

QUESTION 1 Answer the following concisely (40%)

- (1) Organizations may be viewed as systems. The systems view is important to production managers since (i) the production system is a part of the firm or organization and (ii) within the production function there are subsystems. Explain.
- (2) Explain total factor productivity. What is partial factor productivity? What partial factor productivity is likely to be measured most frequently in production management?
- (3) Contrast forecasting and prediction and give an example of each.
- (4) Explain how a flexible manufacturing system differs from a job shop and from an assembly line system.
- (5) What analytical approaches and models are useful in making capacity decisions? Under what circumstances would each model be most beneficial relative to the others?
- (6) Contrast the location problems of a manufacturing firm and a supermarket, showing the relevant considerations they share and those they do not.
- (7) Contrast job enlargement and job enrichment. Are they mutually exclusive?
- (8) In PERT, the terms are important. Explain the difference between an activity and an event. What is a critical path?
- (9) Why are inventories necessary? Discuss.
- (10) How do control charts differ from acceptance sampling plans? Under what circumstances is each appropriate?

QUESTION 2 (30%)

A manufacturer is considering buying one of two types of equipment, Type A or Type B. Initial equipment cost is US\$10,000 for either A or B. Operating costs are estimated as follows:

	A	B
Maintenance (per month)	\$750	\$500
Supplies (per unit)	0	0.052
Operator (per hour)	9	9

The companies selling the equipment each arranged for experimental demonstrations, in which stopwatch time studies of operator/machine performance for five cycles were measured, with the following results:

Task	Task Times (in min.) for A					Task Times (in min.) for B				
	Cycle					Cycle				
Load machine	0.32	0.29	0.28	0.31	0.30	0.30	0.27	0.25	0.22	0.21
Machine time (machine paced)	2.73	2.61	2.68	2.71	2.63	2.62	2.57	2.59	2.51	2.54
Unload machine	0.14	0.10	0.09	0.12	0.11	0.12	0.09	0.10	0.11	0.09
Inspect product	1.21	1.08	1.29	1.15	1.20	0.92	0.94	0.86	0.79	0.87
Apply label to product*	-	-	-	-	-	0.05	0.04	0.05	0.05	0.04

*Label application is automatic for A and manual for B.

The analyst rated the operator at 115 percent on Equipment A and 110 percent on B. It is estimated that during their daily 8-hour shift, operators will receive two 15-minute coffee breaks. Unavoidable delays are estimated to be 40 minutes for A and 25 minutes for B daily. Evaluate the two alternatives and justify your recommendation of A or B. Assume 5.5 working days a week.

QUESTION 3 (30%)

A chair manufacturer who produces three different models (A, B, and C) has developed a master production schedule (MPS) for the coming five weeks. Historically, worker productivity has averaged 8 units/week/employee based on the 'typical mix' of chairs. The company employs 50 workers. The standard labor hours for chairs are 1.0, 2.0, and 1.5 hours for models A, B, and C, respectively. Evaluate the capacity utilization of the MPS.

Chair	Master Production Schedule (in units)				
	Week				
	1	2	3	4	5
A	200	0	200	0	100
B	0	0	0	200	100
C	100	300	100	0	0

Develop a MPS that improves the capacity utilization under the following conditions: Production during the five-week horizon must include 500, 300, and 500 units of chairs A, B, and C, respectively, and no more than two types of chairs can be scheduled in any week.