Z 4508

M.B.A. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2006.

Second Semester

BA 1651 — PRODUCTION MANAGEMENT

(Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Identify the set of decisions that operations managers make.

2. What are the types of technologies that comprise computer-integrated manufacturing?

3. How JIT can facilitate the continuous improvement of operations?

4. Distinguish between independent and dependent demand.

5. Explain the various measures of forecast errors.

6. How aggregate plans relate to a firms long-term and short-term plans?

7. Identify the performance measures that are important in selecting a schedule.

8. How can uncertainty in time estimates be incorporated into project planning?

9. What is the role of MTM in work measurement?

10. What are the four basic layout types?

PART B — (5 × 16 = 80 marks)

11. (a) Write briefly on the following :

(i) Automated Storage and Retrieval Systems (ASRS)

(ii) ABC classification of inventories.

Or

(b) Write briefly on the following :

(i) Product design and development

(ii) MRP-I, MRP-II and ERP.

12. (a) A regional warehouse purchases hand tools from various suppliers and then distributes them on demand to retailers in the region. The warehouse operates 5 day per week, 52 weeks per year. Only when it is open can orders be received. The following data are estimated for hand drills.

Average daily demand = 100 drills

Lead time (L) = 3 days

Holding cost (H) = Rs. 9.40/unit/year

Ordering cost (S) = Rs. 35/order.

(i) What Least order quantity (Q) and reorder point (R) should be used? Consider a safety stock of 70 drills.

(ii) If on-hand inventory is 40 units, there is one open order for 440 drills, and there are no backorders, should a new order be placed?

The warehouse uses a continuous review (Q) system.

Or

(b) The MPS for product-A calls for the assembly department to begin final assembly according to the following schedule :

100 units in week 2 ; 200 units in week 4 ; 120 units in week 6 ; 180 units in week 7 ; and 60 units in week 8.

Develop a materials requirement plan for the next eight weeks for items B, C and D. Identifying any action notices that would be provided. The bill of materials of A is shown in Fig. 12.1 and data from the inventory records are shown in Table 12.2.

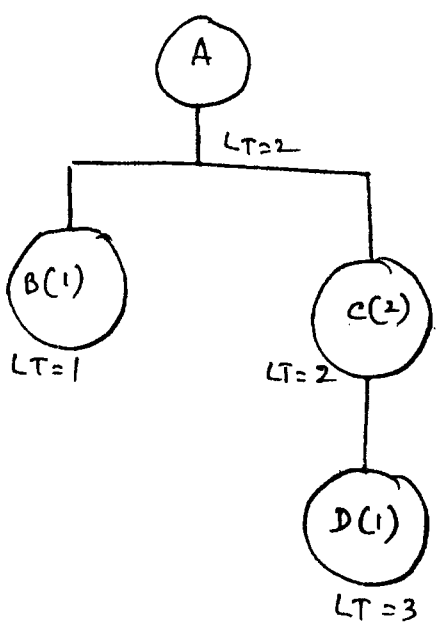

Fig. 12.1

Bill of materials for Product A

Table 12.2 Inventory Record Data			
Data Category	Item		
	B	C	D
Lot sizing rule	POQ (P = 3)	Lot for lot	FOQ = 500 units
Lead time	1 week	2 weeks	3 weeks
Scheduled receipts	None	200 (week 1)	None
Beginning (on hand) inventory	20	0	425

13. (a) The monthly demand for units manufactured by the ARC has been as follows :

Month	Units
May	100
June	80
July	110
August	115
September	105
October	110
November	125
December	120

Use exponential smoothing method to forecast the number of units for June-January. The initial forecast for May was 105 units ; α = 0.2. Calculate the MAD of forecast error.

Or

(b) The AA company produces residential air conditions. The manufacturing manager wants to develop a production plan for the next year based on the following demand and capacity data (in hundreds of product units).

	Period					
	Jan–Feb	March–April	May–June	July–Aug	Sept–Oct	Nov–Dec
	(1)	(2)	(3)	(4)	(5)	(6)
Demand	50	60	90	120	70	40
Capacities –						
Regular time	65	65	65	80	80	65
Overtime	13	13	13	16	16	13
Subcontractor	10	10	10	10	10	10

Undertime is unpaid, and no cost is associated with unused overtime or subcontractor capacity.

