Index No

00046

The Open University of Sri Lanka

Faculty of Natural Sciences

Diploma in Food Science

Department	: Chemistry
Level	: 3
Name of the Examination	: Final Examination
Course Title and Code	: Laboratory Sessions in Food Science (CYD3516)
Academic Year	: 2022-2023
Date	: 30th December 2023
Time	: 9.30 a.m. – 12.30 a.m.
Duration	: 3 hours

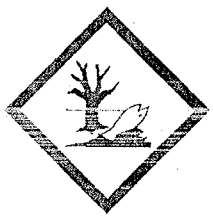
General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists part A and B, (**Part A - Food Chemical Analysis & Part B - Food Microbiological Analysis**) of (5) questions in (10) pages.
3. **Answer all (5) questions.**
4. Use a blue or black pen **not a pencil.**
5. **Answers should be written on the question paper itself.**
6. Draw **fully labelled diagrams** where necessary.
7. The use of a non-programmable electronic calculator is permitted.
8. Clearly state your **index number in the answer script.**
9. Involvement in any activity that is considered as an exam offense **will lead to punishment.**

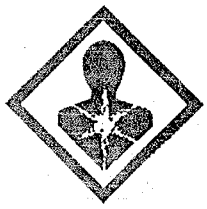
Part A – Food Chemical Analysis

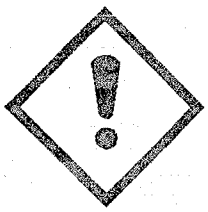
(01) (a) What does **PPE** stand for?
Give **four (04)** components considered under PPE. (10 marks)

. **(b)** Identify the following safety symbols and for each symbol you've identified, **Provide an example** of where you might encounter or find that particular symbol in a laboratory. (It could be a specific substance, equipment, or an area within a lab) (20 marks)

(i) 

(ii) 

(iii) 

(iv) 

(c) Suggest suitable safety measures that should be taken in the following instances. (10 marks)

(i) The rubber tubing attached to a water condenser has caught fire while heating with a Bunsen burner.

(ii) Some solvents were splashed into the eye while shaking a separatory.

(d) Give **five (05)** information that can be obtained from Material Safety Data Sheet (MSDS). (10 marks)

(02) A student who is following the food chemistry practicals, has asked to determine the total acid content in given fruit juice sample **(X)** (lime nectar).
You are provided with the following solutions:

- 10 mL of lime nectar
- 25.00 mL of 0.01 M Sodium hydroxide (NaOH)
- Phenolphthalein indicator

Use the following procedure to determine the total acid content of **X**:

(i) Measure 5.00 mL of lime nectar into a titration flask.
(ii) Dilute it with 100 mL of distilled water.
(iii) Add 4-5 drops of phenolphthalein indicator.
(iv) Titrate the above prepared juice solution with 0.01 M NaOH solution.

(a) Tabulate your results. (12 marks)

(b) Consider the total acid present in the above lime nectar sample represent only by citric acid ($C_6H_8O_7$). citric acid reacts with NaOH forming sodium citrate ($Na_3C_6H_5O_7$) and water (H_2O) as only products.

Write the **balanced chemical equation** for the reaction of citric acid with NaOH.

(04 marks)

(c) Calculate the moles of NaOH consumed. (06 marks)

(d) Calculate the number of moles of citric acid. (06 marks)

(e) Calculate the concentration of citric acid in **ppm** ($mg\ L^{-1}$) in lime nectar fruit juice sample. (Consider the molar mass of citric acid as 192.12 $gmol^{-1}$)

(07 marks)

(03) Spot Test: (15 marks)

Identify the given sets of glassware and equipment.

A - .....

B (i)- .....

(ii)- .....

(iii)-.....

C - .....

D (i)- .....

(ii)- .....

(iii)-.....

E - .....

Part B - Food Microbiology Analysis

(04) You have been provided with a contaminated juice sample **(Y)** containing bacteria and sterile Nutrient Agar (NA) in a Petri plate. You are requested to isolate the bacteria in the contaminated juice sample present by following the streak plate method (quadrant streak).

(a) **Write down the stepwise procedure** you would follow to isolate the bacteria by the streak plate method and get it corrected. (10 marks)

(b) **Carry out the streak plate procedure** to isolate the bacteria present. (10 marks)

(c) **Using a diagram alone**, show how you would prepare a serial dilution up to 10^{-2} and prepare a pour plate from 10^{-2} dilution, in order to isolate bacteria in the sample.
(10 marks)

(05) 'F' , 'G' , 'H' , 'I' and 'J' are important items used in a microbiology laboratory. Answer the following questions based on 'F', 'G' , 'H' , 'I' and 'J'.

(a) Name the equipment/ item. (15 marks)

F - .....

G - .....

H - .....

I - .....

J - .....

(b) What is the **use of each (F, G, H, I and J)** in a microbiology laboratory? (15 marks)

F -

G -

H -

I -

J -

(c) A student was requested to design two (02) experiments to find out if an unknown bacterial sample could utilize starch and whether it is Gram negative or positive
Write down the procedures that you would follow if you were requested to design these experiments. (30 marks)

(i) utilize starch

(ii) whether it is Gram negative or positive

(d) Name one item sterilized using the following equipment. (10 marks)

Autoclave -

Bunsen burner -

Hot air oven -

Filtration apparatus -

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