



**UNIVERSITY OF RUHUNA**

**FACULTY OF GRADUATE STUDIES**

**Master of Business Management Degree Programme Semester II Examination**

**(May / June 2019)**

**Academic Year 2018/2019**

**MBM 12093 – OPERATIONS AND LOGISTICS MANAGEMENT**

**Duration: Three hours**

**The question paper consisted with 06 questions.**

**Answer for five (05) questions only.**

**Other Instructions:**

- **Non-programmable calculators are permitted.**
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**Question 01**

I. "Business organizations have to allocate a significant amount of money out of their budget for quality concerns of products and services". Discuss different types of costs that can be occurred while managing good quality practices in an organization.

**(05 Marks)**

III. Briefly explain how "David Garvin's quality dimensions" can be applied to measure the quality of a given product. Validate your answer using appropriate examples where necessary.

**(07 Marks)**

**(Total 12 Marks)**

### Question 02

I. The Creamy Cafe is well known for its popular homemade ice cream, which it makes in a small plant in back of the cafe. The two ladies who own the cafe want to develop a forecasting model so they can plan their ice cream production operation and determine the number of employees they need to sell ice cream in the cafe. They have accumulated the following sales records for their ice cream for the past 12 months.

Month	Ice Cream Sales (Liters)
January	1400
February	2020
March	2100
April	4200
May	4800
June	4600
July	2800
August	2750
September	2650
October	2875
November	2100
December	5100

Develop the linear regression model for this data and forecast ice cream sales for next January.

(10 Marks)

II. What are the importance of sales forecasting for "Creamy Cafe"?

(02 Marks)

(Total 12 Marks)

### Question 03

I. "Investing more or less money on inventories is risky". Validate this argument with suitable justifications.

(04 Marks)

II. Janath is operating a Batteries selling business. Total demand for batteries per month by Janath's shop is 50 units. The cost of a battery is Rs. 2000.00. Fixed cost of an order is Rs. 200.00. Holding cost is 12% of unit cost. Battery supplier is located in far away from Janath. In the completion of the order, one day is needed for the supplier to get ready the order and two days are needed to prepare the documents. The supplier will takes another two days to complete his delivery process after completing documentations. Once the supplier shipped the order, Janath will be able to receive the order after another two days. Suppose Janath's shop is opened for 300 days per annum.

You are required to calculate,

- a. Economic Order Quantity
- b. Annual total ordering cost
- c. Annual total holding cost
- d. Total cost of inventories
- e. Re-ordering level

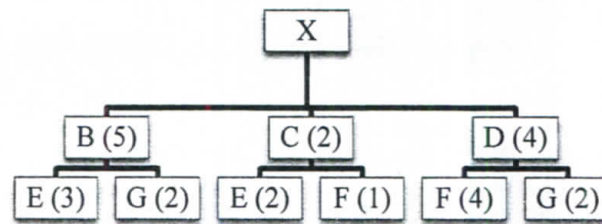
(08 Marks)

**(Total 12 Marks)**

### Question 04

Given the product structure of product X, lead time, and inventory status, you are required to develop a Material Requirement Plan (MRP) for the planning horizon of 10 periods assuming the requirement of product X in period 10 (day) is 245 units. The numbers within brackets represents quantities per assembly.

Product structure



Lead time and inventory status

Item	Lead time (days)	On hand
X	1	25
B	2	225
C	3	40
D	4	30
E	2	750
F	3	50
G	2	100

(Total 12 Marks)

Question 05

I. The guidance system of a ship is controlled by a computer that has three major modules. In order for the computer to function properly, all three modules must function. Two of the modules have reliabilities of .95, and the other has a reliability of .96. What is the reliability of the computer?

(03 Marks)

II. A company that makes shopping carts for supermarkets and other stores recently purchased some new equipment that reduces the labor content of the jobs needed to produce the shopping carts. Prior to buying the new equipment, the company used five workers, who produced an average of 100 carts per hour. A worker receives Rs.30.00 per hour, and machine cost was Rs.50.00 per hour. With the new equipment, it was possible to transfer one of the



workers to another department, and machine cost increased by Rs. 10 per hour while output increased by four carts per hour.

a. Compute labor productivity under two conditions. Use carts per worker per hour as the measure of labor productivity.

(03 Marks)

b. Compute the multifactor productivity under two conditions. Use carts per rupee cost (labor plus equipment) as the measure.

(04 Marks)

c. Comment on the changes in productivity according to the two measures (above 'a' and 'b'), and on which one you believe is the more pertinent for this situation.

(02 Marks)

**(Total 12 Marks)**

### Question 06

I. What is the Supply Chain in Operations Management?

(03 Marks)

III. Explain the role of "Facilities" in a supply chain and five (5) matrices that can be used for measuring the performance of "Facilities" in a Supply Chain.

(09 Marks)

**(Total 12 Marks)**

#### List of formula

$$a = \bar{y} - b \bar{x}$$

$$b = \frac{\sum xy - n\bar{x}\bar{y}}{\sum x^2 - n\bar{x}^2}$$

$$Q = \sqrt{\frac{2DS}{H}}$$

$$Q = \sqrt{\frac{2DS}{H \left[1 - \frac{d}{p}\right]}}$$

$$TC = \frac{D}{Q} \times S + \frac{Q}{2} \times H$$

$$TC = \frac{1}{2}HQ \left[1 - \frac{d}{p}\right] + \frac{D}{Q} \times S$$

$$ROP = \bar{d}L + ss$$

$$SS = Z\sigma_{dLT}$$

$$\sigma_{dLT} = \sqrt{\sigma_a^2 L} = \sigma_a \sqrt{L}$$

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