NOVEMBER 2013 EXAMINATION

DATE: 8 NOVEMBER 2013

TIME: 09H00 – 11H00

TOTAL: 100 MARKS

DURATION: 2 HOURS

PASS MARK: 40%

(XN-88)

FORECASTING AND DEMAND MANAGEMENT

THIS EXAMINATION PAPER CONSISTS OF 3 SECTIONS:

SECTION A: CONSISTS OF:
(i) 10 MULTIPLE-CHOICE QUESTIONS (10 MARKS)
(ii) 5 TRUE OR FALSE QUESTIONS (10 MARKS)
(iii) 10 MATCHING-STATEMENT QUESTIONS (10 MARKS)

SECTION B: CONSISTS OF 3 SHORT QUESTIONS

ANSWER ALL THE QUESTIONS (50 MARKS)

SECTION C: CONSISTS OF 4 INTERPRETATIVE QUESTIONS

ANSWER ANY TWO OF THE QUESTIONS (20 MARKS)

INSTRUCTIONS:

1. Read the following instructions carefully before answering the paper, as failure to act upon them will result in a loss of marks.
2. Write your answers in your answer book, which is provided in the exam.
3. Ensure that your name and student number are clearly indicated on your answer book.
4. Write your answers in either blue or black ink in your answer book.
5. Read each question very carefully before you answer it and number your answers exactly as the questions are numbered.
6. Begin with the question for which you think you will get the best marks.
7. Note the mark allocations for each question – give enough facts to earn the marks allocated. Don't waste time by giving more information than required.
8. You are welcome to use diagrams to illustrate your answers.
9. Please write neatly – we cannot mark illegible handwriting.
10. Any student caught cheating will have his or her examination paper and notes confiscated. The College will take disciplinary measures to protect the integrity of these examinations.
11. If there is something wrong with or missing from your exam paper or your answer book, please inform your invigilator immediately. If you do not inform your invigilator about a problem, the College will not be able to rectify it afterwards, and your marks cannot be adjusted to allow for the problem.
12. This paper may be removed from the examination hall after the examination has taken place.

NOTE: YOU MAY USE A NON-PROGRAMMABLE CALCULATOR.
(i) **MULTIPLE-CHOICE QUESTIONS**

Choose the correct option for each of the following. Write only the question number and your chosen answer. For instance, if you think that the correct answer for number 1 is (a), then write it as 1. (a).

1. The following are examples of quantitative forecast methods with the exception of:

   (a) Time Series Analysis.
   (b) Causal Relationships.
   (c) Simulation.
   (d) Judgemental method.

2. The following are examples of qualitative forecast methods with the exception of:

   (a) Causal Relationships.
   (b) Delphi method.
   (c) Grass Roots.
   (d) Panel Consensus.

3. Which time series model below assumes that demand in the next period will be equal to the most recent period’s demand?

   (a) size of forecasting budget
   (b) availability of qualified personnel
   (c) None of the above.
   (d) All of the above.

4. Gradual, long-term movement in time-series data is called:

   (a) cost
   (b) experience
   (c) trial and error
   (d) (b) and (c)

5. The value for alpha or $\alpha$ must be between _____ when used in an Exponential Smoothing model?

   (a) 1 to 10
   (b) 1 to 2
   (c) 0 to 1
   (d) $-1$ to $1$
6. Which of the following would be the 'best' MAD value in an analysis of the accuracy of a forecasting model?
   (a) 100
   (b) 10
   (c) 0
   (d) 1

7. The following are types of quantitative forecasting except:
   (a) random variation
   (b) autocorrelation
   (c) Both of the above.
   (d) None of the above.

8. Which of the following is a reason why the Exponential Smoothing model has been a well accepted forecasting methodology?
   (a) Computer storage requirements are small.
   (b) It is easy to use
   (c) simple to set up.
   (d) Not good for the long run.

9. Which of the following uses three types of participants: decision makers, staff personnel, and respondents?
   (a) employing the wrong trend line
   (b) random
   (c) None of the above.
   (d) All of the above.

10. Which one of the following is not a step in the forecasting process?
    (a) determine the use of the forecast
    (b) eliminate any assumptions
    (c) determine the time horizon
    (d) select a forecasting model(s) [10]

(ii) TRUE OR FALSE QUESTIONS

Indicate whether the following statements are True or False. Motivate all your answers.

1. Forecasting forms the basis of both long-term strategy and short-term strategy formulation.

2. Material requirements planning is the same as capacity requirements planning.

3. Trend Projection and Regression Analysis are quantitative technique methods.

4. Long-term demand management affects planning for buildings, infrastructure, utilities, capital equipment, and product design and development.

