UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2022/2023

COURSE NAME	:	AIR POLLUTION PREVENTION AND CONTROL
COURSE CODE	:	BFA 40503
PROGRAMME CODE	:	BFF
EXAMINATION DATE	:	JULY/ AUGUST 2023
DURATION	:	3 HOURS
INSTRUCTIONS	1.	ANSWER ALL QUESTIONS
	2.	THIS FINAL EXAMINATION IS CONDUCTED VIA **CLOSED BOOK.**
	3.	STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

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

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Q1 (a) Classify **TWO (2)** sources of air pollution problems found in urban areas.

(5 marks)

(b) Briefly explain potential or existing effects of global warming on Artic ecosystems and wildlife.

(10 marks)

(c) Comment on the phenomenon of acid rain and the different pathways that it impacts on in the environment.

(10 marks)

Q2 (a) Explain the purpose of the Environmental Quality (Clean Air) Regulations 2014.

(5 marks)

(b) Determine the prevention and control of haze due to land and forest fires and open burning activities.

(10 marks)

(c) Assess **FOUR (4)** factors that the government should consider to ensure the effectiveness of regulatory instrument to control stationary and mobile air pollution.

(10 marks)

Q3 (a) Evaluate the effect of wind direction on pollutant concentrations downwind of a source.

(5 marks)

(b) Explain briefly why asbestos is regulated as hazardous air pollutant.

(10 marks)

(c) International attempts to limit carbon dioxide emissions have included meetings between countries in Kyoto in 1997, Copenhagen in 2009 and Cancun in Mexico in 2010. They have had only limited success. Justify the reasons why international action to reduce carbon dioxide emissions has been much slower than many environmental groups would have liked.

(10 marks)

Q4 (a) Describe the usefulness of dissemination by the media of the Air Quality Index (AQI) values in the communities in which you have lived.

(5 marks)

(b) Explain briefly **FIVE (5)** applications of pollution prevention principles for controlling air pollutants.

(10 marks)

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(c)   An activated carbon bed used to control an air stream with a flowrate of 20 m^3/min at 25°C at a pressure of 1 atmosphere. The air contains 850 ppm of monochlorobenzene (C_6H_5Cl). The bed is 0.5 m deep, operates at a superficial face velocity of 0.4 m/s and contains activated carbon with a bulk density of 400 kg/m^3 of bed. Assuming that the working adsorption capacity of the bed is 40% of the adsorption capacity. Determine:

    (i)   The working adsorption capacity of the carbon.

(3 marks)

    (ii)   The physical dimensions of the activated carbon bed if the cross-sectional length (L_c) is equal to two times the width (W).

(3 marks)

    (i)   The mass of activated carbon in the bed.

(2 marks)

    (ii)   The time in minutes required to reach breakthrough if it is assumed that the adsorption wave is vertical, and that saturation occurs when the working adsorption capacity has been reached.

(2 marks)

-END OF QUESTIONS-

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