

FACULTY OF MANAGEMENT STUDIES
UNIVERSITY OF DELHI

MBA (FT) 1st year Exam, March/April 2015

Paper 6206: Production & Operations Management

Max. Marks: 50

Time: 3 hours

Attempt any **five** questions. All questions carry equal marks

1. (a) The owner of a fast-food franchise has exclusive rights to operate in a medium-size metropolitan area. The owner currently has a single outlet open, which has proved to be very popular and there are often waiting lines of customers. The owner is, therefore, considering opening one or more outlets in the area. What are the key factors that the owner should investigate before making a final decision? What trade-offs would there be in opening one additional site versus opening several additional sites?

(b) The fixed and variable costs of three potential manufacturing sites for a particular product are shown below:

Site	Fixed cost (Rs.) per year	Variable cost (Rs.) per unit
1	25,000	550
2	50,000	350
3	85,000	200

- i. Over what range of production is each location optimal?
ii. For a production of 200 units, which site is best?

(4 + 6 = 10)

2. (a) In the basic EOQ model, why does minimizing the total stocking cost also minimize the total material cost? Suppose the EOQ for an item a company uses is 3571. Would it be all right for the company to order 3500 or 4000 instead?

(b) One item a computer store sells is supplied by a vendor who handles only that item. Demand for that item recently changed and the store manager must determine when to replenish it. The manager wants a probability of at least 95 % of not having a stockout during lead time. The manager expects average demand to be 12 units a day and standard deviation to be 2 units a day. Lead time is variable, averaging four days with a standard deviation of one day. Assume normality and the seasonality is not a factor.

- i. When should the manager reorder to achieve the desired probability?
ii. Why might the model not be appropriate if seasonality was present?

(4 + 6 = 10)

3. A company that produces a line of women's bathing suits, hires temporaries to help produce its summer product demand. For the current four month rolling schedule, there are three temps on staff earning an hourly wage of \$14. In addition, 12 full-time employees are working regular hours at a cost of \$18 an hour. The temps can be hired when needed but must be hired for a full month, whereas the full-time employees must be paid whether they are needed or not. Each full time employee can produce 205 suits, while each part-time employee can produce 165 suits per month. Each suit requires an hour to finish. Demand for bathing suits for the next four months are as follows:

May	June	July	August
3200	2800	3100	3000

Beginning inventory in May is 403 complete (a complete two-piece includes both top and bottom) bathing suits. Bathing suits cost \$40 to produce and carrying cost is 24% per year. Develop an aggregate plan using trial and error method.

(10)

4. (a) What is the fundamental difference between single-dimension rules and multiple-dimension rules of sequencing?

✓ (b) The following jobs are waiting to be processed at the same machine centre. Jobs are logged as they arrive. Assume that all jobs arrive on day 275.

Job	Due date	Duration (days)
A	313	8
B	312	16
C	325	40
D	314	5
E	314	3

C E D A B

Determine the sequence of the jobs by following Critical ratio. Also find out (1) average job flow time, (2) average job tardiness, and (3) average number of jobs in the system.

(2 + 8 = 10)

5. (a) Compare among job production, batch production and line flow production on key characteristics with the help of an example in each case. What are the primary advantages of a cellular production system?

(b) Suppose a company wants to perform a work sampling study to determine the proportion of time a worker spends meeting with the clients. The company wants the estimated proportion to

be within 0.05 of the actual proportion with 95% confidence. Compute the minimum number of observations necessary in the study, assuming the company initially believes the proportion is approx. 0.30.

(5 + 5 = 10)

6. (a) What are the significant differences between the layout considerations for retail facilities and for typical production facilities?

(b) As part of a major plant renovation project, the IE department has been asked to balance a revised assembly operation to achieve an output of 240 units per 8 hour day. Task times and precedence relationships are as follows:

Task	Duration (Minutes)	Precedes Task
A	0.2	B
B	0.4	C
C	0.2	F
D	0.4	E
E	1.2	G
F	1.2	G
G	1.0	End

Do each of the following:

- Draw the precedence diagram.
- Determine the minimum cycle time, maximum cycle time and the calculated cycle time.
- Determine the minimum number of workstations needed.
- Assign tasks to workstations on the basis of longest processing time.
- Compute the percentage of idle time for the assignments done and thus line efficiency.

(5 + 5 = 10)

X

7. (a) Using samples of 200 credit card statements, an auditor found the following:

Sample	1	2	3	4
Number with errors	4	2	5	9

- 4
- i) If the true fraction defective for this process is unknown, what is your estimate of it?
 - ii) What is your estimate of the mean and SD of the sampling distribution of fractions defective for samples of this size?
 - iii) What control limits would give you an alpha risk of 0.03 for this process?
 - iv) Suppose that the long-term fraction defective of the process is known to be 2%. What are the values of the mean and SD of the sampling distribution?

(b) Differentiate between process capability ratio and index. What could be their values at six sigma level and why?

(6 + 4) = 10

8. Write short Notes on any **TWO** of the following:

- (a) Theory of Constraints
- (b) Quality Function Deployment
- (c) Components of Flexible Manufacturing System
- (d) Taguchi approach

(5 + 5 = 10)