. It can perform both drainage and filtration.
- (i) Describe the differences between these **TWO(2)** functions. (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 **TWO (2)** 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) Explain any possibilities to reduce the thickness of road by the introduction of geotextile. (4 marks)
- Q4**
- (a) Explain in details the role of geosynthetics to design an embankment on soft soil. (3 marks)
 - (b) Discuss on how to prevent the excessive vertical and horizontal deformation 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)

- END OF QUESTIONS -

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