Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2019/2020

COURSE NAME	: WATER SAMPLING TECHNOLOGY
COURSE CODE	: BNA 30703
PROGRAMME CODE	: BNA
EXAMINATION DATE	: DECEMBER 2019 / JANUARY 2020
DURATION	: 3 HOURS
INSTRUCTION	: ANSWER **ALL** QUESTIONS

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

Q1 (a) List **FOUR (4)** ways of testing the water sample.

(4 marks)

(b) Describe the advantages and disadvantages of field testing.

(5 marks)

(c) The collected water sample is usually send to the laboratory for further analysis using the analytical equipment.

(i) Classify the analytical equipment for each of the following purpose:

(a) Weighing sample.
(b) Volatilize sample.
(c) Drying sample.
(d) Limit exposure to toxic fumes, vapors or dusts.
(e) Protect the laboratory worker from pathogens.
(f) Provide product protection.

(6 marks)

(ii) Distinguish **FIVE (5)** characteristics between Fume hood and Biosafety cabinet.

(10 marks)

Q2 (a) Identify **FOUR (4)** of the informations that should be written on the label of sampling bottle.

(4 marks)

(b) Explain **THREE (3)** ways of decontaminating sample.

(6 marks)

(c) The knowledge of sample handling and storage is important to preserve the condition of the water sample. Demonstrate the correct sample handling process by select the appropriate sample containers, preservation technique, and maximum holding time for the listed parameters:

(i) Total hardness

(ii) Microbes

(iii) Cyanide

(iv) Ammonia

(v) Nitrite

(15 marks)

Q3 (a) Measurements invariably involve errors and uncertainties. Error is the difference between a measured value and the "true" or "known" value.

(i) Name **THREE (3)** sources of systematic error.

(3 marks)

(ii) Explain each type of the systematic error stated in answer of **Q3(a)(i)**.

(6 marks)

(b) Illustrate the difference between "accuracy" and "precision."

(8 marks)

(c) Total of eight measurement was taken for iron content in water sample collected at Muar river as given in **Table Q3(c)**. Analyze the reproducibility of a method for determining the concentration of iron in the river for:

(i) Mean.

(ii) Standard deviation.

(iii) Final concentration.

(8 marks)

Q4 (a) Give **TWO (2)** types of Automatic Water Sampler and Benchtop Meter.

(4 marks)

(b) Explain **THREE (3)** mechanisms involve in the Fourier Transform-Infrared Spectroscopy (FTIR) analytical technique.

(6 marks)

(c) Chromatography is a technique for separating the components of a mixture on the basis of the relative amounts of each solute distributed between a moving fluid stream, called the mobile phase, and a contiguous stationary phase.

(i) Classify in details **THREE (3)** types of the Liquid-Solid Chromatography (LSC) by using a diagram.

(9 marks)

(ii) Differentiate **THREE (3)** principles between gas chromatography and column chromatography.

(6 marks)

-END OF QUESTION-

FINAL EXAMINATION

SEMESTER / SESSION : SEM I /2019/2020 PROGRAMME CODE : BNA
COURSE NAME : WATER SAMPLING TECHNOLOGY COURSE CODE : BNA 30703

Table Q3(c)

Sample	Iron content (mg/L)
1	1.0
2	1.2
3	1.0
4	1.0
5	1.2
6	1.0
7	1.1
8	1.0

Equations

$$\text{Mean} = \Sigma x_i / N$$

$$\text{Standard deviation} = \sqrt{\frac{\sum_{i=1}^{N} x_i^2 - \frac{(\sum_{i=1}^{N} x_i)^2}{N}}{N-1}}$$