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九十一學年度 工業工程與工程管理學系 系（所） 乙，丁 組碩士班研究生招生考試

科目 生產管理 科號 1802 2002 共 2 頁第 1 頁 *請在試卷【答案卷】內作答

1. (15%)何謂整體或總合生產計劃(Aggregate Production Planning)?何謂主生產排程(MPS, Master Production Schedule)?試論述兩者間之差異為何?

2. (15%)試解釋下列名詞(最好舉例):
   (a) DBR(Drum-Buffer-Rope)
   (b) BTO (Build-to-Order)
   (c)ATP (Available-to-Promise)

3. (10%)何謂 DRP(Distribution Requirement Planning), 並請舉例說明之。

4. (10%) A unit of product *A* requires two units of component *B* and three units of part *C*. It takes 5 hours of machine type *M* **OR** 3 hours of machine type *N* to produce one unit of product *A*. It takes 3 hours of machine type *M* **OR** 2 hours of machine type *N* to produce one unit of component *B*. It takes 2 hours of machine type *M* **OR** 1 hours of machine type *N* to produce one unit of part *C*. Suppose there are 8 working hours per working day and five working days per week. In addition, there are 6 units of machine type *M* and 5 units of machine type *N*. The quantity of next week's MPS is 40 units of product *A*. Please write an linear programming formulation to perform CRP to determine if there are enough capacity for this coming week.

5. (20%) The are three machines (A, B, and C) and five jobs (1, 2, 3, 4, and 5). All the processing times are identical. A machine will take 1 hour to produce one job. The machine shop has to delivery these five jobs within two hours. However, the production costs are not identical and are shown in the following table:

| | Job 1 | Job 2 | Job 3 | Job 4 | Job 5 |
|---|---|---|---|---|---|
| Machine A | 10 | 18 | 20 | 5 | 10 |
| Machine B | 14 | 24 | 17 | 9 | 11 |
| Machine C | 8 | 10 | 15 | 8 | 12 |

The management would like to find the schedule that will minimize total production cost.

(a) What are those approaches can be used to solve this problem?

(b) Please use the approach that you can calculate manually to solve the problem.

6. (10%) Assume single machine with $n$ jobs whose processing times are known and whose ready dates are zero. Prove that SPT rule minimizes mean flow time.

7. (20%) A factory faces an EMQ decision problem. Assume that setup cost is $s$ dollars per setup, inventory holding cost is $h$ dollars per unit product per unit time and demand rate is $d$ per unit time. The production starts rate is $p$ per unit time and the cost of raw material is $c$ dollars per unit product. The yield rate is 1.0 right after a new setup, but the yield rate decreases linearly afterward; i.e., the yield function is

$$y = f(t) = \begin{cases} 1 - at, & \text{when } 0 < t < \dfrac{1}{a}, \\ 0, & \text{otherwise} \end{cases}$$

where $t$ is the time elapsed after setup. In addition, the maximum run time of a batch is $\frac{1}{a}$.

(a) Please draw and explain the graph representing inventory level vs. time.

(b) What is the EMQ that minimize the total costs?