Producing one air conditioning unit on regular time costs Rs. 10,000, including Rs. 3,000 for labor. Producing a unit on overtime costs Rs. 11,500. A subcontractor can produce a unit to ARC specifications for Rs. 12,500. Holding an air conditioner in stock costs Rs. 600 for each two month period, and 200 air conditioners are currently in stock. The plan calls for 400 units to be in stock at the end of period 6. No back orders are allowed.

To use the transportation method for preparing aggregate plan, develop transportation table with all relevant data and present a starting feasible solution.

14. (a) An advertising project manager has developed the network diagram shown in Fig. 14.0 for a new advertising campaign. In addition, the manager has gathered the time information for each activity as shown in the Table 14.1.

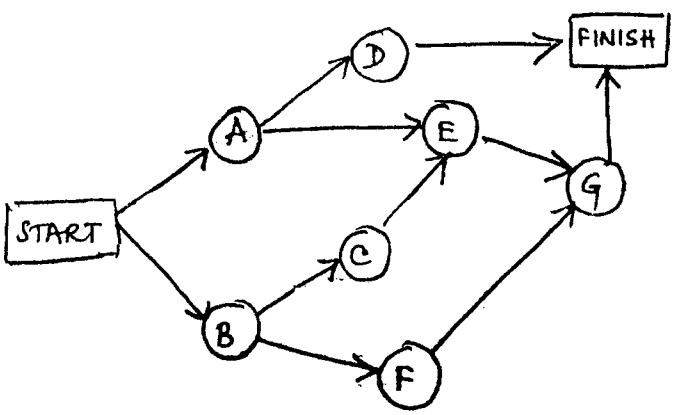

Fig. 14.0

Network diagram for Advertising program

Table 14.1 Time information for each activity.

	Time Estimates (week)			Immediate
Activity	Optimistic	Most likely	Pessimistic	Predecessor (S)
A	1	4	7	—
B	2	6	7	—
C	3	3	6	B
D	6	13	14	A
E	3	6	12	A, C
F	6	8f	16	B
G	1	5	6	E, F

(i) Calculate the expected time and variance for each activity.

(ii) Determine the critical path using the expected activity times.

Or

(b) What is Johnson's rule in scheduling a flow shop? A company just received an order to refurbish five motors for materials-handling equipment that were damaged in a fire. The motors will be repaired at two work stations in the following manner.

WS - 1 : Dismantle the motor and clean parts

WS - 2 : Replace parts as necessary, test the motor, and make adjustments.

The estimated time for repairing each motor is shown in the following table :

	Time (Hours)	
Motor	WS - 1	WS - 2
M1	12	22
M2	4	5
M3	5	3
M4	15	16
M5	10	8

Develop a schedule that minimizes the makespan. Display the schedule in a Gnatt chart.

15. (a) A defense contractor is evaluating its machine shop's current process layout. Figure 15.1 shows the current layout, and the table 15.0 shows the trip matrix for the facility. Safety and health regulations require departments E and F to remain at their current locations.

E	B	F
A	C	D

Fig. 15.1

	Trips between Departments					
Department	A	B	C	D	E	F
A	—	8	3		9	5
B		—		3		
C			—		8	9
D				—		3
E					—	3
F						—

Table 15.0

Trip Matrix

(i) Use Trial and error to find a better layout.

(ii) How much better is your layout than the current one, in terms of ld (load–distance) score? Use rectilinear distance.

Or

(b) What are the steps followed in conducting a work sampling study?

A library administrator wants to determine the proportion of time the circulation clerk is idle. The following information was gathered randomly by using work sampling.

Days	No. of times clerk busy	No. of times clerk idle	Total number of observations
Monday	8	2	10
Tuesday	7	1	8
Wednesday	9	3	12
Thursday	7	3	10
Friday	8	2	10
Saturday	6	4	10

Of the administrator wants a 95% confidence level and a degree of precision of ± 4 percent, how many more observations are needed.