Mid Term Exam-IBM 311 (Autumn 2023)

Duration: From 7:30 am to 9:15 am. Maximum Marks: 52.

Name:
Subject Name:
Subject Code:
Serial number (assigned for this course):
Enrollment No.:
Date:

Signature of the Student Signature of the Invigilator

Standard normal table is provided as a separate sheet and will be **collected** at the end of the exam. Do not write/mark anything on this sheet.

All questions carry 1 mark and has one third negative marking. Unanswered questions will not be marked.

Your answers should be marked in response sheet (backside of this page). This page will be **collected** at the end of the exam.

Right side margin of the question paper can be used for rough work.

Examiner's Signature

Response Sheet

Question Paper Set:

Fill in the correct option (tick mark, darken or cross one box for each response) for each question.

Section 1

Q. No.	Options			
1				
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Section 2

Q. No.	Options			
1				
2				
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Section 3

Q. No.	Options			
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5				

Section4

Q. No.	Options			
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Section 5

Q. No.	Options			
1				
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Section 6

Q. No.	Options			
1				
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Section 7

Q. No.	Options			
1				
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Section 1: General

1. Which of the following statements about the ABC classification system are true:

i) It is a method for classifying inventory based on the percentage of total value and the percentage of total quantity.

ii) Class A items in the ABC classification system require less monitoring and control than Class C items.

iii) It is useful in rationing monitoring capability.

iv) It is useful in determining EOQ.

a) i and ii b) i and iii c) iii and iv d) ii and iv

b

2. The underlying rational for ABC classification scheme for inventory control is (Choose only 1 option):

a) Rationing of monitoring capability
b) Speed
c) Excellence
d) Redundancy

a

3. Select the correct order of steps involved in ABC Classification given below:

i) Evaluate cumulative %age value and quantity across rows
ii) Sort in descending order the table along the column containing the total value
iii) List the inventories items, their cost and quantity
iv) Evaluate %age of total value and total quantity for each row

a) i , ii, iii, iv b) iii, i, iv, ii c) ii, iv, i , iii d) iii, ii, iv, i

d

4. Forecast methods based on judgment, opinion, past experiences, or best guesses are known as _____ methods.

a) quantitative b) qualitative c) time series d) regression

b

5. Which of the following is not a forecasting method

a) Technology diffusion curves b) Associative c) Time Series b) Back casting

d

6. Which of the following is not a type of predictable demand behavior?

a) trend b) random variation c) cycle d) seasonal pattern

b

7. The sum of the weights in a weighted moving average forecast must

a. equal the number of periods being averaged. b) equal 1.00.
c) be less than 1.00. d) be greater than 1.00.

b

8. The sum of weights in exponential smoothing is

a) Equal to 1 b) Equal to e c) Equal to 1/e d) Greater than e

a

9. Given the demand and forecast values below, the naïve forecast for September is:

Period	Demand	Forecast
April	100	97
May	105	103
June	97	98
July	102	105
August	99	102
September		

a) 100.6 b) 99 c) 102.0 d) Cannot be determined

b

10. The smoothing constant, α, in the exponential smoothing forecast
a) must always be a value greater than 1.0.
b) must always be a value less than 0.10.
c) must be a value between 0.0 and 1.0. c
d) should be equal to the time frame for the forecast.

11. The closer the smoothing constant, α, is to 1.0 the a
a. greater the reaction to the most recent demand.
b. greater the dampening, or smoothing, effect.
c. more accurate the forecast.
d. less accurate the forecast.

12. The exponential smoothing model produces a naïve forecast when the smoothing constant, α, is equal to b
a) 0.00. b) 1.00. c) 0.50. d) 2.00

13. For the demand values and the January forecast shown in the table below the exponential smoothing forecast for March using α = 0.30 is

Period	Demand	Forecast
January	500	480
February	476	
March	503	
April		

c
a) 489. b) 486. c) 483. d)480.

14. Which of the following is not an assumption of the EOQ model?
a) demand rate is known and constant
b) shortages are allowed b
c) lead time is constant
d) order quantity is received all at once

15.The extent to which the firm will produce the inputs and control the outputs of each stage of the production process is known as: a
a) vertical integration b) process flexibility c) process planning d) capital intensity.

