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Sr. No. of Question Paper : 165

Roll No.....

Unique Paper Code : 101433

Name of the Course : **Bachelor of Business Studies (BBS)**

Name of the Paper : Production and Operations Management

Semester : IV (2014)

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. Answer any **five** questions.
3. Attempt all parts of a question together.
4. Show your workings clearly on the answer sheet itself.
5. Use of Simple Calculator is allowed.

1. (a) ABC Ltd. is a toy marketing company at Mumbai of which the annual sales (in units) for the past six years is as shown in the table :

Year	Sales (in lakhs; in units)
2008	1754
2009	1821
2010	1956
2011	2054
2012	2298
2013	2386

The manager allotted the task of depicting the sales in year 2014 to two persons; 'Person A' and 'Person B'. Person A used three months simple moving average and person B employed single exponential smoothing method

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with smoothing constant as 0.45. Based on the Mean Absolute Deviation as measures of forecast error determine whether the manager should go with 'person A' prediction or 'person B' forecast? Support the answer with proper justification(s). (6)

- (b) The assembly line activities are shown in the table below. Draw the precedence graph and find the minimum possible number of workstations if the firm has 480 productive minutes of work available per day and the production schedule requires that 40 units of the wing component be should be completed as output from assembly line each day. Also arrange the work activities into workstations so as to balance the line. What is the efficiency of your line balance ? (5)

Task	Production Time (Minutes)	Preceding Task
A	10	---
B	11	A
C	5	B
D	4	B
E	12	A
F	3	C,D
G	7	F
H	11	E
I	3	G,H

- (c) Distinguish between :-

(i) Manufacturing organizations and Service organizations.

(ii) Long-term functions and short-term functions in operations. (4)

2. (a) What are order winning and order qualifying attributes in strategy formulation process of operations management ? Elaborate using example. (3)

- (b) Explain any one qualitative methods of demand forecasting ? In which situations can qualitative methods be useful ? (4)
- (c) XYZ is a company which specialized in manufacturing wooden toys. The operation manager has forecasted the demand for the next six months.

Month	Forecasted Demand (in units)
Jan	500
Feb	800
March	1000
April	1400
May	2000
June	1600

Each worker is paid a monthly salary of INR 8000 and can produce 10 toys per month. The owner does not resort to overtime, instead he prefers to hire and fire workers depending on his requirement of units in the respective month. He can hire and train a new employee for INR 8,000, and lay off for INR 2,000. The cost of holding is INR 50 per unit per month and stock out cost is 150 percent of holding cost. At present there are 100 employees in the manufacturing unit.

The manager has two plans to formulate the aggregate production plan for these six months –

**Plan A :** A level strategy; i.e. use inventory/backlogging to absorb demand-supply mismatch.

**Plan B :** A chase strategy using the hiring and firing of employee's alternative.

Prepare a comparative analysis of the plans and suggest a suitable course of action for the toy manufacturer. (8)

3. (a) How does the capacity issues differ in long run planning as against short term planning ? Describe with the help of an example. (5)

- (b) A cosmetic company has developed a new perfume which the management feels has tremendous potential. A total of Rs. 10 lakhs has already been spent on its development. Two marketing plans have been devised.
- (i) The first plan follows the company's usual policy of giving small samples of the new products when the other items in the company's product lines are purchased and placing advertisements in women's magazine. The plan would cost Rs. 5 lakhs and it is believed that it might result in a high, moderate or low market response with probability of 0.2, 0.5 and 0.3 respectively. The new profit excluding development and promotion costs in these cases would be Rs. 20 lakhs, Rs. 10 lakhs and Re. 1 lakh respectively. If it later appeared that the market demand is going to be low, it would be possible to launch a TV advertisement campaign. This would cost another Rs. 7.5 lakhs. It would change the market response to high or moderate as in the previous case, with the probability of 0.5 each.
  - (ii) The second marketing plan is much more aggressive than the first. It would emphasize TV advertising heavily. The total cost of this plan would be Rs. 10.5 lakhs, and the market response would be either excellent or good, with probabilities of 0.4 and 0.6 respectively. The profit excluding development and promotion would be Rs. 30 lakhs and Rs. 25 lakhs for the two outcomes respectively.

You are required to advise on the sequence of strategy to be followed by the company with the help of decision tree analysis. (10)

4. (a) A road transport company has one reservation clerk on duty at a time. He handles information of bus schedules and makes reservations. Customers arrive at a rate of 8 per hour and the clerk can service 12 customers on an average per hour. After stating your assumptions, answer the following :
- (i) What is the average number of customers waiting for the service of the clerk ?
  - (ii) What is the average time a customer has to wait before getting service ?

(iii) The management is contemplating to install a computer system to handle the information and reservations. This is expected to reduce the service time from 5 to 3 minutes. The additional cost of having the new system works out to Rs. 50 per day. If the cost of goodwill of having to wait is estimated to be 12 paise per minute spent waiting before being served, should the company install the computer system? Assume 8 hours working day. (7)

(b) The following data shows the mean and range of weight of five boxes in each of the 10 samples. Construct a mean chart and a range chart to determine whether the process is in control.

Sample No. :	1	2	3	4	5	6	7	8	9	10
Mean :	7.9	7.85	8.14	7.9	8.14	7.89	8.06	7.97	7.85	7.89
Range :	0.86	0.63	1.05	1.02	0.41	0.75	0.72	0.57	0.76	0.62

(Conversion factors for  $n=5$  are  $A_2 = 0.577$ ,  $D_2 = 0$ ,  $D_4 = 2.115$ ). (8)

5. (a) A typist has six reports to type, proof read and print. The number of days required for each job and due date for each are as follows :

Job	Time Required	Due Date
A	6	12
B	1	11
C	3	15
D	5	2
E	4	8
F	2	4

Schedule the jobs using SPT and EDD. Which of the two sequencing rules is preferable if

- there is a penalty of Rs. 1000 per tardy job.
- there is a Rs 100 penalty for tardy per day and a reward of Rs. 100 for each day that the report is ready before the due date. (8)

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- (b) Write a short note on process layout vs. product layout. (5)
- (c) List four common sources of waste in manufacturing that could be eliminated through lean management. (do not explain) (2)
6. (a) (i) Plot approximate OC curves to illustrate sampling plans for sample size of 50 and acceptance numbers 0, 1, 2, 3, 4.
- (ii) Plot an ideal OC curve and explain briefly why it is ideal. (5)
- (b) Fifty machines were tested for 8 hours a day over a period of 100 days. It was found that there were 50 failures during this period and it took 400 hours to repair them. Calculate the MTBF, MTTR and availability of these machines. (5)
- (c) Explain the failure rate of equipment with the help of the bath tub curve. (5)