



Seat No. \_\_\_\_\_

**HJ-161100010403**  
**B. B. A. (Sem.-IV) (CBCS)**  
**(W.E.F. 2016) Examination**  
**April - 2023**  
**Statistics for Business Decision Making**

Time :  $2\frac{1}{2}$  Hours / Total Marks : 70

- 1 (a) Explain in short : Types of problems in decision making under different environments. 7
- (b) For the following Pay-off matrix find the best act using 7
- (i) Minimax
- (ii) Laplace

| States of nature |    |    |    |    |
|------------------|----|----|----|----|
| Alternatives     | S1 | S2 | S3 | S4 |
| A1               | 3  | 5  | 8  | -1 |
| A2               | 6  | 5  | 2  | 0  |
| A3               | 0  | 5  | 6  | 4  |

**OR**

- 1 For the following Pay-off matrix find the best act using 14
- (i) EMV (ii) EOL (iii) EVPI criterion.

| States of nature |     |     |     |     |
|------------------|-----|-----|-----|-----|
| Alternatives     | S1  | S2  | S3  | S4  |
| A1               | 3   | 5   | 8   | -1  |
| A2               | 6   | 5   | 2   | 0   |
| A3               | 0   | 5   | 6   | 4   |
| Probability      | 0.6 | 0.1 | 0.2 | 0.1 |

- 2 (a) Give the difference between the chart for variables and chart for attributes. 7

- (b) Draw  $\rho$  chart for the following data and save your conclusion. 7

|                        |    |    |    |    |    |    |    |    |    |    |
|------------------------|----|----|----|----|----|----|----|----|----|----|
| Sample No.             | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
| No. of inspection item | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| No. of Defective items | 4  | 8  | 2  | 0  | 1  | 2  | 12 | 8  | 0  | 3  |

**OR**

- 2 Draw  $\bar{X}$  and R chart for the following data and save your conclusion. 14

|              |       |    |    |    |    |    |    |    |    |
|--------------|-------|----|----|----|----|----|----|----|----|
| Sample No.   |       | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
| Observations | $X_1$ | 32 | 30 | 39 | 50 | 41 | 50 | 44 | 23 |
|              | $X_2$ | 37 | 32 | 52 | 42 | 45 | 29 | 52 | 32 |
|              | $X_3$ | 42 | 40 | 29 | 31 | 34 | 20 | 36 | 44 |

[Given for  $n = 3$ ,  $A_2 = 1.023$ ,  $D_3 = 0$   $D_4 = 2.575$ ]

- 3 (a) What is Business Forecasting ? Explain different methods of forecasting. 7  
 (b) Fit a Straight line to the following data : 7

|                           |      |      |      |      |      |
|---------------------------|------|------|------|------|------|
| Year                      | 1991 | 1992 | 1993 | 1994 | 1995 |
| Production in ('000 tons) | 20   | 35   | 45   | 49   | 25   |

**OR**

- 3 Obtain the equation of second degree parabola from the following data. Also obtain the estimated production for 2000. 14

|            |      |      |      |      |      |
|------------|------|------|------|------|------|
| Year       | 1990 | 1992 | 1994 | 1996 | 1998 |
| Production | 12   | 4    | 6    | 11   | 8    |

- 4 (a) Explain the following terms : 7  
 (i) Null hypothesis and Alternative hypothesis.  
 (ii) Type I and Type II errors.  
 (b) The mean life time of 100 LED bulbs produced by a company is computed to be 1570 hours with a standard deviation of 120 hours. The company claims that the average life of the LED bulbs produced by the company is 1600 hours. Is the claim justified ? Use 5% level of significance. 7

**OR**

- (a) Explain the One-tailed, Two-tailed Test and Decision Making with figures. 7
- (b) In City A proportion of female birth in 886 births was 48.50% while in city A and B combined this proportion in 1286 births was 51.6%. Can we conclude that the proportion of female births in city B is more than city A ? (Use 5% one tail test). 7
- 5 (a) Give Assumptions, Properties and Uses of t-distribution. 7
- (b) Certain fertilizer is packed into bags by a machine. A random sample of 10 bags is drawn and their contents found to weigh (in kg) as follows : 50, 49, 52, 44, 45, 48, 46, 45, 49, 45. Test if the average packing can be taken to be 50 kg. (Use  $T_{\text{tab}} = 2.26$ ) 7

**OR**

- 5 From the following information find the value of F statistic and Test the hypothesis that population variances are equal. (Use  $F_{\text{tab}} = 2.9$ )

| Sample | Size | Mean | $\sum(x-\bar{x})^2$ |
|--------|------|------|---------------------|
| 1      | 10   | 12   | 120                 |
| 2      | 12   | 15   | 314                 |

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