Index No 00038

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	: 2024-2025
Date	: 28th June 2025
Time	: 9.30 a.m. – 12.30 p.m.
Duration	: 3 hours

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists (05) questions in (09) pages.
   (Part A - Food Chemical Analysis & Part B – Food Microbiological Analysis)
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 an exam offense **will lead to punishment.**

Part A – Food Chemical Analysis

(01) (a) Name **five (05)** main types of hazards mentioned on a chemical label.

(10 marks)

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(b) List two ways a hazardous substance can enter the human body.

(10 marks)

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(c) Suggest suitable action that should be taken in the following instances.

(15 marks)

(i) A chemical splashes onto your eyes.

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(ii) A minor fire during the refluxing of a reaction mixture.

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(iii) A glass beaker breaks while boiling water and pieces of glass shatter.

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

(10 marks)

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(c) Name **five** (05) parts of Personal Protective Equipment (PPE) that should be used when working safely in a chemical laboratory.

(05 marks)

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(02) You are provided with a sample **(Y)** of fruit juice. Using the standard titration method, determine the **titratable acidity (TA)** of the sample.

You are provided with the following solutions:

- 15 mL of fruit juice sample (Y)
- 25.00 mL of 0.01 M Sodium hydroxide (NaOH)
- Phenolphthalein indicator
- Other required glassware

(a) Write down the principle behind the above method. (03 marks)

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(b) Write down the procedure you use to calculate the titratable acidity (TA) of the above sample (Y) provided to you. (03 marks)

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(c) Tabulate your results (04 marks)

Volume of sample/ (mL)	Initial burette reading/ (mL)	Final burette reading/ (mL)	Volume of NaOH consumed/ (mL)

(d) Consider the total acid present in the above lime nectar sample represented only by citric acid ($C_6H_8O_7$) and when it reacts with NaOH formed sodium citrate ($Na_3C_6H_5O_7$) and water (H_2O) as only products.

(i) Write down the balanced chemical equation. (03 marks)

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(e) Calculate the moles of NaOH consumed. (04 marks)

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(f) Calculate the number of moles of citric acid. (04 marks)

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(g) 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 g mol^{-1})

(05 marks)

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(03) Spot Test: (3 x 8 = 24 marks)

Identify the given sets, glassware and equipment (A to C)

(A) .....

(B) (i).....

(ii).....

(iii).....

(iv) .....

(C) (i).....

(ii).....

(iii).....

Part B - Food Microbiology Analysis

(04) You have been provided with a contaminated juice sample (A) containing bacteria and asked to isolate the bacteria present in the sample. 2 methods are suggested.

(a) Write down the stepwise procedure you would follow to **isolate the bacteria by the streak plate method – assuming a poured NA plate is given to you.** (06 marks)

(b) Write down the stepwise procedure you would follow to **isolate the bacteria by a serial dilution up to 10^{-3}** followed by preparing a pour plate from 10^{-3} dilution. (06 marks)

(c) **You have been given a poured NA plate. Therefore, proceed to isolate the bacteria by the streak plate method- Quadrat streak.**

First, – show the procedure you wrote down above (a) get it corrected, then ask a staff member to observe the procedure you follow when doing (c). (10 marks)

(d) If a student followed the serial dilution for isolation of bacteria (b above) and got 45 isolated bacterial colonies in the 10^{-6} dilution, estimate the concentration of bacteria in 1 ml of the initial sample
(04 marks)

(05) (a) 'G', 'H' ' I' , ' J' and ' K' are important items used in a microbiology laboratory. Give the name and use of each of these items.
(10 marks)

G Name:

Use:

H Name:

Use:

I Name:

Use:

J Name:

Use:

K Name:

Use:

(b) Observe the experimental set up provided.

(i) Discuss the observation you see, using the theory/ principal behind the biochemical reactions taking place in this set-up. (06 marks)

(c) The table below has information regarding the Gram's stain. Fill in the blanks in the following table giving accurate information. (08 marks)

Steps in Gram's stain	Name of Reagent	Expected result (Observation in color of cells after adding reagent)
Primary stain		
Mordent		
Decolorizing agent		
Secondary stain		