[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper	:	**8008**
Unique Paper Code	:	61015913
Name of the Paper	:	Production & Operations Management (Generic Elective)
Name of the Course	:	**Bachelor of Management Studies (BMS), 2024 LOCF**
Semester	:	IV
Duration	:	3 Hours
Maximum Marks	:	75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **any five** questions in all.
3. **All questions** carry equal marks.
4. Show your working clearly in your answer sheet it self.

1. (a) What activities are involved in the operations function? How does operations interact with other functional areas? (5)

   (b) 10 samples of 15 parts each were taken from an ongoing process to establish a p-chart for control. The samples and the number of defectives in each are shown in the following table:

Sample	n	Number of Defects in Sample	Sample	n	Number of Defects in Sample
1	15	3	6	15	2
2	15	1	7	15	0
3	15	0	8	15	3
4	15	0	9	15	1
5	15	0	10	15	0

(i) Develop a p-chart for 95 percent confidence (1.96 standard deviations).

(ii) Based on the plotted data points, what comments can you make? (5)

(c) What is the need for Maintenance Management in an organization? In this context, explain the bath-tub curve analysis. (5)

2. (a) Tucson Machinery Inc., manufactures numerically controlled machines. The manager is trying to determine which forecasting method to use to predict future sales. Based on the following historical data, calculate the following forecast and specify what procedure you would utilise.

Month	Actual Demand	Month	Actual Demand
1	62	7	76
2	65	8	78
3	67	9	78
4	68	10	80
5	71	11	84
6	73	12	85

(i) Calculate the simple three-month moving average forecast for periods 4-12. (2)

(ii) Calculate the weighted three-month moving average using weights of 0.50, 0.30, and 0.20 for periods 4-12. (3)

(iii) Calculate the single exponential smoothing forecast for periods 2-12 using an initial forecast of 61 and α of 0.30. (3)

(iv) Calculate the Mean Absolute Deviation (MAD) for the forecasts made by each technique in periods 4-12. Which forecasting method do you prefer? (2)

(b) The new-accounts officer at the Citizens Northern Savings Bank enrolls all new customers in checking accounts. During the three-week period in August encompassing the beginning of the new school year at State University, the bank opens a lot of new accounts for students. The bank estimates that the arrival rate during this period will be Poisson distributed with an average of four customers per hour. The service time is exponentially distributed with an average of 12 minutes per customer to set up a new account. The bank wants to determine if the current person is sufficient to handle the increased traffic. You are required to calculate all the operating characteristics for this system. (5)

3. (a) Mike Morales is the supervisor of Legal Copy Express, which provides copy services for downtown Los Angeles law firms. Five customers submitted their orders at the beginning of the week. Specific scheduling data are as follows:

Job (in arrival order)	Processing Time (in days)	Due Date (days hence)
A	3	5
B	4	6
C	2	7
D	6	9
E	1	2

All orders require the use of the only colour copy machine available; Morales must decide on the processing sequence for the five orders. The evaluation criterion is minimum flow time. Determine which scheduling method out of FCFS, LCFS, SOT, Earliest Due Date would have the minimum flow time. Calculate all total completion time, average flow time and average lateness for each of the above methods. (10)

(b) Enumerate the assumptions of a general sequencing problem. (5)

4. (a) The following tasks must be performed on an assembly line in the sequence and times specified:

Task	Task Time (seconds)	Tasks that must precede
A	50	-
B	40	-
C	20	A
D	45	C
E	20	C
F	25	D
G	10	E
H	35	B, F, G

(i) Draw the schematic diagram. (2)

(ii) What is the theoretical minimum number of stations required to meet a forecast demand of 400 units per 8-hour day? (2)

(iii) Use the LTT rule and balance the line with minimum number of workstations. (3)

(b) A company is currently working with a process, which after paying for materials, labour etc., brings a profit of Rs. 12,000. The company has the following alternatives:

(i) The company can conduct research R1 which is expected to cost Rs. 10,000 and having 90% probability of success. If successful, the gross income will be Rs. 26,000.

(ii) The company can conduct research R2 which is expected to cost Rs. 6,000 and having 60% probability of success. If successful, the gross income will be Rs. 24,000.

(iii) The company can pay Rs. 5,000 as royalty of a new process which will bring gross income of Rs. 20,000.

Because of limited resources, only one of the two types of research can be carried out at a time. Draw the decision tree and find the optimal strategy for the company (8)

5. (a) Distinguish between a product and process layout. What type of layout(s) would be appropriate for a furniture retailer like IKEA and a grocery store? (7)

(b) What does process planning entail? How would process planning differ for batch, mass, and continuous processes? Give examples of industries that use batch, mass, and continuous production processes. (8)

6. Write short notes on ANY THREE: (3*5=15)

(a) Order winning and order qualifying attributes

(b) Lean manufacturing

(c) Challenges in operations management

(d) Push and pull scheduling

(e) Importance of forecasting

(100)