國立高雄第一科技大學 97 學年度 碩士班 招生考試 試題紙

系 所 別：運籌管理系　　組　別：工業管理組

考科代碼：3122　　考　科：生產管理

注意事項：

1、本科目可使用本校提供之電子計算器。

2、請於答案卷上規定之範圍作答，違者該題不予計分。

註：1. 本試題不需使用字典但可使用計算機

2. 若題目有你認爲描述不清楚以致妨礙作答之處，請自行寫下你的假設

1. To produce an electronic device, there are 11 steps which can be divided into four major sectors as shown below. The operations in each sector have the same tools and setups. But the operations in different sectors require different tools and setups, as well as job skills. If a worker is responsible for operations in two kinds of sectors, the changeover time between the any two sectors of operations is 10 sec to change tool sets. But the changeover time between two operations within the same sector is 0 sec. For example, if a worker is responsible for operations in soldering and assembly, then the total operation time is (14+12) +10+ (10+8+10+14) = 78 sec. Assume the plant operates 8 hours per day. Please answer the following questions.

Sectors	Soldering		Assembly				Binding			Testing	
Operations	S1	S2	A1	A2	A3	A4	B1	B2	B3	T1	T2
Time(sec)	14	12	10	8	10	14	10	8	10	7	6

(a) If the plant is to produce 12000 pieces of the device in three days (i.e., not necessarily three days wholly but more than two days and less than three days), to achieve the highest possible efficiency of production lines, how many production lines are necessary and how many workers are there in a production line. How do you assign the operations to each worker? What is the efficiency of the line you plan? (hints: you can assign more than one worker to any of the 11 operations as is necessary or more than one operations to one worker as well) 8%

(b) Since the market demand for the device is variant ranging from 12000 pieces to 3000 pieces during a three days period, the plant is considering making a team with two workers responsible for a production line to perform all the 11 steps. How do you assign operations to the two workers to achieve the highest efficiency possible? What is the efficiency of the lines you plan? How many teams are required to meet maximal demand of 12000 pieces and minimal demand of 3000 pieces in three days, respectively?(hints: remember to consider the changeover time) 10%

(c) Please evaluate and compare the pros and cons of the plans you made in (a) and (b) from the job design perspectives like job rotation, job enrichment, job enlargement, etc. 7%

2. Kanban is implemented in JIT production systems to control just-in-time supply of materials both in-plant and out-plant. Suppose the consumption of a specific material A in the shop floor of company TK is 150 pieces per hour, and the container for material A contains 15 pieces. To assure proper supply, a safety stock of 20% is authorized. The supplier of material A has three trucks to ship to TK plant, and a trip from the supplier to TK is 2 hours, including loading/unloading time. The maximal capacity of a truck is 16 containers.
   a. What is the time interval of schedule for trucks to arrive at TK reception department to supply material A (trucks are scheduled to arrive at fixed time interval.) 5%
   b. On average, how many containers does a truck carry? 5%
   c. How many number of Kanban is used between the supplier and the TK plant? 7%
   d. How much variation (in terms of the number of material A) of consumption change can this Kanban system tolerate? How much time does it take to respond to this change? 8% (hint: consider the maximal capacity of trucks, and the cycle time of a truck)

3. Explain the functional relationships among demand forecasting, rough-cut capacity planning, aggregate planning, inventory control, material requirements planning, and master production schedule. 15%

4. 運籌系學會準備委託廠商製作 2008 校運紀念衫，每件成本爲 80 元，售價爲 200 元，但是銷售量將受到天候影響，在校運結束後，所有未銷售的紀念衫將以每件 50 元忍痛出清。系學會根據氣象預報與市調估算出銷售量的機率分布，如下表所示。請計算出紀念衫的最佳製作量。 10%

Demand	Probability
30	0.05
40	0.10
50	0.30
60	0.35
70	0.15
80	0.05

5. 目標的作者 Goldratt 用童軍健行的隊伍來比喻工廠生產線，其中一位男孩 Herbie 是(1)隊伍裡最慢的，不僅(2)使隊伍拉長，也(3)造成健行進度落後，後來領隊要其他小孩幫忙(4)分擔 Herbie 的背包重量，(5)使隊伍行進速度加快，終能準時到達露營地點。請按照 Goldratt 的比喻方式，將劃線部分轉換爲生產線管制的情況。 15%

6. 請解釋在產能規劃時，根據 economy of scale 而設立大廠可獲得何種優勢？但是當市場衰退，需求不及原設計規模時，大廠會遭遇那些困難？ 10%