

**UNIVERSITY OF RUHUNA****FACULTY OF MANAGEMENT AND FINANCE****Bachelor of Business Administration Degree Programme 2000 Level Semester II  
Examination (February/March 2021)****BBA 22023 – Operations Management****Duration: Three hours****The question paper contains six (06) questions.****Instructions:**

- **Answer five (05) questions only.**
- **Non-programmable calculators are permitted.**

**Question 01**

- I. Briefly discuss the basic types of layouts that provide optimum space to organize equipment, facilitate movement of goods, and to create safe and comfortable work environment.  
(06 Marks)
- II. Suppose bank credit card division is highly competitive and decided to retain its customers by improving customer service through a reduction in billing errors.

The credit card division monitored its billing department process by taking daily sample of 200 customer bills for 15 days and checking their accuracy. The sample results are as follows:

<b>Sample Number</b>	<b>Number of Defectives</b>
1	7
2	12
3	9
4	6
5	5
6	8
7	10
8	11
9	14
10	10
11	9
12	6
13	3
14	2
15	8

Develop a P-chart for the billing process using  $3\sigma$  control limits and, identify whether the process is out of control.

\*Round up to three (03) decimal places.

(08 Marks)

(Total 14 Marks)

**Question 02**

I. Briefly explain the relationships among capacity planning, aggregate planning, and material requirement planning in a manufacturing firm.

(06 Marks)

II. Jobs processed by New City tool Center passing two operations: machining and polishing. The time (in hours) required for each of these operations as follows:

Job	Machining (hrs)	Polishing (hrs)
L	5	4
M	7	3
N	3	2
O	4	1
P	1	2
Q	3	4

You are required to,

a. Determine a sequence that will minimize the time required to process all six (06) jobs.

(02 Marks)

b. Develop a Gantt chart to map out the schedule on each operation.

(04 Marks)

c. Calculate the makespan for the set of jobs.

(02 Marks)

(Total 14 Marks)

### Question 03

- I. Assume that you are the Operations Manager of Star Garments factory in Matara. Briefly explain two strategies that you can adopt for the capacity expansion in relation to a steady growth in demand in Star Garments factory.

(04 Marks)

- II. The Burger King is going to update and improve its order processing and burger-making procedures. In order to deliver fresh burger fast, six elements must be completed.

Work Element	Precedence(s)	Time (minutes)
A	-	2
B	A	1
C	A	2
D	B,C	3
E	D	3
F	E	3

You are required to,

- Construct a precedence diagram and compute the flow time for the process.  
(02 Marks)
- If the demand for burgers is 120 per night (5.00 p.m. to 1.00 a.m.), what is the cycle time?  
(02 Marks)
- Balance the line and calculate its efficiency.  
(03 Marks)
- How would it be the efficiency of the process, if the line changes to produce 160 burgers per night?  
(03 Marks)

(Total 14 Marks)

#### Question 04

I. "Lean production is the result of the mandate to eliminate waste". Explain this statement with the elements of lean production.

(06 Marks)

II. Mr. Perera runs a photocopy center in University of Ruhuna. It is time to purchase a new high-speed photo copy machine. He has gathered the following data on reliability and maintainability for the three machines that he is expecting to purchase. Given that all other factors are equal, which machine should Perera purchase?

Machine type	Mean Time Between Failures (MTBF) Hours	Mean Time To Repair (MTTR) Hours
A	50	1
B	80	4
C	200	8

(02 Marks)

III. NHSL Post Office is evaluating the productivity of its mail processing centers: 1, 2, and 3. The centers differ in the degree of automation, the type of work that can be performed, and the skill of the workers.

Center	1	2	3
Pieces processed / hr	1500	2500	3000
No. of workers/hr	10	5	2
Hourly wage rate	Rs.6.50	Rs.10	Rs.12
Overhead rate/hr	Rs.15	Rs.30	Rs.50

You are required to,

a. Calculate the multifactor productivity for each center.

(03 Marks)

b. What would be the productivity, if the workers in Center 1 are scheduled to receive a 10% pay raise next month?

(01 Mark)

c. A new processing machine is available for Center 3 that would increase the output to 5000 pieces an hour at an additional overhead rate of Rs.30 an hour. Should NHSL install the new processing machine?

(02 Marks)

(Total 14 marks)

**Question 05**

- I. Assume that you are an operation manager in an automobile manufacturing company. You are given the responsibility of taking decisions of locating a new manufacturing facility. Explain what factors should be considered when selecting a site for a new manufacturing facility?

(06 Marks)

- II. Tech zone is a large computer store that sells computers and printers in Matara district. It has collected historical data on sales of printers for the past 10 years as follows:

Year	Number of Printers sold
1	381
2	579
3	312
4	501
5	296
6	415
7	535
8	592
9	607
10	473

You are required to,

- a. Develop the linear trend line.
- b. Forecast the demand for printers in year 11.

(06 Marks)

(02 Marks)

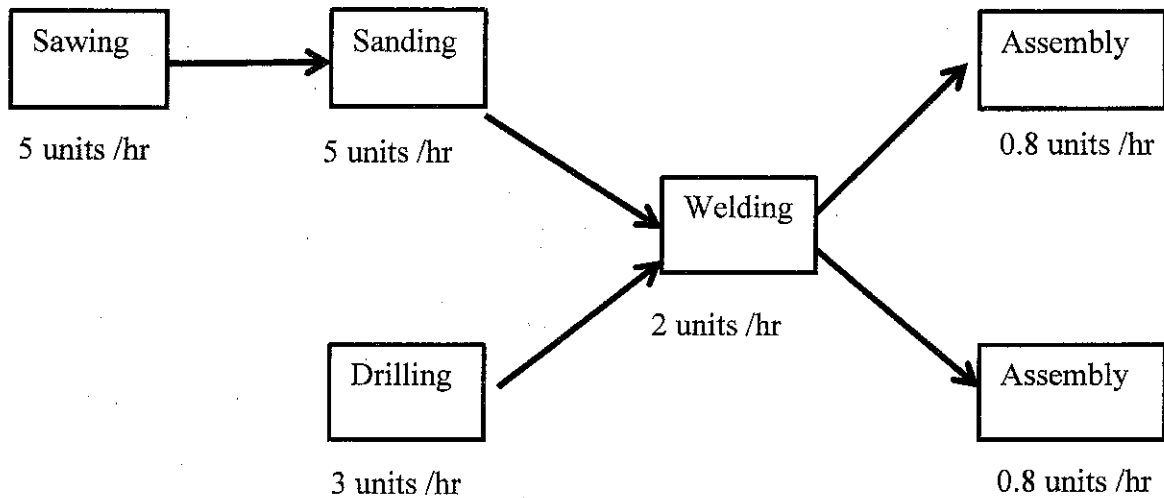
(Total 14 Marks)

**Question 06**

I. "The cost of quality consists of cost of achieving good quality and cost of poor quality."  
Explain this statement with examples.

(06 Marks)

II. A production process at JJ Manufacturing is given below. The drilling operation occurs separately from, and simultaneously with, sawing and sanding operations. A product needs to go through one of two assembly operations (the operations are in "parallel").



a. What is the bottleneck operation?

(02 Marks)

b. What is the bottleneck time?

(02 Marks)

c. What is the throughput time of the overall system?

(02 Marks)

d. What is the monthly capacity of the manufacturing process, if the firm operates 8 hours per day, 20 days per month?

(02 Marks)

(Total 14 Marks)

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