



UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF CHEMICAL AND BIO-ENGINEERING TECHNOLOGY

FINAL EXAMINATION
OCTOBER 2025 SEMESTER

COURSE CODE : CQB 20804
COURSE TITLE : FOOD QUALITY AND STANDARD
PROGRAMME NAME : BACHELOR OF FOOD SAFETY AND QUALITY TECHNOLOGY WITH HONOURS
DATE : 27 JANUARY 2026
TIME : 2:00PM - 5:00PM
DURATION : 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of TWO sections.
4. Answer ALL questions for Section A.
5. Section B consist of four questions. Answer THREE (3) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Please answer MCQ/EMQ questions using OMR sheet. ☐ *Tick if applicable*
9. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

SECTION A (Total: 40 marks)

Answer ALL questions.

Please use the answer booklet provided.

1. Choose the **CORRECT** statement related to QA and QC.
 - A. QA is an integral part of QC
 - B. QC may or may not depend on QA
 - C. QA and QC are independent to each other
 - D. QC is an integral part of QA

2. According to Deming, Quality problems are
 - A. Due to machine
 - B. Due to management
 - C. Due to material
 - D. Due to method

3. Which of the following best defines quality in the context of products or services?
 - A. Achieving low production costs
 - B. Expanding market share
 - C. Maximizing profitability
 - D. Meeting customer expectations and requirements

4. Which 'pillar of TQM' is referred to when the study of customer needs is done, the requirements of the customer are gathered, and customer satisfaction is measured and managed?
 - A. Continuous improvement
 - B. Customer focus
 - C. Employee empowerment
 - D. Process management

5. Chemical analysis of a finished food product is an example of
 - A. Quality Control
 - B. Food Safety Audit
 - C. Quality Assurance
 - D. All of the above

6. Which of the following is an example of an internal cost within a manufacturing company?
 - A. Government fines for non-compliance
 - B. Employee training expenses
 - C. Environmental cleanup costs
 - D. Product returns and replacements

7. Below are the the quality management principle on the basis of which ISO 9000:2015 and ISO 9001:2015 are based on **EXCEPT**
 - A. Evidence based decision making
 - B. Supplier management
 - C. Customer focus
 - D. Leadership

8. Total Quality Management (TQM) focuses on the following items **EXCEPT**
- A. Product
 - B. Customer
 - C. Cost
 - D. Employee
9. The systematic activities and planned activities which provide adequate confidence that the manufactured products are meeting the requirements is called
- A. Quality control
 - B. Inspection
 - C. Quality assurance
 - D. Sampling
10. Inspection, scrap, and repair are examples of _____
- A. external costs
 - B. societal costs
 - C. internal costs
 - D. costs of dissatisfaction
11. All of the following are the elements of a TQM system **EXCEPT**:
- A. Measurement
 - B. Detentions
 - C. Leadership
 - D. Communications

12. In attribute control charts, a point falling outside the control limits indicates:
- A. A stable and predictable process
 - B. Normal process variation
 - C. Presence of special cause variation
 - D. Common cause variation
13. Which of the following best distinguishes a *defective* from a *defect*?
- A. A defective refers to a single flaw, while a defect refers to the entire unit
 - B. Defects apply only to variable data
 - C. Both terms have the same meaning
 - D. A defective is a unit that fails specifications, while a defect is a single flaw
14. The u chart is best used when:
- A. Sample size varies and defects per unit are counted
 - B. Sample size is constant and proportions are plotted
 - C. Variable data are measured
 - D. Sample size is constant and defectives are counted
15. A food factory records the number of scratches on each food container, with sample size kept constant. Which chart should be used?
- A. u chart
 - B. c chart
 - C. p chart
 - D. np chart

16. Which control chart assumes a binomial distribution?
- A. p and np charts
 - B. c chart only
 - C. u chart only
 - D. c and u charts
17. The np chart is most appropriate when:
- A. The number of defects per unit is counted
 - B. The data follow a Poisson distribution
 - C. The sample size is variable
 - D. The sample size is constant
18. Attribute control charts are mainly used to monitor:
- A. Process capability index
 - B. Measured data on a continuous scale
 - C. Count-based quality characteristics
 - D. Process mean and range
19. Accuracy refers to:
- A. How consistent the process is over time
 - B. How close measurements are to the true value
 - C. How close measurements are to each other
 - D. The amount of variation in the data

