Total No. of printed pages = 12

63/2 (SEM-1) MBA 1·3

2021

(held in 2022)

MBA

(Theory Paper)

Paper Code : MBA-1·3

**(Quantitative Technique for Business)**

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Section – A

Answer any *five* from the following.

Each questions carries 2 marks.

1. Why is statistics important for business and industry ?
2. What are the three general technique of assigning probability ?
3. What is a point estimate ?
4. What are the various elements of decision analysis ?

[Turn over

5. Why is regression used ?

6. What are the application of mode ?

7. What is the difference between discrete and continuous probability distribution ?

## Section – B

Answer any *four* from the following.

Each questions carries 5 marks.

1. What are the major limitations of statistics ? Explain with suitable example.

2. A firm wants to investigate the number of minor accidents in a particular area of its manufacturing plant. Historical data of the company indicates that on an average 8 accidents per month took place in this particular area of the plant. The number of accidents is Poisson distributed. Compute the probability of exactly 0, 1, 2, 3, 4, 5 and 6 accidents in any month. (e=2.718).

3. Explain the sampling design process.

4. The following gives indices of industrial production and number of registered unemployed people (in lakhs). Calculate the value of correlation coefficient.

| Year | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|
| Indices of Production | 100 | 102 | 104 | 107 | 105 | 112 | 103 | 99 |
| Number of unemployed | 15 | 12 | 13 | 11 | 12 | 12 | 19 | 26 |



5. What is binomial distribution ? State the assumption of binomial distribution.

6. Compute range and coefficient of range from the following data :

| x | 10-60 | 60-120 | 120-180 | 180-240 | 240-300 |
|---|---|---|---|---|---|
| f | 3 | 5 | 6 | 3 | 2 |

## Section – C

Answer any four from the following.

Each questions carries 7 marks.

1. From the following information on the number of defective components in 1000 boxes.

| Number of components | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| Number of boxes | 25 | 306 | 402 | 200 | 51 | 10 | 6 |

Calculate the arithmetic mean of defective components for the whole production line.

2. Explain the concept of Bayes' theorem and state its application and importance in decision making.

3. Explain the types of non-random sampling techniques.

4 You are given a following pay-off table :

| STATES OF NATURE | | | | |
|---|---|---|---|---|
| Alternative | $S_1$ | $S_2$ | $S_3$ | $S_4$ |
| $A_1$ | 1 | 3 | 8 | 5 |
| $A_2$ | 2 | 5 | 4 | 7 |
| $A_3$ | 4 | 6 | 6 | 3 |
| $A_4$ | 6 | 8 | 3 | 5 |

Decide the best course of action according to :

(i). Maximax Criterion

(ii). Minimax Criterion

(iii) Laplace Criterion.

5. In the context of decision tree, explain the following terms :

(i) Nodes (ii) branches

(iii) probability estimates and (iv) pay-off.

6. In a partially destroyed records, the following data are available. Variance of $x=25$. Regression equation x on y is $5x-y=22$. Regression equation y on x is $64x-45y=24$.

Determine :

(i) Mean value of x and y

(ii) Coefficient of correlation between x and y

(iii) Standard deviation of y.



## Section – D

### Case Study Compulsory.

1. Chemical, Industrial, and Pharmaceutical Laboratories (Cipla): A Leading Player in the Indian Pharmaceutical Industry.

**Introduction**

Khwaja Abdul Hamied incorporated the Chemical, Industrial, and Pharmaceutical Laboratories, which came to be popularly known as Cipla. Cipla was registered as a public limited company with an authorized capital of Rs. 60,000 million in 1935.1 Operations officially started in September 1937 when its first product was launched in the market. The Sunday Standard reported, "The birth of Cipla which was launched into the world by Dr. K. A. Hamied will be a red lettered day in the annals of industries in Bombay. The first city in India can now boast of a concern, which will supersede all existing firms in the magnitude of its operations.

**Product Ranges offered**

Cipla's products and services are categorized as prescription, animal health care products, over-the-counter (OTC) products, bulk drugs, and technology services. The prescription division covers medicines

for a variety of human diseases. The OTC products manufactured by Cipla include a range of drugs such as analgesics, artificial sweeteners, cosmetics and skin care products, dental care and oral hygiene products, food supplements, toiletries, infant foods, medicated Plasters, etc. The animal health care products are further categorized as per animal groups, herbal specialties, and therapeutic groups. The drugs produced under this category are equine products, poultry products, products for companion animals, and products for livestock.

