



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA
PEPERIKSAAN SEMESTER 1
TEST 1 - SESI II 2010/2011**

FAKULTI KEJURUTERAAN PEMBUATAN

KOD MATA PELAJARAN	: BMFP 4513
MATA PELAJARAN	: PERENCANAAN & KAWALAN PENGELUARAN (PRODUCTION PLANNING & CONTROL)
PENYELARAS	: H HAERY IP
KURSUS	: BMFA/BMFB/BMFP/BMFR/BMFU
MASA	: 8.30 MLM – 9.30 MLM (1 JAM)
TARIKH	: 17 FEBRUARI 2011
TEMPAT	: DEWAN BESAR UTEM

ARAHAN KEPADA CALON:

- 1. Kertas soalan ini mengandungi DUA (2) Bahagian iaitu Bahagian A dan B.**
- 2. Sila jawab SEMUA soalan di Bahagian A dan B.**

**KERTAS SOALAN INI TERDIRI DARIPADA ENAM (6) MUKA SURAT SAHAJA
(TERMASUK MUKA SURAT HADAPAN)**

PART A: Short Answer Questions**(LO 1, PO 1)**

1. Distinguish between the chase versus level strategy options. (2 marks)

ANSWER: The chase strategy sets production equal to forecasted demand, using varying work force levels, overtime, idle time, part-time employees, or subcontracting. Its main advantage is low inventory levels. The level strategy maintains a constant output rate, production rate, or work force level over the planning horizon. A stable work force generally leads to better quality, less turnover and absenteeism, and more employee commitment to corporate goals.

(LO 1, PO 1)

2. Explain briefly the hierarchy of production planning decisions. (2 marks)

ANS: First, we have the forecasting data which is the basic requirements for aggregate planning decisions. When aggregate planning is done, then it is disaggregated into individual products, which leads to the Master Production Schedule. And then, each individual items are broken down into its part requirements, which is listed in the MRP system.

(LO 1, PO 1)

3. Scheduling has several objectives, among which is to reduce the WIP inventory and to reduce worker idle time. Explain why these two objectives are conflicting. (2 marks)

ANS: Reducing WIP inventory increases the likelihood that operations may have to wait. With little or no WIP inventory, a breakdown in one part of the plant could halt production operations in the rest of the plant resulting in significant worker idle time.

(LO 1, PO 1)

4. Briefly discuss the advantages and disadvantages of each of these planning strategies.
 - Maintain a level production and use inventories to absorb fluctuations in demand.
 - Vary the size of workforce to correspond to predicted changes in demand requirements.
 - Maintain a constant workforce, but vary hours worked to correspond to predicted demand requirements. (4 marks)

ANS: a. Maintaining a constant workforce has the advantage of making estimation of labor costs relatively easy, is good for morale, and minimizes hiring and layoff costs. However, inventory carrying costs tend to be high.

b. Since labor force has to be continually adjusted, hiring and layoff costs tend to be high. Due to the instability of the labor force, employee morale is low. However, the inventory carrying costs are very low because production is matched with demand, resulting in little or no inventory.

c. Varying the workforce can cause morale problems. Moreover, working overtime generally is less productive, increases quality problems, and increases the risk of accidents.

PART B : Long answer questions**Question 1 (LO 3, PO 1,2,3) Aggregate Planning**

1. Happy Production Sdn Bhd has the following aggregate demand requirements and other data for the upcoming four quarters.

Quarter	Demand	Previous quarter's output	1500 units
1	1300	Beginning inventory	200 units
2	1400	Stockout cost	\$50 per unit
3	1500	Inventory holding cost	\$10 per unit at end of quarter
4	1300	Hiring workers	\$4 per unit
		Firing workers	\$8 per unit
		Unit cost	\$30 per unit
		Overtime	\$40 per unit

- a) Calculate the total cost of the aggregate plan if the company decides to use the chase strategy. (8 marks)
- b) Calculate the total cost of the aggregate plan if the company decides to produce at a constant rate of 1200 and obtain the remainder from overtime. (8 marks)
- c) Conclude by stating which plan works better for Happy Production Sdn Bhd. (4 marks)

ANSWER:

Plan A would cost \$165,400, while Plan B would cost \$167,400. In this case it is cheaper to vary work force than to use overtime.

