



University of Kelaniya - Sri Lanka
Centre for Distance and Continuing Education
Faculty of Commerce & Management Studies

Bachelor of Business Management (General) Degree Third Examination (External) – 2024

May - 2026

BMGTE 3035 – Total Quality Management

Time: 03 Hours

Instructions

1. The paper consists of two sections: Section I and Section II.
2. Question No. 1 is compulsory and must be answered.
3. Answer four (04) questions in total, including Question No. 01
4. Graph papers will be provided.
5. Read each question carefully before answering.
6. Use relevant theories, models, tools, diagrams, and examples where appropriate.
7. Where a format is requested, candidates should present the answer in the format and provide a short explanation where necessary.

SECTION 1

Question No. 01

Compulsory Case Study - Sahana Dairy Foods (Pvt) Ltd.

Sahana Dairy Foods (Pvt) Ltd. is a medium-sized Sri Lankan dairy manufacturer located in the Kurunegala District. The company produces set yogurt, drinking yogurt, and curd cups. Its products are distributed to groceries, supermarkets, school canteens, and small hotels in nearby towns and rural areas.

During the last four years, the company has grown steadily because of affordable prices, attractive packaging, and its reputation for fresh local dairy products. Its highest-selling product is the 80g fruit yogurt cup. Although the campaign improved product visibility in shops, customer complaints and retailer dissatisfaction increased during the same period.

During the last six weeks, retailers have frequently reported leaking yogurt cups, late deliveries, sour taste before the expiry date, and unreadable date codes. Some retailers in distant areas have reduced the shelf space allocated to the product because they no longer trust the company's quality consistency. Some customers have also complained that the yogurt cups were not cold enough at the time of purchase.

An internal review found several operational weaknesses. The production process starts with collecting raw milk from village suppliers. The milk is then tested, chilled, pasteurised, mixed, filled into cups, sealed, date coded, stored in the cold room, packed into cartons, and dispatched to retail outlets.

One cup-sealing machine has not been calibrated for more than three months. Sealing temperature fluctuates during the evening and night shifts, and temporary workers are frequently assigned to the night shift because of labour shortages.

The Quality Assurance Officer also reported that raw milk quality varies during rainy periods, but some borderline batches were still accepted because of production pressure. In addition, sanitation schedules were not fully followed on a few peak production days.

Storage and transport conditions have also become a concern. On several recent days, the cold room temperature exceeded the recommended level. One refrigerated vehicle has a faulty rear-door seal, and delivery routes are often revised at short notice. As a result, distant outlets sometimes receive products much later than planned.

Complaint handling is weak. Complaints are received through sales representatives, phone calls, and WhatsApp messages, but they are not recorded in one standard format. Therefore,

management cannot clearly identify the major problem categories, the most affected routes, or whether corrective actions are working.

You have recently been appointed as the Quality Improvement Manager of Sahana Dairy Foods (Pvt) Ltd. The Managing Director has asked you to analyse the situation and recommend a practical quality improvement plan.

Data for Analysis

Use the following data sets to answer all parts of Question 1.

Data Set 1: Customer Complaint Summary for the Last 4 Weeks

Complaint Category	Number of Complaints
Leaking yogurt cups	74
Late delivery to outlets	52
Sour taste before expiry date	43
Unclear / unreadable date code	18
Underweight cups	15
Wrong quantity per carton	11
Damaged outer cartons	9

Data Set 2: Rejected Cups at Filling, Sealing, and Packing Stage over 6 Production Days

Defect Type	Morning Shift	Evening Shift	Night Shift	Total
Incomplete / weak seal	22	37	84	143
Underfilled cups	14	19	28	61
Damaged cup rim	11	17	29	57
Unclear date code	13	18	24	55
Fruit mix inconsistency	8	11	15	34
Total	68	102	180	350

Data Set 3: Cold Room Temperature and Daily Retailer Returns for One Week

Day	Average Cold Room Temperature °C	Number of Returned Cups
Monday	4.3	5
Tuesday	5.0	7
Wednesday	6.2	11
Thursday	6.8	15
Friday	7.1	17
Saturday	5.7	9
Sunday	4.8	6

Data Set 4: Route Delivery Performance for the Previous Week

Route	Planned Delivery Time	Actual Average Arrival Time	Number of Complaints
Town route	7.30 a.m.	7.50 a.m.	6
Semi-urban route	8.00 a.m.	9.05 a.m.	14
Rural long-distance route	8.30 a.m.	11.20 a.m.	26

Using the case study and the data sets provided, prepare a **management report** to the Managing Director of Sahana Dairy Foods (Pvt) Ltd. In your report, identify the major quality problems faced by the company, analyse the possible causes of those problems, interpret the main patterns shown in the given data, and recommend practical solutions to improve the company's overall quality performance. Your report should be based on the facts given in the case study and the data sets provided.

(Total 40 Marks)

SECTION II

Answer any three questions from this section. Each question carries 20 marks.

