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| Name: |  |
| Enrolment No: | |

UPES
End Semester Examination, December 2024

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| Course: Demand Forecasting and Production Planning | Semester: V |
| Program: BBA OM_INT. BBA-MBA | Time: 03 hrs. |
| Course Code: LSCM3017 | Max. Marks: 100 |

Instructions: As per sections

SECTION A
10Qx2M=20Marks

| S. No. | Attempt all questions in this section | Marks | CO |
|--------|--|----------|------------|
| Q 1 | True or False (10 questions) | | |
| 1.1 | The forecast of demand forms the basis for all strategic and planning decisions in a supply chain T/F | 2 | CO1 |
| 1.2 | Throughout the supply chain, all pull processes are performed in anticipation of customer demand, whereas all push processes are performed in response to customer demand.....T/F | 2 | CO1 |
| 1.3 | Time series analysis in demand forecasting is primarily based on Expert opinions and judgments.....T/F | 2 | CO1 |
| 1.4 | The result when each stage in the supply chain makes its own separate forecasts is often a match between supply and demand because these forecasts are often very different..... T/F | 2 | CO1 |
| 1.5 | Mature products with stable demand are usually the most difficult to forecast.....T/F | 2 | CO1 |
| 1.6 | Marketing research forecasting techniques involve asking a group of experts to provide their judgments independently and then aggregating their responses.....T/F | 2 | CO1 |
| 1.7 | Forecasts should include both the expected value of the forecast and a measure of forecast error.....T/F | 2 | CO1 |
| 1.8 | In time series forecasting, the terms “trend” and Cycle” are interchangeable and represent the same component of the series..... T/F | 2 | CO1 |
| 1.9 | In seasonal time series forecasting, a multiplicative model is useful when seasonal fluctuations increase in proportion to the level of the series.... T/F | 2 | CO1 |

| 1.10 | Time series models like ARIMA cannot be used with seasonal data; seasonal decomposition is required for such data.....T/F | 2 | CO1 | | | | | | | | | | | | |
|---|---|--------------------|--------------------------------|----|---|---|---|----|---|---|---|----|---|---|-----|
| SECTION B 4Qx5M= 20 Marks | | | | | | | | | | | | | | | |
| Q 2 | Attempt all questions in this section: | | | | | | | | | | | | | | |
| 2.1 | Write a short note on ARIMA. | 5 | CO2 | | | | | | | | | | | | |
| 2.2 | Differentiate the P-Type and Q-Type Inventory models with examples. | 5 | CO2 | | | | | | | | | | | | |
| 2.3 | Illustrate the steps with examples for conducting successful forecasting. | 5 | CO2 | | | | | | | | | | | | |
| 2.4 | <p>Cengiz Haksever runs an Istanbul high-end jewelry shop. He advertises weekly in local Turkish newspapers and is thinking of increasing his ad budget. Before doing so, he decides to evaluate the past effectiveness of these ads. Five weeks are sampled, and the data are shown in the table below:</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Sales (1,000s USD)</th> <th>Ad Budget that week (100s USD)</th> </tr> </thead> <tbody> <tr> <td>11</td> <td>5</td> </tr> <tr> <td>6</td> <td>3</td> </tr> <tr> <td>10</td> <td>7</td> </tr> <tr> <td>6</td> <td>2</td> </tr> <tr> <td>12</td> <td>8</td> </tr> </tbody> </table> <p>Develop a regression model to help Cengiz evaluate his advertising.</p> | Sales (1,000s USD) | Ad Budget that week (100s USD) | 11 | 5 | 6 | 3 | 10 | 7 | 6 | 2 | 12 | 8 | 5 | CO3 |
| Sales (1,000s USD) | Ad Budget that week (100s USD) | | | | | | | | | | | | | | |
| 11 | 5 | | | | | | | | | | | | | | |
| 6 | 3 | | | | | | | | | | | | | | |
| 10 | 7 | | | | | | | | | | | | | | |
| 6 | 2 | | | | | | | | | | | | | | |
| 12 | 8 | | | | | | | | | | | | | | |
| 2.5 | Write short notes on MRP, ERP, CPFR | 5 | CO2 | | | | | | | | | | | | |
| SECTION-C 3Qx10M=30 Marks | | | | | | | | | | | | | | | |
| Q 3 | Attempt all questions in this section: | | | | | | | | | | | | | | |
| 3.1 | Define demand forecasting and explain its significance in the business world. Provide examples of industries where demand forecasting plays a crucial role. | 10 | CO3 | | | | | | | | | | | | |
| 3.2 | In January, Ahuja car dealer predicted February demand for 145 bike units. The actual February demand was 153 units. Using a smoothing constant chosen by the management of $\alpha = 0.20$ and 0.35 , the dealer wants to forecast March demand. Also, explain the concept of smoothing constant (α) in this question. | 10 | CO3 | | | | | | | | | | | | |
| 3.3 | Differentiate the various forecasting errors with its meaningful interpretation – (MAD, MAPE, and MSE) using an example. | 10 | CO3 | | | | | | | | | | | | |
| SECTION-D 2Qx15M= 30 Marks | | | | | | | | | | | | | | | |
| Q4 | Attempt all questions in this section: | | | | | | | | | | | | | | |
| 4.1 | Short Case – Manor Bakeries | 15 | CO4 | | | | | | | | | | | | |