16. The conditions when the economic order quantity model results in periodic ordering are: i
a) Fixed lead time b) Variable lead time c) Fixed Demand rate
d) Variable demand rate

i) a and c ii) a and b iii) c and d iv) b and d v) a and d

17 Fundamental problem of O&SCM is
a) Demand and supply are not collocated
b) Demand and supply are coincidental in time
c) Demand and supply are not coincidental in time
d) Demand and supply are not relevant ii

i) All of the above
ii) a) & c)
iii) b) & d)
iv) c) & d)

18 Generally, which of the following O&SC processes add the highest value

a) Marketing and Branding
b) Manufacturing
c) Design
d) Assembly

II

i) a and b ii) c and a iii) d iv) b

19 Which of the following statements is not correct:

a) Tracking signal is used to monitor forecasts
b) Control chart is used for monitoring of forecasts
c) Upper and lower limits on the control chart are fixed numbers and not multiples of standard deviation of the error.
d) Upper and lower limits on the tracking signal chart are fixed numbers and not multiples of its standard deviation.

c

20 When we incorrectly label a forecast out of control while it is actually in control, it is called as type II error.

a) True
b) False

b

21 When we incorrectly label a forecast in control while it is actually out of control it is called as Type II error.

a) True
b) False

a

22. If the limits of the control chart are set at 3 sigma on either side of the centre line and the distribution of the variable being monitored is normal, the probability of type II error is
a) .0027 b) Can't Say c) .027 d) .27

we want the measured mean to calculate type II error. => b

23. If the limits of the control chart are set at 3.1 sigma on either side of the centre line and the distribution of the variable being monitored is normal, the probability of type I error is
a) .0027 b) .00006 c) Can't Say d) .0019

remaining area => d

24. How many feedback loops are there in the flowchart of the forecasting process:
a) 1 b) 2 c) 3 d) 0

b

25. The daily demand for a product is normally distributed with a mean value of 100 and the variance of 25, what is the probability that on any given day the demand would be greater than 105
a) .158 b) .27 c) .33 d) .015

a

26. Which of the following statements is true for demand per period which is independent and normally distributed
a) The standard deviation for the aggregate demand during the lead time is the sum of the demand per period.
b) The standard deviation for the aggregate demand during the lead time is the product of the demand per period.
c) The variance for the aggregate demand during the lead time is the sum of the demand per period.
d) The variance for the aggregate demand during the lead time is the product of the demand per period.

c

27. The Sales and Operations planning falls in which of the following categories

it is short to medium range planning and hence, tactical planning.

a) Tactical Planning b) Operational Planning c) Strategic Planning d) None of the above

28. Which of the following is not a variable in production planning:
a) overtime b) Sub-contracting c) Capital Investment d) Inventory c

Section 2: Service level

The demand for an electronic component is normally distributed with an average daily demand of 500 units and a standard deviation of 50. The lead-time for the component is 9 days.

1. If a service level of 95% is desired then the company's reorder point for this component is approximately
a. 3,785 units.
b. 4,500 units.
c. 4,627units.
d. 4,747units. d

2. If a service level of 95% is desired, then the company's safety stock for this component is approximately
a. 150 units.
b. 247 units. b
c. 336 units.
d. 740 units.

3. The demand for an electronic component is normally distributed with an average daily demand of 500 units, and a standard deviation of 50. The lead time for the component is 9 days. If the company sets a reorder point of 4,650 for this component then its service level is approximately
a. 50 percent.
b. 84 percent. b
c. 92 percent.
d. 98 percent.

Section 3: Inventory

Annual demand for a product is 40,000 units. The product is used at a constant rate over the 365 days the company is open every year. The annual holding cost for the product is estimated to be $2.50 per unit and the cost of placing each order is $125.00.

1. If the company orders according to the economic order quantity (EOQ) formula then its optimal order size for this product is
a. 2,000 units.
b. 4,000 units. a
c. 20,000 units.
d. 40,000 units.

2. If the company orders according to the economic order quantity (EOQ) formula then _____ orders are placed annually.
a. 5
b. 10
c. 15
d. 20 d

3. If the company orders according to the economic order quantity (EOQ) formula, then the time between orders (order cycle time) is

a

a. 18.25 days.
b. 24.33 days.
c. 36.5 days.
d. 73 days.