20. Which control chart is suitable for tracking the proportion of defective items when sample size varies?
- A. c chart
 - B. u chart
 - C. np chart
 - D. p chart
21. Select the **CORRECT** control chart that can be used to monitor the number of defects for a process with a variable sample size.
- A. P Chart
 - B. C Chart
 - C. U Chart
 - D. NP Chart
22. Below are the focus of continuous quality improvement **EXCEPT**
- A. Individuals
 - B. Exceeding standards
 - C. Processes
 - D. Effective competition
23. The definition of HACCP is a system which identifies, evaluates and controls
- A. hazard which are significant for food safety
 - B. hazard which are significant for food safety and food quality
 - C. hazard which are significant for food quality
 - D. all hazards

24. Benchmarking mainly involves _____.
A. Comparing key performance measures with best performers
B. Hiring more workers
C. Eliminating employee training
D. Increasing advertising budgets
25. In PDCA, the step that involves studying the results is the _____ phase.
A. Act
B. Plan
C. Check
D. Do
26. PDCA is also known as the _____.
A. Juran Cycle
B. Ishikawa Cycle
C. Deming Cycle
D. Kaizen Cycle
27. A company aims to improve customer satisfaction, legal compliance and market acceptance through internationally recognized food safety certification. Which certification is most suitable?
A. ISO 22000
B. MeSTI
C. HACCP
D. GMP

28. A factory wants to apply HACCP but must first ensure it has proper sanitation programs, trained employees and safe suppliers. These requirements are best described as:
- A. Critical control points
 - B. Prerequisite programs
 - C. Verification steps
 - D. Preliminary requirements
29. A beverage manufacturer labels its product as "premium fruit juice", but laboratory tests show that it does not meet the required standard. Under which control system would this be a major non-conformance?
- A. GMP
 - B. HACCP
 - C. MeSTI
 - D. ISO 22000
30. A food premise only uses permitted ingredients and ensures food is safe, clean and wholesome according to Islamic law. This practice reflects the concept of:
- A. Halal
 - B. Haram
 - C. Halalan Toyyiban
 - D. Syubhah
31. A company wants an international certification that combines HACCP principles with ISO management structure to manage food safety along the supply chain. Which system is most suitable?
- A. ISO 22000
 - B. GMP
 - C. HALAL
 - D. MeSTI

32. During an inspection, a restaurant fails to control time and temperature during cooking and holding. Which food safety system mainly emphasizes these controls?
- A. ISO 9000
 - B. HALAL
 - C. MeSTI
 - D. HACCP
33. A food factory ensures that all production processes are standardized so that every batch has the same quality and safety level. This practice best represents:
- A. ISO 9000
 - B. HACCP
 - C. HALAL
 - D. GMP
34. A small bakery wants a basic food safety certification that includes hygiene and labelling requirements, and is valid for 3 years. Which certification should the bakery apply for?
- A. HALAL
 - B. MeSTI
 - C. GMP
 - D. ISO 22000
35. Food Safety Hazard are classified as
- A. Biological, Chemical, Physical and Allergen
 - B. Biological, Chemical and Physical
 - C. Biological, Environment, Chemical and Allergen
 - D. All of the above

36. The following are objectives of Codex Alimentarius EXCEPT
- A. Protect consumer health
 - B. Promote fair trade
 - C. Facilitate international trade
 - D. Set national taxation policies
37. The Codex Alimentarius was created mainly to provide ____.
- A. A common ground for international food trade standards
 - B. Guidelines for restaurant design
 - C. International food packaging designs
 - D. National food labelling templates
38. Which of the following is **NOT** one of the seven HACCP principles?
- A. Revising recipes
 - B. Identifying corrective actions
 - C. Assessing hazards
 - D. Establishing critical limits
39. Choose the **INCORRECT** statement related to quality improvement.
- A. Increases machine time
 - B. Leads to greater uniformity of product
 - C. Reduces rework
 - D. Increases output with lowered cost

40. Total Quality Management (TQM) focuses on the following items **EXCEPT**
- A. Employee
 - B. Product
 - C. Cost
 - D. Customer

SECTION B (Total: 60 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

A food processing company producing chilled ready-to-eat meals has received repeated customer complaints related to inconsistent product quality and occasional safety concerns. The company currently relies mainly on end-product inspection to control quality. Senior management is considering transitioning from basic quality control activities to a more comprehensive quality management approach.

