

[This question paper contains 6 printed pages.]

4249

Your Roll No. ....

MBA (FT)

A

Paper F-206 – PRODUCTION AND OPERATIONS  
MANAGEMENT

(Admissions of 1998 and onwards)

Time : 3 hours

Maximum Marks : 70

*(Write your Roll No. on the top immediately  
on receipt of this question paper.)*

*Attempt any FIVE questions.*

*All questions carry equal marks.*

1. Which company in the current times has made impact on design of products and the manufacturing practices and systems, according to you. Briefly discuss these design approaches and some of the best practices in manufacturing this company follows. (14)
2. What kind of layout is followed in the following kind of facilities :
  - (i) An automobile repair shop
  - (ii) Dentist's Chair
  - (iii) An afternoon super-speciality clinic
  - (iv) An automatic car wash

P.T.O.

Illustrate with the help of some characteristics of the respective type of layout.  $(3\frac{1}{2} \times 4)$

3. A company sets a target of carrying out an assembly task containing eight activities, at the rate of 60 finally assembled units per a shift of 8 hours. Given the data in the table that follows, estimate the following :
- The cycle time
  - Minimum number of workstations
  - Regrouping of activities to balance the work flow  
(Show through the diagram)
  - Efficiency of the line as achieved by re-grouping and the balance-delay at each work-station.

Activity Code	Activity duration (min.)	Predecessor requirement
A	5	-
B	3	A
C	4	B
D	3	B
E	6	C
F	1	C
G	4	D,E,F
H	2	G

$(2,2,5,5)$

4. (a) What steps are involved in estimation of process capability ratio? What would be the process capability ratio in case of 'six sigma' approach to quality and how? (2,2,2)
- (b) A pharmaceutical company produces a variety of adult nutritional and energy products under the brand name 'Vibe'. The management in Quality Assurance (QA) department is interested in assessing the process capability of the filling line which comprises several machines and converges. The standard calls for specification of  $974 \text{ mg} \pm 14 \text{ mg}$ . The process standard deviation is observed to be  $4.758 \text{ mg}$  and the process mean is observed to be  $975.7 \text{ mg}$ . The company randomly takes samples of six ampoules.
- (i) Design a mean ( $\bar{X}$ ) chart limits.
- (ii) Estimate the process capability ratio and the process capability index. Interpret the results. (4,4)
5. (a) Outline the role of method study in operations management. Briefly discuss any one method study tool/technique. (4,4)
- (b) The manager of the billing department of a large telephone utility company is concerned about the mushrooming work-load of credit-checking required

to be done on its customers by its executives. He forecasts that 200,000 credit checks would have to be made by the department next year and wonders as to how many executives would be required to perform these checks. The consultant carries out an activity sampling study over 150 minutes during which 900 observations were taken out of which number of observations with credit checks was found to be 225. The number of credit checks was found to be 10 during the study period. If the performance rating of selected executive is 10% greater than normal and the alliance as percent of job time is 20%, estimate

(i) the standard time per credit check in minutes.

(ii) the number of executives required to complete the forecasted credit checks next year if there are 50 working weeks per year, each week being of 40 working hours. (3,3)

6. (a) Do you think EOQ is a realistic model for purchase order quantity planning. Justify your answer in either case. (4)

(b) A company manufacturing TVs purchases 36000 CRTs (Cathode Ray Tubes) a year at ₹ 6500 each. Ordering costs are ₹ 310 and annual carrying costs are 20% of the purchased price. Compute the optimal order quantity and the total annual variable cost of inventory. (2½,2½)

- (c) A paint manufacturing company uses an average of 50 kilolitres of a specialty dye each week. Weekly usage of the dye has a standard deviation of 3 kilolitres. The manager is willing to accept a stockout risk of not more than 4.5% during lead time which is 2 weeks. Assuming the distribution of consumption to be normal, determine the R.O.P. (5)

7. (a) The following table lists the jobs, their processing times and due dates to be scheduled for processing at a work centre :

Jobs	Processing Time (hours)	Due Date (hours)
A	12	15
B	6	24
C	14	20
D	3	8
E	7	6

Use SPT, EDD and FCFS rules to schedule the jobs. Find in each case :

- (i) Average flow time
- (ii) Average tardiness and
- (iii) Average number of jobs at the work centre

Which rule is best and why? (3×3,1)

P.T.O.

- (b) Outline the essential features of the 'Theory of Constraints' (ToC). (4)
8. Briefly discuss the elements of a Quality Management System (QMS) **OR** an Environment Management System (EMS).