UNIVERSITY OF KELANIYA - SRI LANKA

Centre for Distance and Continuing Education

Faculty of Commerce & Management Studies

Bachelor of Business Management (General) Degree Third Year Examination (External) – 2023

November - 2025

BMGT E 3045 – Operational Management

No. of questions : Eight (08) Time: 03 hours

Answer Five (05) questions.

Question No. 01

a) Explain Operations Management and its importance in modern organizations.

(05 Marks)

b) "Production and Operations Management involves the effective utilization of resources to transform inputs into desired outputs." Discuss this statement.

(05 Marks)

c) Explain the historical development of Operations Management by examining the roles of the Industrial Revolution, Scientific Management, and Division of Labour in its evolution.

(10 Marks)

(Total 20 Marks)

Question No. 02

a) What are the main characteristics that distinguish goods from services in operations management?

(05 Marks)

b) Explain the concept of a production system and its key components, providing examples.

(05 Marks)

c) What are the latest developments in operations management? Discuss their impact on organizations and provide suitable examples.

(10 Marks)

(Total 20 Marks)

Question No. 03

a) Define capacity planning and explain its importance in operations management.

(05 Marks)

b) A manufacturing firm produces two products, **Product A** and **Product B**. Each product requires processing in two departments: **Cutting** and **Assembly**. The firm wants to determine the optimal production quantity of each product to maximize profit, while not exceeding the capacity of each department. Formulate a model for this scenario using the data provided below.

Product	**Profit per Unit**	**Cutting Time per Unit**	**Assembly Time per Unit**
	Rs	Hours	Hours
A	40	2	1
B	50	3	2
Department Capacities		100	80

(05 Marks)

c) Start Pvt. Ltd., dealing with a newly invented telephone device, is faced with the problem of selecting from the following courses of actions.

- Manufacture the device themselves
- Allow manufacturer by another part on royalty basis
- Sell the rights for the invention for a lump sum

The profits in Lakhs of rupees which can be expected in each case and the probabilities associated with the level of sales are shown in the following table

Outcome	**probability**	**In-house**	**Royalties**	**Sell all rights**
High sales	0.1	75	35	15
Medium sales	0.3	25	20	15
Low sales	0.6	-10	10	15

Other information

- If the Company manufactures the product and sales are medium or high, then the company has the opportunity of developing a new version of its telephone
- From past experience, the company estimates that there is a 50% chance of successful development.
- The cost of development is Rs. 15 lakhs and the returns after deducting the development costs are Rs. 30 lakhs and Rs.10 lakhs for high and medium sales respectively.

(i) Draw a decision tree showing the decisions, chance events, and their probabilities as well as the profitability of outcomes.

(ii) Solve the decision tree and decide what Start Pvt. Ltd. Should do.

(10 Marks)

(Total 20 Marks)

Question No. 04

a) Briefly describe the steps involved in the forecasting process.

(05 Marks)

b) Explain the term "forecast accuracy" and mention two common measures used to evaluate it.

(05 Marks)

c) A company records monthly sales of its product (in units) for the last 6 months as follows:

Month	Sales (units)
1	120
2	135
3	150
4	145
5	160
6	155

The company wants to forecast sales for Month 7 using **exponential smoothing** with a smoothing constant $\alpha=0.3$

You are required to

i) Compute the forecast for Months 2 to 7. Assume the forecast for Month 1 is equal to the actual sales of Month 1.

ii) Calculate the **Mean Absolute Deviation (MAD)** for the forecast.

iii) Explain briefly the impact of choosing a higher vs. lower smoothing constant (α) value on the forecast.

(10 Marks)

(Total 20 Marks)

Question No. 05

a) Draw a basic plant layout for a small garment manufacturing unit with the following sections: Fabric Storage, Cutting, Sewing, Washing, Finishing, Packing, and Dispatch. Label the layout and briefly explain the material flow.

(05 Marks)

b) A small furniture manufacturer currently uses a process layout. Due to increased demand, they plan to mass-produce three popular furniture models. **Propose a new layout and explain how it will reduce handling time, cost, and production lead time.**

(05 Marks)

c) The tasks given in the following table are to be performed on an assembly line.

Task	Immediate Predecessor	Time (seconds)
A	-	18
B	A	09
C	A	24
D	B	15
E	C	12
F	C	20
G	D	14
H	E, F	08

i) Construct an activity (precedence) diagram for the tasks.

ii) If the assembly line operates **8 hours per day** and the demand is **1000 units per day**, what is the cycle time?

iii) What is the theoretical minimum number of workstations?

iv) Assign tasks to workstations (show one feasible assignment).

v) What is the efficiency of your line balance?

(10 Marks)

(Total 20 Marks)

Question No. 06

a) Explain how **work measurement** and **method study** support effective job design.

