



# UTHM

Universiti Tun Hussein Onn Malaysia

**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER II  
SESSION 2022/2023**

COURSE NAME : PRODUCTION PLANNING AND CONTROL

COURSE CODE : BPC 22103

PROGRAMME CODE : BPB / BPP

EXAMINATION DATE : JULY / AUGUST 2023

DURATION : 3 HOURS

- INSTRUCTIONS
1. ANSWER **ALL** QUESTIONS
  2. THIS FINAL EXAMINATION IS CONDUCTED VIA **CLOSED BOOK**
  3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF **SEVEN (7)** PAGES

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- Q1** (a) An assembly line has a total of 8 hours available time in a shift. The employees working the shifts have a half hour lunch break and two fifteen minute tea breaks each shift. The machines also require ten minutes per shift in basic maintenance. At the start of each working day, the supervisor spends ten minutes talking to the staff and setting goals for the shift ahead.
- (i) Calculate the available time to work for the line for 100 units per day.  
(3 marks)
- (ii) Analyse the answer in **Q1(a)(i)** if the maximum time is allowed to make a product if the demand 100 units a day and the employee is working only one shift.  
(4 marks)
- (b) You are managing a group of 10 Electricians. These individuals undertake in-home servicing of electrical systems and are called by telephone for either emergency or pre arranged visits. They charge a minimum call out fee that covers the first 15 minutes of their visit plus travelling time. Beyond the first fifteen minutes they charge in minimum blocks of 15 minutes plus any materials that might be necessary to carry out the job. The average call out takes 1 hour. The workers usually are available for eight hours a day but with 2 coffee breaks of 15 minutes each and a half hour lunch break, they actually work a 7 hour day. Taking time off and illness into account reduces the electricians' available time by 20%. This means the 7 hours per day is reduced to a 5 hour and 36 minute day (5.6 hours).

If actual work is 200 hours billed in a week:

- (i) Calculate the efficiency of the team.  
(2 marks)
- (ii) Calculate the utilisation of the team.  
(2 marks)

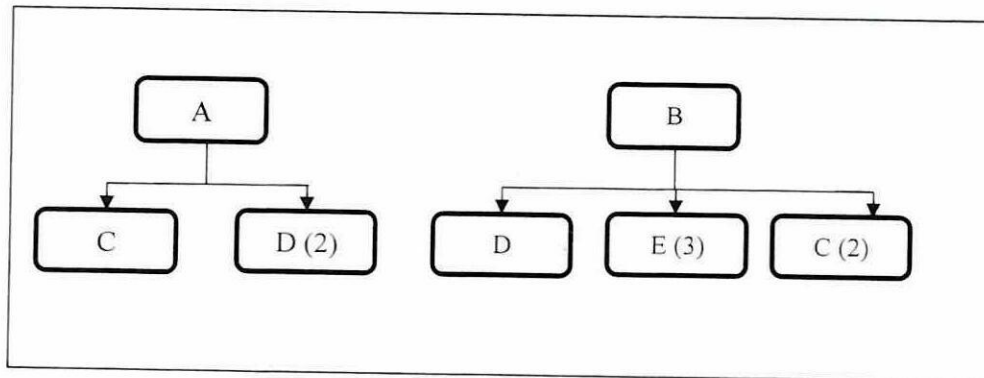
(c) The following capacity bills are given for item A and B.

**Table Q1(c)(i): Setup Time**

Work Center	A (hours)	B (hours)
10	0.14	0.07
20	0.82	0.71
30	1.16	0.88

**Table Q1(c)(ii): Routing Information**

Item	Work Center	Operation	Run (hrs per unit)
A	10	1 of 1	0.43
B	10	1 of 1	0.57
C	20	1 of 2	0.18
C	30	2 of 2	0.33
D	20	1 of 1	0.19
D	30	2 of 2	0.22
E	30	1 of 2	0.09



**Figure Q1(c): Bill of Materials**

Examine:

- (i) The capacity requirements for the work centre for week 1 if in week 1 there is a Master Production Schedule (MPS) of 60As and 70Bs. (4 marks)
- (ii) The capacity requirements for the work centre for week 2 if in week 2 there is a MPS of 50As and 90Bs. (4 marks)
- (iii) Analyse the action should be taken if each work center has a stated capacity of 120 standard hours available per week. (6 marks)

**Q2** Olympeca Enterprise plans to assemble a new model of mountain bikes called MTB. MTB is made from components 3Bs and 2Cs. Item 3Bs in turn are made from D and E. Meanwhile item C is made from D. Data from the inventory records are shown in **Table Q2**.