- (a) Based on the scenario, identify the current quality approach practiced by the company.

Justify your answer using **TWO (2)** characteristics of this approach.

(4 marks)

- (b) Analyse the limitations of relying primarily on Quality Control (QC) activities in ensuring consistent food quality and safety for this company. State and explain **THREE (3)** limitations.

(6 marks)

- (c) Management plans to implement a Quality Assurance (QA) system as part of a Quality Management System (QMS).

- i. Explain how a QA system would address the limitations identified in part (b).

(2 marks)

- ii. Describe **TWO (2)** QA activities that could be implemented to prevent food safety hazards and quality defects.

(4 marks)

- (d) The company aims for long-term improvement by adopting Total Quality Management (TQM).

Explain how Deming's PDCA cycle can be applied to one quality problem identified in the scenario to achieve continuous improvement.

(4 marks)

Question 2

A food processing company monitors the net weight (g) of sealed snack packs using $\bar{X}$ -R control charts.

Each hour, 5 snack packs are randomly sampled, and their weights are measured. The data collected over 6 consecutive hours are shown in the following table.

Refer Below - Table1 : Net Weight Measurements (g) .

Refer Appendix Attachment - Control Chart Constants .

Table 1: Net Weight Measurements (g)

Sample	1	2	3	4	5	6
1	100	101	99	100	101	100
2	102	100	101	102	100	101
3	101	102	100	101	102	101
4	99	100	98	99	100	99
5	100	101	99	100	101	100

- (a) Calculate the sample mean ($\bar{X}$) and range (R) for each sample. (8 marks)
- (b) Determine the overall average mean ($\bar{X}$) and average range (R). (4 marks)
- (c) Calculate the Upper Control Limit (UCL) and Lower Control Limit (LCL) for:
- $\bar{X}$ -chart (3 marks)
 - R-chart (3 marks)
- (d) Based on the control charts, interpret whether the process is in statistical control. (2 marks)

Question 3

A food manufacturing company produces sealed ready-to-eat meal packs. As part of quality control, the company monitors defective packages (leaking seals) using an attributes control chart.

During inspection, 200 packs were sampled each day for 10 consecutive days, and the number of defective packs recorded is shown in the following table.

Refer Below - Table2 : Number of Defective Packs .

Table 2: Number of Defective Packs

Day	1	2	3	4	5	6	7	8	9	10
Defective units	6	4	5	7	3	6	5	8	4	6

- (a) Identify the most appropriate type of attributes control chart to be used for this data and justify your choice.
(4 marks)
- (b) Calculate the proportion defective (p) for each day and determine the average proportion defective ($\bar{p}$).
(6 marks)
- (c) Calculate the Upper Control Limit (UCL) and Lower Control Limit (LCL) for the control chart.
(6 marks)
- (d) Based on the control limits calculated, state whether the process is in statistical control and justify your answer.
(4 marks)

Question 4

A food manufacturing company producing bottled fruit beverages has been facing several operational issues, including high product rejection rates, inconsistent filling volumes, customer complaints, and increasing production costs. Management decides to implement suitable quality improvement techniques to improve product quality, operational efficiency, and customer satisfaction.

- (a) Define Quality Improvement (QI). Explain **TWO (2)** benefits of quality improvement to the company based on the scenario.

(4 marks)

- (b) Analyse the company's problems and identify **TWO (2)** different quality improvement techniques that could be applied to address these issues. For each technique identified, explain how it can be applied to improve quality or efficiency in the company.

(8 marks)

- (c) The company plans to focus on reducing defects and errors in the production process.

- i. Identify the quality improvement technique that is most suitable for this purpose.

(1 marks)

- ii. Explain **TWO (2)** key concepts or steps associated with this technique.

(2 marks)

- (d) To enhance competitiveness, management decides to compare its performance with industry leaders.

- i. Identify the quality improvement technique described above.

(1 marks)

- ii. Describe **TWO (2)** types of benchmarking that could be applied by the company.