(05 Marks)

b) List any five factors that influence job design in an organization.

(05 Marks)

c) The following table shows the observed times (in minutes) for each element of a particular task, along with the performance rating for the worker:

Elements	Cycle observed timings (in minutes)	Performance Rating %
A	0.15, 0.14, 0.16, 0.15, 0.14	95
B	0.10, 0.11, 0.09, 0.10, 0.10	105
C	0.12, 0.13, 0.12, 0.11, 0.12	100
D	0.08, 0.07, 0.08, 0.09, 0.08	110

Assuming a total allowance of 20%,

(i) Calculate the **normal time** for each element.

(ii) Calculate the **standard time per 8-hour shift.**

(iii) Calculate the **standard production per 8-hour shift.**

(10 Marks)

(Total 20 Marks)

Question No. 07

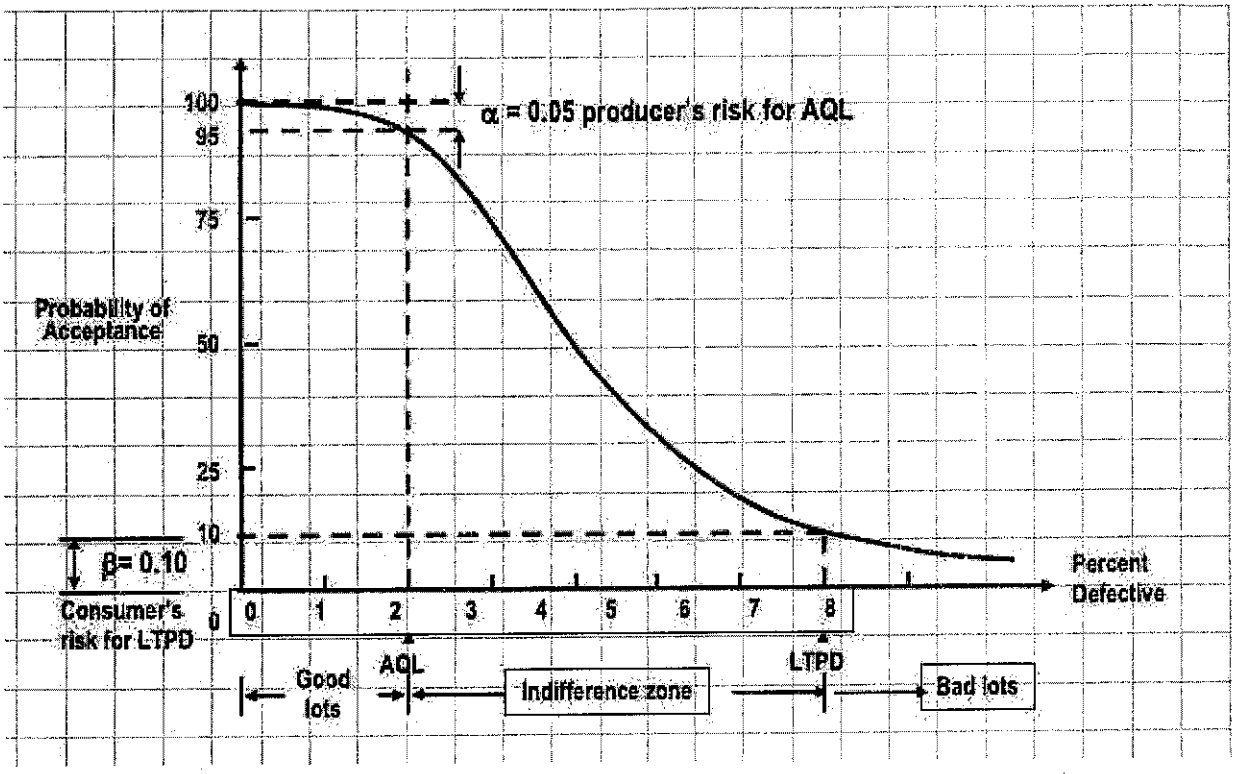
a) Explain how prevention, appraisal, internal failure, and external failure costs affect an organization's total quality cost. Give practical examples for each type.

(05 Marks)

b) How does an Operational Characteristics curve (OCC) help a quality manager decide on lot acceptance or rejection?

(05 Marks)

c) Analysis and Interpret the following OCC curve



(10 Marks)

(Total 20 Marks)

Question No. 08

a) Explain importance of inventory management in operations management.

(05 Marks)

b) How does **Just-In-Time (JIT) inventory** reduce holding costs?

(05 Marks)

c) Explain the role of **Material Requirements Planning (MRP)** in:

Reducing inventory levels

Ensuring timely availability of materials

Improving production efficiency

(10 Marks)

(Total 20 Marks)