

FACULTY OF MANAGEMENT STUDIES

UNIVERSITY OF DELHI

Semester Examination 2014

Name of Examination..... MBA (FULL TIME) I YEAR.....

Paper Name... PRODUCTION AND OPERATIONS MANAGEMENT

Paper No....6206.....Option.....

Time allowed.....3Hours Maximum Marks.....50.....

..... Attempt any FIVE questions. All questions carry EQUAL marks.....

Serial No. of Question		
1.	What are some of the current trends in Operations Management ? Briefly discuss any key SEVEN of these giving examples from corporate .How some of these have been used as a competitive strategy at the market place.	47,3
2.	a. What are some of the design factors for products in current scenario? What approaches can be used to accomplish these? b. What is a 'robust design' according to Taguchi? How is a 'quality loss function' described by Taguchi's approach?	34 75,5
3.	(a) Identify two important factors that a location planner should consider with respect to each of the following: (i) A multi-specialty hospital (ii) An Aluminium processing unit (b) A Company plans to replace its existing metal casting facility with a new one. The company is considering two possible capacities for the new facility: 350,000 or 500,000 units per year. The 350,000 unit plant would have an annual fixed cost of Rs. 5000,000 and a per unit production cost of Rs. 50; the 500,000 unit plant would have an annual fixed cost of Rs. 7800,000 and a per unit cost of Rs. 40. The Company sells its cast products for an average price of Rs. 75 per unit. (i) Compute the breakeven point for each capacity alternative. (ii) Suppose the Company projects its sales to be 190,000 units next year and it expects them to grow by 5% each year for the 10 years. Which capacity option would you recommend and why?	2,2 9,3

4. a. Why 'aggregate planning' is called so? What is its time frame?

b. 'Digiview' company is a DVD manufacturer in need of an aggregate plan for July through December. The company has gathered the following data:

Holding cost:	Rs. 8/DVD/month
Subcontracting:	Rs. 80/DVD
Regular time labour:	Rs. 12/hour
Overtime labour:	Rs. 18/hour for hours above 8 hours/worker/day
Current workforce (June):	8
Labour hours/DVD:	4 hours
Workdays/month:	20
Beginning inventory:	150 DVDs*
Ending inventory:	0
*There is no inventory holding cost for June	

Demand data					
July	Aug.	Sept.	Oct.	Nov.	Dec.
400	500	550	700	800	700

Formulate the aggregate plan and cost of the same by using a constant workforce of 8 and varying overtime only.

5. a. What is Line Balancing? What are the constraints for balancing a line?

b. See the attachment on Line Balancing at MICO. The MICO factory in this snapshot works on two-shift basis and desired daily production rate is 1500 barrels.

i. Find cycle time.

ii. Theoretical Minimum and Actual no of work stations

iii. Line efficiency thus achieved by grouping of activities in work stations

6. a. Kat is a student of Management in Delhi University. She has five term papers due soon and she must decide in what order to complete them. Below are the estimated number of days required to complete each paper and the due dates. Because all the instructors deduct 5 points per day for any term paper that is tardy, Kat wants to minimize tardiness.

Course	Estimated time (days)	Due Date (days from now)
Marketing	3.0	7
Finance	4.0	8
POM	5.5	12
Accounting	4.5	17
QT	2.5	16

Use the SPT, EDD and CR rules to sequence the jobs. Which one(s) results in the least average tardiness?

b. A manufacturer of ball bearings has diameter specifications as 245 ± 0.85 mm. There are two processes under consideration A and B as follows. Which one is better and why? (Interpret only on the basis of desirable calculations).

PROCESS	CENTRE	LOWER BOUND	UPPER BOUND
Process A	244.90	244.15	245.65
Process B	244.98	244.16	245.80

a. What are the features of a Group Layout? Under what conditions, it is preferred?

b. A merchandising retail store operator is being observed for tagging the bar codes over a shift of 8 hours. The store operates 52 weeks a year, 5 days a week and 8 hours a day. She is found to work in 800 of the 1000 observations randomly taken during the shift when 400 pieces were tagged. The performance rating is 20% above normal and the allowances granted are 8.5%. Estimate-

i. If adequate number of observations have been taken for a confidence to precision ratio of 40.

ii. Standard time of tagging per unit of merchandise.

iii. Find the number of operators if 300,000 pieces are forecasted to be tagged next year.

a. 'Smart Copy Centre' uses five 500-sheet boxes of copier paper a week. Experience suggests that usage can be well approximated by normal distribution with a mean of 5 boxes per week and standard deviation of $\frac{1}{2}$ box per week. Two weeks are required to fill an order. Ordering cost is Rs. 100 and annual holding cost is Rs. 5 per box.

(i) Determine the EOQ, assuming a 52-week year.

(ii) If the copy centre reorders when the supply on hand is 12 boxes, compute the risk of a stock-out.

(iii) If a fixed-order interval of 7 weeks instead of an ROP is used for reordering, what risk does the copy centre incur that it will run out of paper before this order arrives if it orders 36 boxes when the amount on hand is 12 boxes?

b. Differentiate between- (take any TWO of the following)

a. Normal variations and assignable variations.

b. Type I and Type II error in process control.

c. Costs of Quality and Costs of Poor Quality

LINE BALANCING AT MICO

Motor Industries Co. Ltd. (MICO), a member of the BOSCH group was established in 1951. MICO pioneered the manufacture of fuel injection equipment in India and is a mass manufacturer of these equipments. A barrel and plunger go into the final assembly of the fuel pump. Design of production flow lines consisting of multiple workstations for the mass manufacture of barrels requires line balancing techniques. Let us understand the process.

Manufacture of the barrel involves 17 tasks (see table below for task descriptions and times). In addition to technological constraints, there are other operational constraints that influence the design of workstations. In the case of the barrel, the activities are broadly classified into two stages: soft stage and hardness stage. The operational constraints are: (a) Heat treatment requires an exclusive workstation and (b) soft stage and hardness stage operations cannot be combined. The 17 tasks have a serial precedence relationship (that is task A precedes task B, B precedes C and so on).

Task ID	Task Description*	Task time (Seconds per 100 parts)
A	Deephole drilling	530
B	Counter sinking of main bore	810
C	Mill slotting	320
D	Drilling	540
E	Drill counter boring	1,520
F	Leakage oil hole drill	1,720
G	Cleaning	120
H	Deburring	1,080
I	Heat treatment	306
J	Tumble chute	1,550
K	Hardness checking	420
L	Pre-lapping	1,500
M	Profile grinding	3,000
N	Top face grinding	1,320
O	Final lapping bore	3,000
P	Cleaning	180
Q	Inspection	3,600
Total task time		21,516

*Tasks A to K pertain to soft stage and the rest to Hardness Stage. (Source: Mahadevan, 2007)