**Table Q2: Inventory Record**

Data Category	MTB	B	C	D	E
Lot-sizing rule	L4L	L4L	Lot size 200	L4L	Lot size 100
Lead time	1 week	1 week	1 week	1 week	2 weeks
Gross Requirement	100 (week 4) 50 (week 5)	None	None	None	None
Scheduled Receipts	0	300 (week 1)	0	200 (week 3)	0
Beginning inventory	20	0	0	0	0

(a) Illustrate a bill of material (BOM) with level code for MTB. (5 marks)

(b) Prepare a material requirement planning for MTB, refer **Figure Q2** in appendix. (20 marks)

**Q3** (a) List **FOUR (4)** priority rules for sequencing jobs. (4 marks)

(b) Currently a consulting company has four jobs in its backlog. The time since the order was placed, processing time, promised due date and operations due dates are given in **Table Q3(b)** below.

**Table Q3(b): Data for Sequencing Jobs at Workstation**

Workstation	Process Time (days)	Arrival Date	Due Date	Operation Due Date
Drilling	5	132	142	121
Milling	3	131	144	126
Turning	4	125	140	125
Wire cutting	7	121	146	124

Calculate the sequence job rules based on your answer in **Q3(a)**. (8 marks)



- (c) Seemy Sky Sdn Bhd has an order for 200 calculators for Model ASE-120, and delivery on day 200. The calculator has three parts. Components C3 and C4 form subassembly for component C2. Then, component C2 and component C1 form the final assembly of ASE-120 calculator. **Table Q3(c)** shows the routine file of the work centers and times for each operation.

Assume:

- Only one machine is assigned to each operation.
- The factory works 8-hour shifts, 5 days a week.
- All parts move in one lot of 200.

**Table Q3(c): Routine File of the Work Centre**

Components	Operations	Standard Time (days)
C1	10	5
	20	7
C3	10	5
	20	7
C4	10	12
	20	5
C2		7
Final Assembly ASE-120		5

- (i) Illustrate the backward schedule based on the routine file above. (10 marks)
- (ii) Identify when component C4 must be started to meet the delivery date. (2 marks)
- (d) Explain **FIVE (5)** actions to be taken in managing bottlenecks. (10 marks)
- Q4** (a) State **FOUR (4)** objectives of purchasing. (4 marks)
- (b) Explain **THREE (3)** impacts of Material Requirement Planning (MRP) on purchasing. (6 marks)
- (c) Discuss **THREE (3)** methods that can be implemented in the purchasing department to minimise the impact of the business organisation on the environment. (6 marks)

-END OF QUESTIONS -

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**Figure Q2: MRP Record**

Low Level Code	Part Number	WEEK	1	2	3	4	5
		Gross Requirements					
		Scheduled Receipts					
		Projected Available					
		Net Requirements					
		Planned Order Receipt					
		Planned Order Release					
		Gross Requirements					
		Scheduled Receipts					
		Projected Available					
		Net Requirements					
		Planned Order Receipt					
		Planned Order Release					
		Gross Requirements					
		Scheduled Receipts					
		Projected Available					
		Net Requirements					
		Planned Order Receipt					
		Planned Order Release					
		Gross Requirements					
		Scheduled Receipts					
		Projected Available					
		Net Requirements					
		Planned Order Receipt					
		Planned Order Release					
		Gross Requirements					
		Scheduled Receipts					
		Projected Available					
		Net Requirements					
		Planned Order Receipt					
		Planned Order Release					

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				Gross Requirements			
Scheduled Receipts							
Projected Available							
Net Requirements							
Planned Order Receipt							
Planned Order Release							
				Gross Requirements			
		Scheduled Receipts					
		Projected Available					
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