	UNIVERSITY OF RUHUNA	No. of Pages : 06
		No. of Questions: 06
	FACULTY OF MANAGEMENT AND FINANCE	Total Marks :70

BBA 22023 – Operations Management	Academic Year 2021/2022
BACHELOR OF BUSINESS ADMINISTRATION HONOURS DEGREE	Three Hours
2000 LEVEL SECOND SEMESTER END EXAMINATION – FEB/MARCH 2023	

Instructions

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

➡ *For the computation, the final answer should be rounded off to two decimal places where necessary.*

➡ *Non- programming calculators are allowed.*

Question 01

I. Briefly explain the difference between "order winners" and "order qualifiers" with suitable examples.

(06 Marks)

II. A wrapping paper company is evaluating their productivity in three different manufacturing centers: A, B, and C. Each center differs in the degree of automation, type of work, and the skill of its workers. Information for the work centers are as follows.

Center	A	B	C
Rolls of paper / hour	2000	3000	4000
No: of workers / hour	8	5	10
Hourly wage rate	Rs: 10	Rs: 13	Rs:15
Overhead rate/ hour	Rs:20	Rs: 30	Rs:45

You are required to,

a. Calculate the multifactor productivity for each center.

(02 Marks)

b. What would be the productivity, if the workers in Center A were scheduled to receive a 15% pay raise in the next month?

(02 Marks)

c. A new wrapping machine is available for Center B that would increase the output from 4000 to 6000 rolls per hour at an hourly additional overhead rate of Rs. 35. Decide whether the wrapping paper company install the new machine.

(02 Marks)

III. The Pro Sound (Pvt) Ltd. company assembles the major five components of a new sound system with 0.85, 0.96, 0.93, 0.90, and 0.98 component reliabilities. All of the components must function in order to operate the sound system efficiently.

Calculate the reliability of the new sound system.

(02 Marks)

(Total 14 Marks)

Question 02

I. Briefly discuss the dimensions of quality for manufactured Products.

(04 Marks)

II. The toy manufacturing company is going to update and improve its order processing and manufacturing procedures. Following table shows the tasks necessary for the assembly of a toy, the length of time needed to perform each task, and the operations that must be completed prior to subsequent operations.

Work Task	Task Time (Minutes)	Task Predecessor (s)
A	4	-
B	5	A
C	9	B
D	8	-
E	9	C, D
F	3	A
G	7	E, F

You are required to,

a. Construct a precedence diagram for the assembly of a toy.

(02 Marks)

b. Find the process flow time and the desired cycle time needed to produce 240 toys in a week of 40-hours.

(02 Marks)

c. What is the minimum number of workstations that can be used on the assembly line?

(02 Marks)

d. Balance the line and calculate its efficiency.

(04 Marks)

(Total 14 Marks)

Question 03

I. Briefly discuss the strategic importance of capacity planning in design of a manufacturing system.

(06 Marks)

II. The Baked Colombo Company believes its sandwich sales follow a seasonal pattern. It has accumulated the following data for sandwich sales per season during the past four years:

Season	Sandwich sales ('000)			
	2019	2020	2021	2022
January - March	42.7	44.3	45.7	40.6
April- June	36.9	42.7	34.8	41.5
July- September	51.3	55.6	49.3	47.3
October - December	62.9	64.8	71.2	74.5

Using a linear trend line estimate for the year 2023, forecast the demand for each season in 2023.

(08 Marks)

(Total 14 Marks)

Question 04

I. Briefly explain the difference between the "chase" and "level" strategies in aggregate planning and discuss their pros and cons.