Inventory management is one of the most important operations management activities at Manor Bakeries, Europe’s largest manufacturer of ‘ambient’ packaged cakes and pies. (Ambient means that they can be stored at room temperature.) Its brands include Lyons and Mr Kipling. Its fleet of vans routinely restocks the shelves of thousands of small retailers and also distributes to major supermarkets, but here the re-ordering process is usually managed by the supermarket’s own inventory management systems. Cakes are produced at four factories, on production lines, some of which are operated continuously. Although considerable effort is made to forecast sales accurately, there is always uncertainty. Yet there are limits to how much inventory can be used to compensate for demand fluctuations because supermarkets require products to be on their shelves for most of their shelf-life, allowing only a few days for Manor to transport, store and deliver the products.

Input stocks of raw materials must also be carefully managed at each factory. Bulk ingredients such as flour and sugar are delivered to giant storage silos, but managing the hundreds of other ingredients (butter, nuts, dried fruits, pasteurized egg, etc.) is more complex. Some of these are not expensive but are used in huge volumes, while others are very expensive but usage is small. Some ingredients have a short shelf-life and have to be stored in special conditions. Some are easily available, others are specially imported and are on long lead times and fresh annual crops such as fruit can vary in quality and availability. Packaging is frequently changed to reflect new promotions and price changes. Yet running out of stock is serious. It can disrupt production schedules and lead to stock-outs of finished products, affecting both sales and customer relations. Inventory also occurs because of the way products are produced on the production lines. Although some products sell enough to warrant their own production lines, most lines have been designed to make a range of similar products. So, products are made in batches, sufficient to last until the next production run.

Questions

- 1- What are the factors which constitute inventory holding costs, order costs and stock-out costs at Manor Bakeries?
- 2- What makes its inventory planning and control so complex?

4.2

The following table represents sales data for Litres of milk (in hundreds) sold by a milk booth.

| | | | | | | | | | | | | |
|-------|----|-----|----|-----|-----|----|----|-----|-----|----|-----|----|
| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Sales | 96 | 106 | 92 | 114 | 108 | 98 | 99 | 115 | 106 | 91 | 102 | 99 |

- (a)- Use single exponential smoothing to forecast demand, with an alpha of 0.20 and an initial forecast of 100.00.
- (b)- Use trend-adjusted exponential smoothing to forecast sales through period 13 for the following data. Use an alpha of 0.30, a Beta of 0.50, an initial base of 29.0, and a trend of 1.0.

15

CO4

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