Bulk drugs include active pharmaceutical ingredients and drug intermediates. Technology services provided by Cipla include consulting, project appraisal, engineering, plant supply and commissioning, training, operation management, support, know-how transfer, and quality control.

The domestic pharmaceutical industry in India grew at more than double the rate, recording a 11% growth in value as per ORG-IMS, compared to 4.2% during 2004-2005. For the first time, the company's turnover crossed the Rs 30 billion (see Table 3.010).

Once again, this was way more than the overall growth rate of the industry. Cipla now exports to countries in Europe, Australia, Africa, Asia, the Middle East, and North, Central, and South



America. The company's steady progress won it the "Express Pharma Pulse Award" for "sustained growth" for 2005-2006. Cipla is one of a handful of companies in India that has consistently increased its turnover and profitability in the past 15 years in a row.

Cipla overtook Ranbaxy and Glaxo Smith Kline (GSK) to become the largest pharmaceutical company in the domestic market for the first time in 2007.

Table

Sales turnover of Cipla Ltd. from 1989-2006 :

| Year | Sales (in million rupees) |
|---|---|
| 1989 | 971.3 |
| 1990 | 928.9 |
| 1991 | 1236.4 |
| 1992 | 1514.0 |
| 1993 | 1990.3 |
| 1994 | 2454.7 |
| 1995 | 2987.1 |
| 1996 | 3623.6 |
| 1997 | 4525.8 |
| 1998 | 5170.8 |
| 1999 | 6255.4 |
| 2000 | 7721.4 |

| Year | Sales (in million rupees) |
|---|---|
| 2001 | 10643.1 |
| 2002 | 14008.1 |
| 2003 | 15730.2 |
| 2004 | 20554.3 |
| 2005 | 24008.9 |
| 2006 | 31036.2 |

1. Calculate the average sales of Cipla Ltd. for 1989-2006. 6

2. Calculate the median sales of Cipla Ltd. for 1989-2006. 6



(Theory Paper)

Paper Code : MBA-1.3 (Old)

**(Quantitative Technique for Business)**

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Section – A

*All* questions are compulsory.

Each questions carries 2 marks.

1. Why is statistics important for business and industry ?

2. What are the three general technique of assigning probability ?

3. What is a point estimate ?

4. What are the application of mode ?

5. Why is regression used ?

## Section – B

Answer any *five* from the following.

Each questions carries 4 marks.

1. What are the major limitations of statistics ? Explain with suitable example.
2. Explain the sampling design process.
3. What are the assumptions of binomial distribution ?
4. Compute range and coefficient of range from the following data :

| x | 10-60 | 60-120 | 120-180 | 180-240 | 240-300 |
|---|---|---|---|---|---|
| f | 3 | 5 | 6 | 3 | 2 |

5. What are the various elements of decision analysis ?
6. Determine mode from the following frequency distribution :

| Class Interval | Frequency |
|---|---|
| 30-40 | 4 |
| 40-50 | 6 |
| 50-60 | 8 |
| 60-70 | 12 |
| 70-80 | 9 |
| 80-90 | 7 |
| 90-100 | 4 |

7. Discuss the various tools for data presentation.



## Section – C

Answer any *five* from the following.

Each questions carries 8 marks.

1. From the following information on the number of defective components in 1000 boxes :

| Number of components | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| Number of boxes | 25 | 306 | 402 | 200 | 51 | 10 | 6 |

Calculate the arithmetic mean of defective components for the whole production line

2. Explain the concept of Bayes' theorem and state its application and importance in decision making.
3. Explain the types of non-random sampling techniques.
4. You are given a following pay-off table :

| STATES OF NATURE | | | | |
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| Alternative | $S_1$ | $S_2$ | $S_3$ | $S_4$ |
| $A_1$ | 1 | 3 | 8 | 5 |
| $A_2$ | 2 | 5 | 4 | 7 |
| $A_3$ | 4 | 6 | 6 | 3 |
| $A_4$ | 6 | 8 | 3 | 5 |

Decide the best course of action according to :

(i) Maximax Criterion

(ii) Minimax Criterion

(iii) Laplace Criterion.

5. Explain decision tree with example.

6. Determine the coefficient of correlation between x and y

| x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| y | 12 | 11 | 13 | 15 | 14 | 17 | 16 | 19 | 18 |

7. Explain the meaning of the following terms used in probability :

(a) Mutually exclusive events

(b) Equally likely events

(c) Sample Space.