1 (12%) You are given this net requirements schedule:

	Week							
	1	2	3	4	5	6	7	8
Net requirements (units)	500	500	1,000	3,000	1,500	2,500	2,000	1,000

If it costs $6,000 to get the final assembly department ready to assemble batches of this product, it costs $30 to carry one unit in inventory for a year, and 52 weeks per year are worked by the final assembly department, develop a schedule of completed production lots for the product and calculate the cost of your schedule by using these methods:
a) Lot-for-lot (LFL)
b) Economic order quantity (EOQ)
c) Period order quantity (POQ) using the order period of 4
You may disregard the effects of initial inventory and safety stock on your calculations.

2 (5%) A basic modeling assumption underlying the EOQ model is constant and level demand over the infinite time horizon. Of course, this is never satisfied exactly in practice. What option does one have for lot sizing in the face of nonconstant demand.

3 (8%) What is the difference between operator-to-stock and stock-to-operator material handling equipment? Provide two examples for each type of the equipment.

4 (12%) A company is planning the aggregate production capacity required to produce the sales forecast in this table:

	Sales forecast (thousands of tons)			
Resin	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
A	9.0	10.0	12.0	14.0
B	7.0	8.0	5.0	10.0
C	6.0	3.0	4.0	7.0

Ample machine capacity exists to produce the forecast and each ton of resin requires five labor-hours.
a) Compute the aggregate demand for resin in each quarter.
b) Compute the aggregate number of labor-hours in each quarter.
c) If each worker works 520 hours per quarter, how many workers will be required in each quarter.

(背面仍有題目,請繼續作答)

5 (15%) Six jobs are waiting to be processed at a workstation. Their job code numbers, estimated production times, and promised delivery times are given in the following table.

Job code number	Production time (hours)	Time to promised delivery (hours)
161	3.8	6.0
162	2.1	3.0
163	4.5	14.0
164	3.0	10.0
165	4.2	20.0
166	2.9	19.0

Determine the sequence of producing the jobs using the following rules:
a) shortest processing time rule
b) least slack rule
c) critical ratio rule

6 (10%) A company receives part from suppliers to be used in its manufacturing departments. The quality control department must perform two operations when shipments are received: Operation A – draw a random sample, package, and deliver to testing, and Operation B – test the materials and issue a disposition report. The time estimates for processing six shipments through quality control are:

Shipment	Operation A (hours)	Operation B (hours)
1	1.5	1.0
2	1.1	2.7
3	1.2	1.4
4	0.7	1.6
5	1.6	1.5
6	1.9	2.9

a) Use Johnson's rule to set the sequence of processing the shipments through quality control. (Operations need not change over to new jobs at the same time.)
b) How much total time is required to process the six shipments through quality control?

7 (12%) In a manufacturing operation, the percentage defective average 2.5 percent and sample size is 200.
a) Compute the center line for the p chart.
b) Compute the 3σ control limits for the chart.
c) Plot these recent data collected from daily samples and decide if the operation is in control: Number of defectives per sample = 2, 9, 7, 5, 0, 3, 8, 7, 2, 5, 3, 2

8 (8%) Discuss the differences between the single-card Kanban and the two-card systems. Please use a graph to explain.

9 (10%) For each of the following situations, indicate whether you would be inclined to use constant work-in-process (C), Kanban (K), pull-from-bottleneck (P), or an individual system (I) for shop floor control. Explain your reasoning.

a) A flow line with a single-product family.
b) A paced assembly line fed from inventory storage.
c) A steel mill where casters feed hot strip mills (with slab storage in between), which feed cold rolling mills (with coil storage in between)
d) A plant with several routings sharing some resources with significant setup times, and all routings are steadily loaded over time.
e) A plant with many routings sharing some resources but where some routings are sporadically used.

10 (8%) Under what conditions is it possible for a workstation to operate at 100 percent capacity over the long term and not be unstable (i.e., not have work-in-process grow to infinity)? Can this occur in practice? Explain your reasoning clearly.