Question No. 02

Lakrasa Biscuits (Pvt.) Ltd. is a local biscuit manufacturer in Ratmalana. The company has experienced product returns due to broken biscuits, incorrect packaging, and customer complaints about freshness. The management is reviewing its quality cost strategy using the traditional Cost of Quality Curve and the modern Cost of Quality Curve.

Note: Calculations are not required. Students may use suitable diagrams to support the answer.

- a) Explain the traditional view of the Cost of Quality Curve and the modern view of the Cost of Quality Curve. In your answer, clearly explain how prevention and appraisal costs, failure costs, and total cost of quality behave under each view.
- (10 marks)
- b) Compare the traditional and modern views of Cost of Quality and explain which approach is more suitable for Lakrasa Biscuits (Pvt) Ltd. Justify your answer using the quality problems given in the case.

(10 marks)

(Total 20 Marks)

Question No.03

Helarasa Foods (Pvt) Ltd. operates a ready-to-eat food production unit in Gampaha. The company faces the following challenges:

- Workers spend excessive time searching for tools and cleaning equipment
- Large batches of packaging materials are stored for months, occupying warehouse space
- Production processes are not standardised, leading to frequent errors and repeated reworking of products
- Workplace is cluttered with unused items, making hygiene maintenance difficult
- No systematic method for workers to suggest and implement small, continuous improvements

As a Total Quality Management consultant, analyse the situation and develop a practical improvement plan using 5S, JIT (Just-in-Time) and Kaizen. Submit your answer in the format below.

Observed issue	Japanese Concept Applicable	Specific Action	How Improvement Will Be Measured / Controlled
Workers spend excessive time searching for tools and cleaning equipment			
Large batches of packaging materials stored for months			
Production processes not standardised; frequent errors and rework			
Workplace cluttered with unused items; poor hygiene maintenance			
No systematic method for worker-driven small improvements			

(Total 20 Marks)

Question No. 04

Siyapatha Higher Education Institute operates five campuses in Sri Lanka. Management has observed major differences in student satisfaction, dropout rates, lecture punctuality, examination pass rates, and administrative efficiency across campuses. The Board wants to benchmark performance across campuses and also compare with leading private higher education providers. As a management consultant, design a practical benchmarking approach using the following format and provide a brief explanation.

Performance Area	Suitable Benchmarking Type	Comparison Source	Justification
Student satisfaction			
Dropout rate			
Lecture punctuality			
Examination pass rate			
Administrative efficiency			

(Total 20 Marks)

Question No. 05

Lakdana Commercial Bank evaluates branch employees mainly based on the number of new accounts opened, loans sold, and complaints closed each month. Employees are ranked against each other every quarter. As a result, some employees compete aggressively, avoid helping colleagues, hide mistakes, and focus mainly on short-term targets. Customer complaints and staff turnover are increasing. Using Deming's management philosophy and the Baldrige excellence perspective, evaluate the current system and design a quality-focused performance management approach.

(Total 20 Marks)

Question No. 06

Quality Management has evolved through several distinct eras over approximately 200 years. Each era attempted to address the fundamental fatal limitation of the previous era.

- Describe the focus of quality and one fatal limitation of each of the following eras: Inspection, Statistical Quality Control (SQC), and Quality Assurance (QA). Explain how the limitation of each era directly led to the emergence of the next era.

(10 marks)

- (b) Explain how Total Quality Management (TQM) differs from Quality Assurance (QA) in relation to three fundamental dimensions: scope of involvement, definition of quality, and approach to improvement.

(10 marks)

(Total 20 Marks)

Question No. 07

Ceylon Precision Manufacturing (Pvt) Ltd. produces plastic bottle caps. Specification: 28.00 mm $\pm$ 0.50 mm.

Ten samples were collected, with four observations in each sample:

Sample	Obs 1	Obs 2	Obs 3	Obs 4
1	28.1	28.3	27.9	28.2
2	28.0	28.4	27.8	28.1
3	27.9	28.2	28.0	28.3
4	28.3	28.5	28.1	28.4
5	28.2	27.8	28.0	28.1
6	28.0	28.2	27.9	28.1
7	28.4	28.6	28.2	28.5
8	28.1	27.7	28.0	28.2
9	28.2	28.4	28.0	28.3
10	28.5	28.7	28.3	28.6

Constants for $n = 4$: $A_2 = 0.729$, $D_3 = 0$, $D_4 = 2.282$

- a) Draw the $\bar{X}$ -chart and R-chart. Identify any out-of-control samples.

(10 marks)

- b) The company currently spends Rs. 65,000 monthly on 100% final inspection. Implementing SPC reduces this by 40%. Defective caps cost Rs. 15 each in scrap, and SPC is expected to prevent 120 defective caps monthly. Calculate the total annual quality cost savings from switching to SPC.

(10 marks)

(Total 20 Marks)

End of Question Paper