(06 Marks)

II. The Superdag Tire Company in Sri Lanka wants to monitor the quality of the tires it manufactures. Each day, the company's quality-control manager takes a sample of 100 tires, tests them, and determines the number of defective tires. The results of 20 samples have been recorded as follows:

Sample	Number of Defectives
1	14
2	12
3	9
4	10
5	11
6	7
7	8
8	14
9	16
10	17
11	18
12	10
13	19
14	20
15	17
16	18
17	18
18	22
19	24
20	23

Develop a P-chart using the 3σ control limits and identify whether the process is out of control.
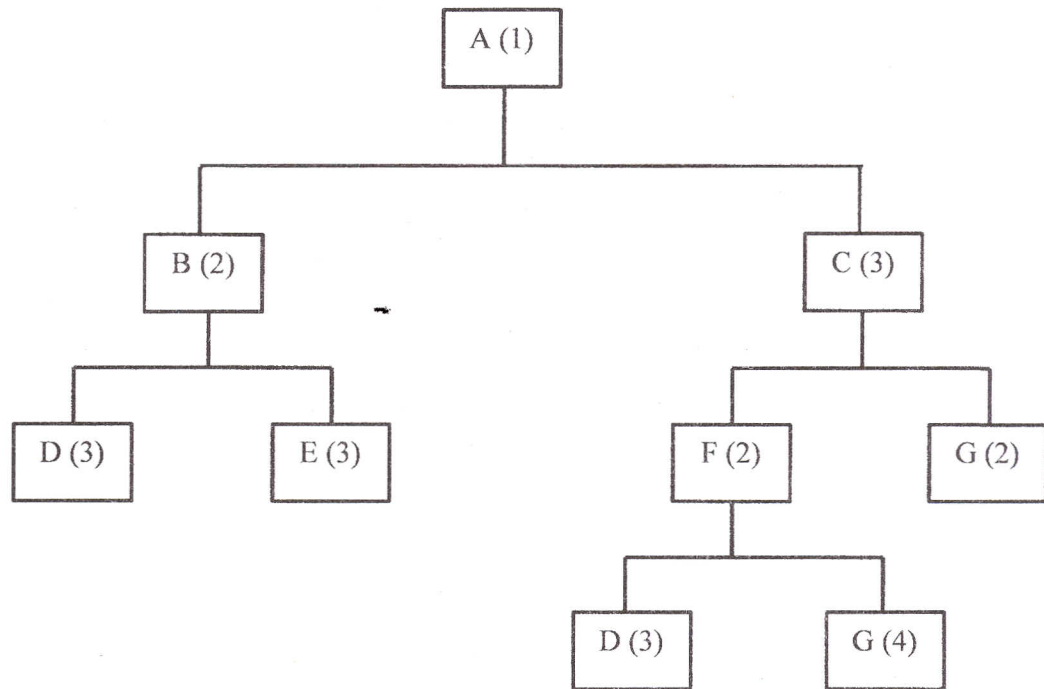
(08 Marks)

(Total 14 Marks)

Question 05

I. Briefly explain the manufacturing process types within an organization.

(04 Marks)

II. The following figure represents the assembly structure of product A (the numbers within the bracket represents quantities required per immediate upper- level assembly)

A (1)

B (2)   C (3)

D (3)   E (3)   F (2)   G (2)

D (3)   G (4)

Assume the firm has made a commitment to ship 200 units of the final product A to one of its customers in the 9th week. Inventory status and lead time are as follows.

Item	Lead time (weeks)	On hand
A	2	0
B	3	100
C	2	0
D	2	200
E	1	100
F	1	150
G	2	0

Prepare a material requirement plan (MRP) for the nine-week planning horizon based on the information provided above.

(10 Marks)

(Total 14 Marks)

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Question 06.

I. Briefly discuss the difference between product and process layouts with appropriate examples.

(06 Marks)

II. The machine operator of XYZ company has five tasks waiting to be processed through his machine. Processing time (in days) and due date for completion the each task are as follows:

Task	Processing time (In days)	Due Date
A	5	10
B	8	15
C	6	15
D	3	20
E	10	25

a) Schedule the above jobs by using the shortest processing time (SPT) and slack time remaining (STR) sequencing rules.

(06 Marks)

b) Calculate the mean flow time and the mean tardiness of the five tasks under each sequencing rule. Which rule would you recommend?

(02 Marks)

(Total 14 Marks)

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