5. A lot of data is required for regression analysis. [5 × 2 = 10]
(iii) MATCHING-STATEMENT QUESTIONS

Match the statements in Column B to the terms in Column A. Write down the answers only, for example 1. (a).

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. medium-term forecasting</td>
<td>(a) calculates the average of absolute differences between the actual and the forecast demand over n time periods</td>
</tr>
<tr>
<td>2. mean absolute deviation</td>
<td>(b) involves decisions relating to production scheduling</td>
</tr>
<tr>
<td>3. mean-square error</td>
<td>(c) involves decisions relating to the sales and operations planning</td>
</tr>
<tr>
<td>4. short-term forecasting</td>
<td>(d) calculates the average of square of the forecast errors</td>
</tr>
<tr>
<td>5. item demand</td>
<td>(e) a structured variation of the small-group method</td>
</tr>
<tr>
<td>6. Delphi technique</td>
<td>(f) a more structured version of the jury of executive opinion</td>
</tr>
<tr>
<td>7. nominal group technique</td>
<td>(g) given only by senior management</td>
</tr>
<tr>
<td>8. random variations</td>
<td>(h) refers to specific parts or other resources required</td>
</tr>
<tr>
<td>9. user expectations forecasting technique</td>
<td>(i) include all non-typical behaviours not accounted for by the other classifications</td>
</tr>
<tr>
<td>10. a 'must do' forecast</td>
<td>(j) shows the commitment to a product</td>
</tr>
</tbody>
</table>
ANSWER ALL THE QUESTIONS

QUESTION 1

(a) List seven quality improvement tools. (7)

(b) Explain two important kinds of errors (or variations) in processing of results. (4)

(c) Identify the nine systems that may be used for manufacturing, planning and control. (9) [20]

QUESTION 2

(a) Explain the following:
   i. manufacturing resources planning (2)
   ii. order releases (2)
   iii. general capacity testing (2)

(b) What are the three shortcomings of the Delphi technique? (3 × 2 = 6)

(c) What are the advantages of the Delphi technique? (3 × 2 = 6)

(d) Give one advantage of the user expectations forecasting technique. (2) [20]

QUESTION 3

(a) Identify seven quantitative techniques you have studied during the course. (7)

(b) Give the three processes used for master planning for operations. (3) [10]

[50]
SECTION C: INTERPRETATIVE QUESTIONS (20 MARKS)

ANSWER ANY TWO OF THE QUESTIONS

QUESTION 1

(a) Given a forecast using a six-period moving average, give the average age of data. (5)

(b) If the age of data in exponential smoothing is $1/\alpha$, for what value of $\alpha$, exponential smoothing performs close to a six period moving average? (5) [10]

OR

QUESTION 2

(a) Given an actual demand of 60 for a period when a forecast of 70 was anticipated and an alpha of 0.3, what would the forecast for the next period be, using simple exponential smoothing? (5)

(b) You have been asked to generate a demand forecast for a product for year 2012 using an exponential smoothing method. The forecast demand in 2011 was 910. The actual demand in 2011 was 850. Using this data and a smoothing constant of 0.3, what is the demand forecast for year 2012? (5) [10]

OR

QUESTION 3

(a) If a Least Squares model is: $y = 25 + 5x$, and $x$ is equal to 10, what is the forecast value using this model? (2)

(b) Forecast the sales for period 5 using the Time Series method.

<table>
<thead>
<tr>
<th>Period</th>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>?</td>
</tr>
</tbody>
</table>

(2)
(c) What is the MAD value given the forecast values in the table below?

<table>
<thead>
<tr>
<th>Month</th>
<th>Sales</th>
<th>Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>220</td>
<td>n/a</td>
</tr>
<tr>
<td>2</td>
<td>250</td>
<td>255</td>
</tr>
<tr>
<td>3</td>
<td>210</td>
<td>205</td>
</tr>
<tr>
<td>4</td>
<td>300</td>
<td>320</td>
</tr>
<tr>
<td>5</td>
<td>325</td>
<td>315</td>
</tr>
</tbody>
</table>

AND / OR

**QUESTION 4**

Assume you only have 3 weeks and 5 weeks of actual demand data for the respective forecasts:

<table>
<thead>
<tr>
<th>Week</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand</td>
<td>820</td>
<td>775</td>
<td>680</td>
<td>655</td>
<td>620</td>
<td>600</td>
<td>575</td>
</tr>
</tbody>
</table>

(a) What is the 3-week moving average forecast for this data?  (4)

(b) What is the 5-week moving average forecast for this date?  (6) [10]

Section A: 30 marks
Section B: 50 marks
Section C: 20 marks
TOTAL: 100 MARKS