



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
(ONLINE)
SEMESTER II
SESSION 2020/2021**

COURSE NAME : MANUFACTURING CONTROL
COURSE CODE : BBM 40402
PROGRAM CODE : BBA / BBD
DATE : JULY 2021
DURATION : 2 HOURS
INSTRUCTION : (1) ANSWER ALL QUESTIONS.
(2) MANUALLY WRITTEN ANSWERS ONLY
(3) FOLLOW THE GIVEN ELECTRONIC SUBMISSION INSTRUCTIONS

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THIS QUESTION PAPER CONSIST OF SIX (6) PAGES

Q1 (a) Explain the design of a product service system by using home water filter machine as example.

(10 marks)

(b) The performance of an electrical switch assembly line in an electronic circuit manufacturing company is presented as in Table Q1(b).

Table Q1(b): Assembly Line Process

Task	Follower	Performance Time (minutes)
A	B	0.2
B	E	0.2
C	D	0.8
D	F	0.6
E	F	0.3
F	G	1.0
G	H	0.4
H	-	0.3

(i) Draw a precedence diagram for this operation.

(4 marks)

(ii) Assuming 8 hours of working per day, and daily production of 400 units of electrical switches, calculate the cycle time.

(3 marks)

(iii) Calculate the theoretical minimum number of workstations.

(3 marks)

(iv) Balance the assembly line by assigning tasks into workstations. What is the overall efficiency of this assembly line?

(5 marks)

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Q2 (a) Discuss the challenges of the following job design in terms of job function under the current challenging economic situation due to global pandemic.

(i) Job enrichment.

(5 marks)

(ii) Job specialization.

(5 marks)

(b) A machine job shop has four departments - machining (M), dipping in chemical bath (D), finishing (F) and plating (P) that are all assigned to four work areas. The operation manager has gathered the workpiece movement data (in meters) among the four departments as indicated in Table Q2(b)(i) (Plan A). The quantity of workpieces that are moving among departments is summarized in Table Q2(b)(ii). It is estimated that it costs \$0.50 to move a workpiece 1 meter in the job shop.

Table Q2(b)(i): Plan A – Original Workpiece Movement Data Among Departments (in meters)

	M	D	F	P
M	-	6	18	2
D	-	-	4	2
F	-	-	-	18
P	-	-	-	-

Table Q2(b)(ii): Workpiece Quantity Movement Data Among Departments

	M	D	F	P
M	-	300	1600	200
D	-	-	400	250
F	-	-	-	1800
P	-	-	-	-

(i) Determine cost of the current layout (Plan A).

(4 marks)

(ii) The operation manager wish to switch those departments with high loading, namely, finishing (F) and plating (P), which alters the distance between them and machining (M) and dipping (D), as in the revised Plan B with movement data as summarized in Table Q2(b)(iii). Determine the cost of this layout (Plan B).

(4 marks)

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Table Q2(b)(iii): Plan B – Revised Workpiece Movement Data
Among Departments (in meters)

	M	D	F	P
M	-	20	8	12
D	-	-	10	6
F	-	-	-	4
P	-	-	-	-

Table Q2(b)(iii): Plan C – Proposed Workpiece Movement Data
Among Departments (in meters)

	M	D	F	P
M	-	20	10	6
D	-	-	8	12
F	-	-	-	4
P	-	-	-	-

- (iii) The CEO of the company wants the operation manager to evaluate a new proposed plan (Plan C) that switches milling (M) and drilling (D) with movement data as summarized in Table Q2(b)(iv). Calculate the cost of this layout (Plan C).
(4 marks)
- (iv) Based on your previous answers, in overall which layout is the best from the costing perspective? Justify your answers.
(3 marks)

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Q3 (a) Explain how target oriented quality works in Taguchi concept and its relationship with quality loss function.

(10 marks)

(b) A company has the master production plan for its product as shown in Table Q3(b). The lead time is 1 period, setup cost is \$200 and holding cost is \$10 per week. Develop the ordering plan and calculate the total cost involved using different lot-sizing strategies below (*note: you may use the provided Net Requirement Planning Sheet*).

Table Q3(b): Master Production Plan

Period (Weeks)	1	2	3	4	5	6	7	8	9
Gross Requirement		15		20		10			25

(i) Lot-for-lot.

(5 marks)

(ii) Economic order quantity (EOQ).

(5 marks)

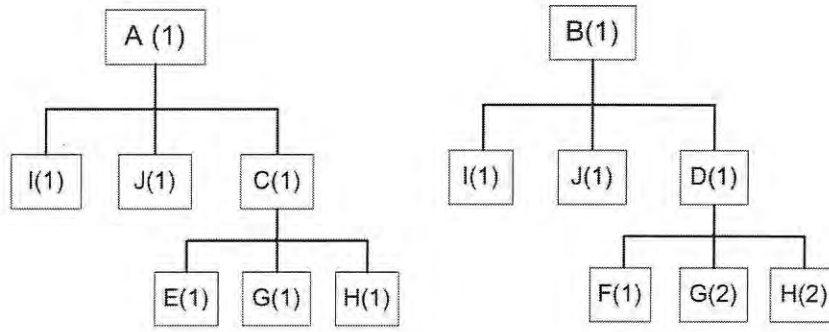
(iii) Periodic order quantity (POQ).

(5 marks)

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Q4 (a) Explain how the three core components of Toyota Production System (TPS) can be applied in managing a small local cafeteria. (9 marks)

(b) An electrical appliance company produces two types of document printer: CP100 for home use, and CP200 for office use. The product structure and the required number of components of the two printers are as shown in Figure Q4(b). Table Q4(d) shows the lead time for all the components. After a stock check, the production engineer discovered safety stocks for components as follows: 200 units of Printhead Motor 1, 1000 units of Stabilizer Bar, 500 units of Paper Roller & Feed and 300 units of System Board. Assuming the demand for CP100 is 500 units and CP200 is 800 units and both products are due in week 10, generate the net material requirements with consideration of current stock availability (*note: use the Net Requirement Planning Sheet attach to answer sheet*). (16 marks)



() = Number of Components

Figure Q4(b): Product Structure and Number of Components

Table Q4(b): Lead Time for Components

Label	Lead Component	Lead Time (weeks)
A	CP100	2
B	CP200	2
C	Printing Subassembly 1	1
D	Printing Subassembly 2	2
E	Printhead Motor 1	1
F	Printhead Motor 2	2
G	Stabilizer Bar	1
H	Belt	1
I	Paper Roller & Feed	1
J	System Board	2

-END OF QUESTIONS-

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