

# 國 立 清 華 大 學 命 題 紙

96 學年度工業工程與工程管理學系(所) 乙、丁組碩士班入學考試

科目 生產管理 科目代碼 1602、1802 共 乙 頁第    頁 \*請在【答案卷卡】內作答

註：不得使用計算器。

1. (20%) 試論述一般生產系統(production system)之內涵。說明生產系統與「生產計畫與管制 (Production Planning and Control, PPC)」之關係。

2. (10%) 試論述豐田式生產系統(TPS, TOYOTA production system)之兩大支柱內涵：及時化(JIT)與自動化。

3. (20%)

(1) Complete the following MRP record. Assume lead time is two weeks, lot size is 100 and no safety stock is maintained. Inventory balance is 40 units at the start of week 1. There was an open order (scheduled receipt) for 100 units due to delivered at week 1.

Week	1	2	3	4	5
Gross requirements	80	50	80	70	80
Scheduled receipts					
Projected on hand					
Net requirements					
Planned order receipts					
Planned order releases					

(2) During the week 1, the following events occur. Enter them in the MRP record. (Please explain the calculation process and your assumptions)

- a. The actual requirements of 75 in week 1 are issued.
- b. The planned order for 100 in week 1 is released.
- c. 10 of the scheduled receipts for week 1 are scrapped.
- d. An emergent order(or requirement) for 10 is received and added for delivery in week 2.
- e. An order(or requirement) for 60 is received for delivery in week 6.

Week	2	3	4	5	6
Gross requirements					
Scheduled receipts					
Projected on hand					
Net requirements					
Planned order receipts					
Planned order releases					

(3) What is your decision(or action) based on MRP record in (2)?

國 立 清 華 大 學 命 題 紙

96 學年度工業工程與工程管理學系 (所) 乙、丁 組碩士班入學考試

科目 生產管理 科目代碼 1602、1802 共 2 頁第 2 頁 \*請在【答案卷卡】內作答

4. (20%) A work shop with two identical parallel machines has the following five jobs to be finished.

Job	Processing time	Due date
1	6	15
2	8	23
3	9	8
4	10	10
5	12	22

Assume the ready times are 0 for all the jobs and a job can not be interrupted once started. Find an optimal schedule that not only minimizes makespan but also minimize total tardiness. What are the minimum makespan and the minimum total tardiness?

5. (15%) A manufacturer has an EMQ problem to be solved. Assume that the demand rate is  $u$  units per week and the inventory holding cost is  $h$  dollars per unit per week. There are three production modes with different setup costs and production rates. The higher production rate, the higher setup cost has to be paid. If mode  $i$  is used, the setup cost is  $s_i$  dollars ( $i=1, 2, 3$ ) and production rate is  $p_i$  units per week ( $i=1, 2, 3$ ). Also,  $p_i > u, \forall i$ . How do you determine the optimal EMQ?

6. (15%) A 3C retail store has the following demands information for a MP3 player. The daily demand for the MP3 player is a random variable and we assume they are all normal distributions, but, with different parameters. In addition, we assume the demand between each day is independent.

Monday	Normal distribution (mean=20, standard deviation=5)
Tuesday	Normal distribution (mean=15, standard deviation=4)
Wednesday	Normal distribution (mean=15, standard deviation=4)
Thursday	Normal distribution (mean=10, standard deviation=2)
Friday	Normal distribution (mean=20, standard deviation=5)
Saturday	Normal distribution (mean=40, standard deviation=8)
Sunday	Normal distribution (mean=30, standard deviation=6)

The replenishment lead time for the MP3 player is three days. That is, if we order at the end of Monday, we will have the replenishment at the end of Thursday. Now, we are at the end of Monday. The current inventory for the MP3 player is 48. The service level is set at 0.8413(one standard deviation) by the top management. Should we issue a replenishment order now? Why?