Your Roll No..............................

Sr. No. of Question Paper	:	5713
Unique Paper code	:	61015913
Name of the Paper	:	Production & Operations Management
		(Generic Elective)
Name of the Course	:	**Bachelor of Management Studies (BMS),**
		2022 LOCF
Semester	:	IV
Duration	:	3 Hours
Maximum Marks	:	50

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

5.   Use of simple calculator is allowed

Q1. a) What is the relationship between lean management and JIT manufacturing? Comment on the role of lean philosophy in reducing the cost and improving the quality in manufacturing organizations. (4)

b) What activities are involved in the operations function? How do operations interact with other functional areas? (4)

c) The National Bread Company daily delivers multiple orders by truck from its regional distribution center to stores in the Wayman's Supermarket chain. One measure of its supply chain performance is the number of late deliveries. The company's goal is to make all deliveries within one day, so a delivery is late if it exceeds one day. The total number of late deliveries for each of the past 20 days is as follows:

Day	Late Deliveries	Day	Late Deliveries
1	7	11	6
2	16	12	12
3	14	13	15
4	8	14	10
5	19	15	17
6	12	16	16
7	10	17	14
8	14	18	12
9	8	19	18
10	7	20	20

Construct a relevant control chart for late deliveries with 3 control limits and indicate if the delivery process was out of control at any time.2   (7)

Q2. a) A finance manager is considering drilling a well. In the past, only 70% of the wells drilled were successful at 20 metres depth in that area. Moreover on finding no water at 20 metres, some people in that area drilled it further upto 25 metres (i.e., by another 5 metres beyond the initial 20 metres) but only 20% struck water at that level. The prevailing cost of drilling is Rs. 500 per metre. The Finance Manager estimated that in case he does not get water in his own well, he will have to pay Rs. 15,000 to buy water from outside for the same period of getting water from the well. The following decisions are considered:

i)   Do not drill any well,

ii)   Drill upto 20 metres, and

iii)   If no water is found at 20 metres, drill further upto 25 metres.

Draw an appropriate decision tree and determine the Finance Manager's optimal strategy.

                                                                                    (9)

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 the operating characteristics for this system to determine if the current person is sufficient to handle the increased traffic.   (6)

Q3. a) XYZ Company has kept records of breakdown of its machines for a 300 day work year as shown below:

No. of Breakdowns	Probability of Breakdowns
0	0.133
1	0.5
2	0.233
3	0.1
4	0.033

The firm estimates that each breakdown costs Rs.650/- and is considering adopting a preventive maintenance program which would cost Rs.200/- per day and limit the number of breakdowns to an average of one per day. Determine the expected annual savings if any from the preventive maintenance program. (5)

b) Evan Schwartz has six jobs waiting to be processed through his machine. Processing time (in days) and due date information for each job are as follows:

Job	Processing time	Due date
A	2	3
B	1	2
C	4	12
D	3	4
E	4	8
F	5	10

Sequence the jobs by FCFS, SPT, and EDD. Calculate the following for the six jobs under each sequencing rule:

i)   Total make span

ii)   Mean flow time

iii)   Average number of jobs in the system

iv)   Mean job tardiness

Which rule would you recommend? (10)

Q4. a) Is there any relationship between volume, variety and flow with respect to process design? Differentiate between continuous flow system and intermittent flow systems. What are the key implications for operations manager? (7)

station, and sent to another station for review. The processing time (in minutes) required for each general type of claim is shown here. Currently, Bill Frazier has 10 claims to be reviewed. In what order should he process the claims so that the entire batch can get into the system as soon as possible? How long will it take to process the 10 claims completely? Draw the relevant Gantt chart also.

classification	Processing time	
	Data Entry	Review
1. Medicare I	8	6
2. Physician 24	15	9
3. Medicare II	6	5
4. Physician 4	5	10
5. HMO I	17	15
6. Physician 17	9	10
7. Emergency II	5	3
8. HMO II	4	15
9. Physician 37	12	10
10. Emergency I	20	4

(8)

Q5. a) How do location decisions provide a competitive advantage to an organization? What are the consequences of a bad location decision?   (6)

b) Mama's Stuffing is a popular food item during the fall and winter months, but it is marginal in the spring and summer. Use the following demand forecasts and costs to determine which of the following production planning strategies is best for Mama's Stuffing:

i)   Level production over the 12 months.

ii) Produce to meet demand each month. Absorb variations in demand by changing the size of the workforce.

Month	Demand	Month	Demand
January	2000	July	2500
February	1000	August	3000
March	1000	September	9000
April	1000	October	7000
May	1000	November	4000
June	1500	December	3000

Other relevant costs are as below:

Compute exponentially smoothed forecast ($\alpha = 0.2$) for ninth month. Also compute a weighted three-month moving average forecast for months 4 through 9. Assign weights of 0.5, 0.3, and 0.2 to the months in sequence, starting with the most recent month. Compare the two forecasts using MAD. Which forecast appears to be more accurate? (6)

Q7. a) What is the difference between quantitative forecast methods and qualitative forecast methods? List and explain different quantitative and qualitative forecast methods. (7)

b) Using the factor rating method of facilities location, recommend the best site to ABC Ltd.

Sr. No.	Factor for consideration	Score out of 100
1	Nearness to port	80
2	Existence of supplier infrastructure	70
3	Availability of skilled labour	90
4	Government policies and local taxes	50
5	Projected cost of operations	60
6	Quality of road infrastructure	70
7	Availability of educational infrastructure	40

Sr. No.	Factor for Consideration	Site 1	Site 2	Site 3	Basis
1	Nearness to port	70 Kms	130 Kms	95 Kms	Actual Data
2	Existence of supplier infrastructure	60	80	85	Score out of 100
3	Availability of skilled labour	50	70	85	Score out of 100
4	Government policies and local taxes	70	45	60	Score out of 100
5	Projected cost of operations	Rs. 200 Lacs	Rs. 180 Lacs	Rs. 170 Lacs	Actual Data
6	Quality of road infrastructure	80	90	70	Score out of 100
7	Availability of educational infrastructure	60	80	80	Score out of 100

(8)

Regular production cost:	$30 per pallet
Holding cost:	$2 per pallet
Beginning workforce:	10 workers
Production rate:	200 pallets per worker per month
Hiring cost:	$5000 per worker
Firing cost:	$8000 per worker

(9)

Q6. The Henry Street Mission uses volunteers to assemble care packages for needy families during the holiday season. The mission would like to organize the work as efficiently as possible. A list of tasks, task times, and precedence requirements is as below:

Task	Precedence	Time (minutes)
A	-	6
B	A	3
C	B	7
D	B	5
E	C,D	4
F	E	5

If the mission wants to complete a care package every 10 minutes, how many volunteers should be called in? Balance the line and calculate the efficiency. How many packages can be assembled in a four-hour period? (9)

b) The manager of the I-85 Carpet outlet needs to be able to forecast accurately the demand for Soft Shag carpet (its biggest seller). If the manager does not order enough carpet from the carpet mill, customers will buy their carpets from one of the outlets many competitors. The manager has collected the following demand data for the past eight months.

Month	Demand for soft shag carpet
1	5
2	10
3	6
4	8
5	14
6	10
7	9
8	12