(4 marks)

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END OF EXAMINATION PAPER

APPENDIX

Appendix for Section B Question 2 : Control Chart Constants

Subgroup	X bar chart		Sigma estimate	R chart		S chart	
	A ₂	A ₃		D ₃	D ₄	B ₃	B ₄
2	1.880	2.659	1.128	-	3.267	-	3.267
3	1.023	1.954	1.693	-	2.574	-	2.568
4	0.729	1.628	2.059	-	2.282	-	2.266
5	0.577	1.427	2.326	-	2.114	-	2.089
6	0.483	1.287	2.534	-	2.004	0.030	1.970
7	0.419	1.182	2.704	0.076	1.924	0.118	1.882
8	0.373	1.099	2.847	0.136	1.864	0.185	1.815
9	0.337	1.032	2.970	0.184	1.816	0.239	1.761
10	0.308	0.975	3.078	0.223	1.777	0.284	1.716
11	0.285	0.927	3.173	0.256	1.744	0.321	1.679
12	0.266	0.886	3.258	0.283	1.717	0.354	1.646
13	0.249	0.850	3.336	0.307	1.693	0.382	1.618
14	0.235	0.817	3.407	0.328	1.672	0.406	1.594
15	0.223	0.789	3.472	0.347	1.653	0.428	1.572
16	0.212	0.763	3.532	0.363	1.637	0.448	1.552
17	0.203	0.739	3.588	0.378	1.622	0.466	1.534
18	0.194	0.718	3.640	0.391	1.608	0.482	1.518
19	0.187	0.698	3.689	0.403	1.597	0.497	1.503
20	0.180	0.680	3.735	0.415	1.585	0.510	1.490
21	0.173	0.663	3.778	0.425	1.575	0.523	1.477
22	0.167	0.647	3.819	0.434	1.566	0.534	1.466
23	0.162	0.633	3.858	0.443	1.557	0.545	1.455
24	0.157	0.619	3.895	0.451	1.548	0.555	1.445
25	0.153	0.606	3.931	0.459	1.541	0.565	1.435

APPENDIX

$$\begin{array}{l} \bar{X} \text{ CHART} \\ UCL_{\bar{X}} = \bar{X} + A_2 \cdot \bar{R} \\ LCL_{\bar{X}} = \bar{X} - A_2 \cdot \bar{R} \end{array}$$

$$\begin{array}{l} \bar{R} \text{ CHART} \\ UCL_R = D_4 \cdot \bar{R} \\ LCL_R = D_3 \cdot \bar{R} \end{array}$$

$$\begin{array}{l} \bar{p} \text{ CENTRE LINE} \\ \bar{p} = \frac{\sum p_i}{k} = \frac{\sum \left(\frac{d_i}{n_i} \right)}{k} \end{array} \quad \begin{array}{l} UCL = \bar{p} + 3\sigma_p \\ LCL = \bar{p} - 3\sigma_p \end{array}$$

$$\bar{p} \text{ STANDARD DEVIATION} \quad \sigma_p = \sqrt{\frac{\bar{p}(1 - \bar{p})}{\bar{n}}}$$

$$\bar{c} \text{ CHART}$$

$\bar{c}$ = average number of defects per sample

$$UCL \text{ (Upper Control Limit)} = \bar{c} + 3\sqrt{\bar{c}}$$

$$LCL \text{ (Lower Control Limit)} = \bar{c} - 3\sqrt{\bar{c}} \text{ (but not less than 0)}$$

$$\begin{array}{l} \bar{u} \text{ CHART} \\ u = \frac{c}{n} \\ \bar{u} = \frac{\sum c}{\sum n} \end{array} \quad \begin{array}{l} UCL_u = \bar{u} + 3 \frac{\sqrt{\bar{u}}}{\sqrt{n_i}} \\ LCL_u = \bar{u} - 3 \frac{\sqrt{\bar{u}}}{\sqrt{n_i}} \end{array}$$

$$\bar{p} \text{ CHART}$$

$$\begin{array}{l} n\bar{p} = \frac{\sum np}{k} \\ \bar{p} = \frac{\sum np}{\sum n} \\ UCL_{np} = n\bar{p} + 3\sqrt{n\bar{p}(1 - \bar{p})} \\ LCL_{np} = n\bar{p} - 3\sqrt{n\bar{p}(1 - \bar{p})} \end{array}$$

