1. (15%) Please use the tracking signal method (with control limits of ±3MAD) to monitor the forecasting data shown in Table 1. In which period does the tracking signal method indicates the forecasting method begins to be out of control? (請計算出第二期至第八期的 **Tracking Signal**，並指出在哪一期開始 **out of control**，否則不計分)

Table 1.

Period (t)	Demand D_t	Forecast F_t
1	37	
2	40	37.00
3	41	37.90
4	37	38.83
5	45	38.28
6	50	40.29
7	43	43.20
8	47	43.14

2. (10%) Thomas Manufacturing Company must select a process for its new product, TS2, from three different alternatives. The following cost data (see Table 2) has been gathered. For what volume of demand would each process be desirable? (請寫出計算過程，否則不計分)

Table 2.

	PROCESS A	PROCESS B	PROCESS C
Fixed Cost	$10,000	$40,000	$70,000
Variable Cost	$5/unit	$2/unit	$1/unit

3. (16%) ABC Discount Store stocks toy race cars. Recently, the store has been given a quantity discount schedule for these cars. This quantity schedule was shown in Table 3. In other words, the normal price for the toy race cars is $5.00. For orders between 900 and 1,999 units, the unit cost drops to $4.80; for orders of 2,000 or more units, the unit cost is only $4.75. Furthermore, ordering cost is $49.00 per order, annual demand is 5,000 race cars, and inventory carrying cost, as a percent of cost, is 20%. What order quantity will minimize the total inventory cost? (請寫出計算過程，否則不計分)

Table 3.

Discount Number	Discount Quantity	Discount (%)	Discount Price
1	0 to 899	no discount	$5.00
2	900 to 1,999	4	$4.80
3	2,000 and over	5	$4.75

4. (9%) Please explain the following key terms (每題 3 分)：
- Postponement
- Virtual Companies
- Drop Shipping

注意：背面有試題

5. (10%) 請說明 Setup 時間與 JIT 有無關係？

6. (10%) 請說明 ERP 導入於一公司與 Project management 有無關係？。

7. (10%) 請問服務業相對於製造業，於產能利用率(Capacity utilization)上的考量有何不同？

8. (10%) 請說明 Statistical Process Control (SPC) 與 Acceptance Sampling 使用的時機有何不同？

9. (10%) 請說明 Sales and Operations Planning 是否會用到 Bill of Materials？

參考用

注意：背面有試題