Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
(ONLINE)
SEMESTER II
SESSION 2020/2021

COURSE NAME	:	GEO-ENVIRONMENT ENGINEERING
COURSE CODE	:	BFG 40303
PROGRAMME CODE		BFF
EXAMINATION DATE	:	JULY 2021
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

Q1 (a) What are the role of engineers in geoenvironmental engineering?

(5 marks)

(b) Explain with examples any **TWO (2)** potential source of contaminants into the soil and groundwater system.

(8 marks)

(c) In Malaysia, before EQA 1974 (or in the US, before 1970s) it was not illegal to dispose of hazardous chemicals in unlined pits, and many companies did so. Should they be held responsible today for the contamination of those wastes, or should the government (taxpayers) pay for the cleanup? Give your comment based on that statement by relating it to the relevant laws and regulations.

(12 marks)

Q2 (a) Water present in pore spaces of soil is termed soil water or pore water. The quantity of water present in the pores will significantly influence its physical, chemical and engineering properties. Name it and briefly explain these **TWO (2)** categories of water that exist in the soil.

(6 marks)

(b) Soil additives are identified as one of the sources of soil contamination. Analyse how the contamination occurs from the aspect of soil chemistry.

(9 marks)

(c) Summarize the interaction mechanism in between the contaminants with soil and/or groundwater system.

(10 marks)

Q3 The Malaysian Ministry of Housing and Local Government had on 27 July 2020 announced for the request for proposal ("**RFP**") for a waste-to-energy project in Bukit Payong, Johor on a public-private partnership basis ("**WtE Project**"). The WtE Project is one of the 6 expected waste to energy projects that the federal government of Malaysia is planning to develop by 2021. The decision was made following the closure of CEP 1 Estate Sanitary Landfill in Simpang Renggam in March 2019 after reports of leachate overflow into a nearby river. Prior to this, the Federal government had postponed the construction of the Bukit Payong sanitary landfill due to protest by residents in the area.

(a) Based on the environmental issue arise in Simpang Renggam, **propose** any **ONE (1)** site monitoring works that should be carried out after the closure of this sanitary landfill. Your proposal should also include an **evaluation** in terms of its cost and lifelong sustainability.

(10 marks)

(b) It was reported in the newspaper that leachate was found to overflow from the CEP 1 Estate Sanitary Landfill in Simpang Renggam into a nearby river. **Analyze** and **evaluate** any **ONE (1)** potential contaminant transport mode that may be taken place in Simpang Renggam.

(10 marks)

(c) Propose any **ONE (1)** critical site investigation measurement that the authority should taken in order to convince the local community of Bukit Payong that the site is suitable to be develop as sanitary landfill.

(5 marks)

Q4 Since middle of year 2018, a small town in Malaysia grew accustomed to the smell of burning plastic. At night, the putrid scent would waft into homes in Jenjarom, a community of around 30,000 residents. Instead of handing over un-recyclable scraps and parts to waste centers, the illegal factories cut costs by burning those scraps, releasing noxious fumes. Burning plastic can release toxic chemicals like mercury, dioxins, and polychlorinated biphenyls (PCBs) into the atmosphere, which poses a threat to human health. Today, the fumes have mostly dissipated, but their source — nearly 19,000 tons of waste piled in high heaps — is still around as shown in **Figure Q4**.

(a) Based on your reading and geoenvironmental knowledge, **propose** any **TWO (2)** mitigation methods that can be utilized in Jenjarom. Your proposal should also **compare** the potential cost and its long term sustainability between these two methods.

(15 marks)

(b) In order to make sure the safety and health of the population in Jenjarom, please **propose** and **evaluate** any **ONE (1)** most relevant site monitoring methods that need to be carried out in order to safe guard the environment of Jenjarom. Your evaluation should be based on the types of on-site contamination that faced by Jenjarom.

(10 marks)

– END OF QUESTIONS –

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Although the government has shut down 33 illegal factories in Jenjarom, thousands of tonnes of plastic waste remain piled in high heaps, transforming the small town into a giant landfill. – The Malaysian Insight pic by Najjua Zulkefli, March 21, 2019

FIGURE Q4: Illegal dumping of plastic wastes in Jenjarom