4. If the company orders according to the economic order quantity (EOQ) formula then its total annual inventory cost for this product is

c

a. $100,000.
b. $50,000.
c. $5,000.
d. $2,500.

5. If the company orders according to the economic order quantity (EOQ) formula, then its average inventory level for this product is

d

a. 20,000 units.
b. 10,000 units.
c. 2,500 units.
d. 1,000 units.

Section 4: Forecasting

A forecasting model has produced the following forecasts:

Period	Demand	Forecast	Error
January	120	110	
February	110	115	
March	115	120	
April	125	115	
May	130	125	

1. The mean absolute deviation (MAD) for the end of May is

a

(a) 7.0. (b) 7.5. (c) 10.0. (d) 3.0

2. The mean absolute percent deviation (MAPD) for the end of May is

b

(a) 0.0250. (b) 0.0583. (c) 0.5830. (d) 0.6670.

3. At the end of May, the average error would be

c

(a) 7. (b) 5. (c) 3. (d) 1.

4. At the end of May, the tracking signal would be

d

(a) 0.000. (b) 0.667. (c) 1.333. (d) 2.143.

Section 5: Forecasting II

A local building products store has accumulated sales data for 2*4 lumber and the number of building permits in its area for the past 10 quarters

Quarter	Permits	Lumber sales
1	8	12.6
2	12	16.3
3	7	9.3
4	9	11.5
5	15	18.1
6	6	7.6
7	5	6.2
8	8	14.2
9	10	15
10	12	17.8

1. Using time series regression the forecast for quarter 11 is: a => 14.04
   a) 14 b) 16 c) 12 d) 10
2. On an average, if the number of permits increase by 1, by how much the lumber sales increase: a => do by Linear regression
   a) 1.25 b) 2.25 c) 0.25 d) .75
3. Regressing lumber sales on number of building permits, the sales forecast for 11 building permits is: b
   a) 13 b) 15 c) 10 d) 17
4. For which of the following pairs is the correlation coefficient value higher
   a) Quarter and lumber sales b) Permits and Lumber Sales

Section 6: Forecasting III

A computer software firm has experienced the following demand for its software package. Calculate the exponential smoothing forecast using alpha = 0.4 and adjusted exponential smoothing forecast using alpha = 0.4 and beta = 0.2.

Period	Units
1	56
2	61
3	55
4	70
5	66
6	65
7	72
8	75

1. The MAD value, considering forecast values period 2 onwards, using Exponential smoothing is: (for period 2 the forecast would be the naïve forecast) d
   a. 5.34 b) 3.34 c) 6.34 d) 5.99

2. The MAD, considering forecast values period 2 onwards, using adjusted Exponential smoothing is: (for period 2 the forecast would be the naïve forecast, the trend factor for period 2 would be 0) Adjusted expo smoothing on book given...answer => a
   a. 5.34 b) 3.34 c) 6.34 d) 5.99

3. Basis MAD, which method would you prefer: b => as MAD is less
   a. Exponential Smoothing b) Adjusted Exponential Smoothing

4. Using best of the two techniques, the forecast for period 9 is: a
   a) 72.19 b) 70.39 c) 76.19 d) 73.39

Section 7: Production Planning

The demand for a product exhibits the following pattern. Given the demand pattern, production costs and the constraints, design the lowest cost production plan.

Month	Demand
1	100
2	130
3	200
4	300

Maximum regular production: 100 units/month
Maximum overtime production: 50 units/month
Maximum subcontracting: 50 units/month
Regular production cost: 10/unit
Overtime production cost: 25/unit
Sub-contracting cost: 35/unit
Inventory holding cost: 5/unit/month
Beginning inventory: 0
Answer the following questions for the optimal plan:

1. The cost of production plan is
   a) 14800 b) 13800 c) 15800 d) 15200
2. The level of inventory at the end of period 3 is
   a) 0 b) 100 c) 50 d) 120
3. Sum of subcontracted production across all periods is
   a) 100 b) 120 c) 130 d) 50
4. Sum of overtime capacity across all periods is
   a) 50 b) 100 c) 150 d) 200

a

b

c

d