Plan A

Eagle Fabrication Solution					
	Demand	Regular time Capacity	Regular time production	Units increase	Units decrease
Initial Inventory					
Period 1	1,300.	1,100.	1,100.	0.	400.
Period 2	1,400.	1,400.	1,400.	300.	0.
Period 3	1,500.	1,500.	1,500.	100.	0.
Period 4	1,300.	1,300.	1,300.	0.	200.
Total(units)	5,500.	5,300.	5,300.	400.	600.
			@\$30 /unit	@\$4 /unit	@\$8 /unit
Subtotal Costs			159,000.	1,600.	4,800.
Total Cost	165,400.				

Plan B

Eagle Fabrication Solution							
	Demand	Regular time Capacity	Overtime Capacity	Regular time production	Overtime production	Inventory (end PD)	Units decrease
Initial Inventory						200.	
Period 1	1,300.	1,200.	400.	1,200.	0.	100.	300.
Period 2	1,400.	1,200.	400.	1,200.	100.	0.	0.
Period 3	1,500.	1,200.	400.	1,200.	300.	0.	0.
Period 4	1,300.	1,200.	400.	1,200.	100.	0.	0.
Total(units)	5,500.	4,800.	1,600.	4,800.	500.	100.	300.
				@\$30 /unit	@\$40 /unit	@\$10 /unit	@\$8 /unit
Subtotal Costs				144,000.	20,000.	1,000.	2,400.
Total Cost	167,400.						

(Methods for aggregate planning, moderate)

Question 2 (LO 3, PO 1,2,3) SCHEDULING

Question 2 (LO 3, PO 1,2,3) SCHEDULING

2. Jack's Refrigeration Repair is under contract to repair, recondition, and/or refurbish commercial and industrial icemakers from restaurants, seafood processors, and similar organizations. Jack currently has five jobs to be scheduled, shown in the order in which they arrived.

Job	Processing Time (hours)	Due (hours)
V	20	50
W	10	35
X	50	90
Y	15	35
Z	55	75

- a. Complete the following table. (Show your supporting calculations below). [16 marks]
- b. Which dispatching rule has the best score for flow time? [1 mark]
- c. Which dispatching rule has the best score for work-in-process (jobs in the system)? [1 mark]
- d. Which dispatching rule has the best score for lateness? [1 mark]
- e. What dispatching rule would **you** select? [1 mark]

Dispatching Rule	Job Sequence	Average Flow Time	Average Number of Jobs	Average Lateness
FCFS				
SPT				
EDD				
CR				

ANSWERS:

(a) A summary of calculations appears in the table below.

Dispatching Rule	Job Sequence	Average Flow Time	Average Number of Jobs	Average Lateness
FCFS	V, W, X, Y, Z	75	2.50	27
SPT	W, Y, V, X, Z	65	2.17	16
EDD	W, Y, V, Z, X	66	2.23	17
CR	Z, X, Y, V, W	114	3.80	61

(b,c,d) SPT is best on all three criteria: flow time, work-in-process, and lateness. (e) Most students will select SPT as quite obvious, but EDD is a close second in all criteria. Supporting calculations for each priority rule appear in the tables below.

SPT	Machine1	Due Date	Flow Time	Late
W	10	35	10	0
Y	15	35	25	0
V	20	50	45	0
X	50	90	95	5
Z	55	75	150	75

Total 325 80
Average 65 16

Average # jobs in system = 2.17

FCFS	Machine1	Due Date	Flow Time	Late
V	20	50	20	0
W	10	35	30	0
X	50	90	80	0
Y	15	35	95	60
Z	55	75	150	75

Total 375 135
Average 75 27

Average # jobs in system = 2.5

EDD	Machine1	Due Date	Flow Time	Late
W	10	35	10	0
Y	15	35	25	0
V	20	50	45	0
Z	55	75	100	25
X	50	90	150	60

Total 330 85
Average 66 17
Average # jobs in system = 2.23

CR	Machine1	Due Date	CR	Flow Time	Late
Z	55	75	1.36	55	0
X	50	90	1.8	105	15
Y	15	35	2.33	120	85
V	20	50	2.5	140	90
W	10	35	3.5	150	115

Total 570 305
Average 114 61
Average # jobs in system = 3.80