

1019  
B.E. (Mechanical Engineering)  
Eighth Semester  
MEC-804(g): Production and Operations Management

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

Q1.	<ol style="list-style-type: none"> <li>1. Differentiate between Tangible and Intangible output.</li> <li>2. What is the difference between job shop scheduling and batch shop scheduling?</li> <li>3. State advantages &amp; disadvantages of fixed position layout.</li> <li>4. What is fixed order quantity?</li> <li>5. Write the significance of ABC analysis.</li> <li>6. What is ISO certification?</li> <li>7. State the symptom of bad plant layout.</li> <li>8. What is quality cost?</li> <li>9. Write time series components in demand forecasting.</li> <li>10. What is aggregate planning?</li> </ol>	1x10 = 10									
Section A											
Q2a	<p>a) A small coffee shop serves coffee to an average 224 customers each day. The coffee shop is open from 6.00 am to 2.00 pm and four employees make-up the total staff.</p> <ol style="list-style-type: none"> <li>1. What is the productivity?</li> <li>2. On Wednesday 232 customers were served. Only two employees worked full day and one worked for only three hours. What is the productivity?</li> </ol> <p>b) Discuss the role of operation management in production system</p>	5  5  5									
Q3.	<ol style="list-style-type: none"> <li>a) Discuss methodology for Process design with suitable example.</li> <li>b) Differentiate between product and process layout mentioning their advantages and limitations.</li> </ol>	5									
Q4a	<p>Discuss the strategies</p> <p>The General Ford Motors Corporation (GFMC) is planning the introduction of a Brand new SUV—the Vector. There are two options for production.</p> <p>One is to build the Vector at the company's existing plant in Indiana, sharing production time with its line of minivans that are currently being produced there. If sales of the Vector are just moderate, this will work out well as there is sufficient capacity to produce both types of vehicles at the same plant. However, if sales of the Vector are strong, this option would require the operation of a third shift, which would lead to significantly higher costs.</p> <p>A second option is to open a new plant in Georgia. This plant would have sufficient capacity to meet even the largest projections for sales of the Vector. However, if sales are only moderate, the plant would be underutilized and therefore less efficient. This is a new design, so Sales are hard to predict. However, GFMC predicts that there would be about a 60% chance of strong sales (annual sales of 100,000), and a 40% chance of moderate sales (annual sales of 50,000). The average revenue per Vector sold is \$30,000. Production costs per vehicle (in \$) for the two production options depend upon sales, as indicated in the table below.</p> <table border="1" data-bbox="247 1751 1279 1940"> <thead> <tr> <th></th> <th>Moderate Sales</th> <th>Strong Sales</th> </tr> </thead> <tbody> <tr> <td>Shared Plant in Indiana</td> <td>16,000</td> <td>24,000</td> </tr> <tr> <td>Dedicated Plant in Georgia</td> <td>22,000</td> <td>20,000</td> </tr> </tbody> </table>		Moderate Sales	Strong Sales	Shared Plant in Indiana	16,000	24,000	Dedicated Plant in Georgia	22,000	20,000	8
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The amortized annual cost of plant construction and other associated fixed costs for the Georgia plant would total \$400 million per year (regardless of sales volume). The fixed costs for adding Vector production to the plant in Indiana would total \$200 million per year (regardless of sales volume). Construct a decision tree to determine which production option maximizes the expected annual profit, considering fixed costs, production costs, and sales revenues.

Q4b Write the difference between long term and short term capacity strategies.

Section B

Q5.

a) The manager of a small health clinic would like to use exponential smoothing to forecast demand for laboratory services in their facility. However, she is not sure whether to use a high or low value of  $\alpha$ . To make her decision, she would like to compare the forecast accuracy of a high and low  $\alpha$  on historical data. She has decided to use an  $\alpha = .7$  for the high value and  $\alpha = .1$  for the low value. Given the following historical data, which do you think would be better to use?

Week	Demand (labor requirement)
1	330
2	350
3	320
4	370
5	368
6	343

b) Write a short note on the economics of forecasting

Q6.

a) Shashi Export House has to process five jobs on three machines. Processing times (in minutes) are given in the following table:

Job	M1	M2	M3
1	3	3	5
2	8	4	8
3	7	2	10
4	5	1	7
5	2	5	6

Using Johnson's algorithm, determine the order in which these jobs should be processed so as to minimize the total processing time. Also calculate the makespan. Draw Gantt chart showing idle time on these machines.

b) What is the need of scheduling? Discuss various factors effecting scheduling.

Q7.

a) What are the merits and demerits of narrow band of control limits and of wider band of control limits? Is it always necessary to use  $\pm 3\sigma$  limits for the control charts?

b) What do you mean by process capability? Describe with suitable examples

c) How quality is different from inspection. Mention various types of inspections.