

# BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN 

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Course Code 

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First Semester MBA Degree Examinations, June 2022

## BUSINESS STATISTICS

Duration: 3 hrs

Max. Marks: 100

- Note:** 1. Answer any FOUR full questions from Question No. 1 to 7.  
2. Question No. 8 is compulsory  
3. Missing data, if any, may be suitably assumed

- | <u>Q. No</u>                        | <u>Question</u>   | <u>Marks</u>                        | <u>(RBTL:CO:PO)</u> |           |           |           |           |                          |           |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
|-------------------------------------|---|-------------------------------------|---------------------|-----------|-----------|-----------|-----------|--------------------------|-----------|-----------|----------------|---------------------|----|----|----|----|----|----|----|----|----|--------------|----|----|----|----|----|----|----|----|----|--|--|
| 1. a.                               | Mention the various measures of central tendency and write its applications.  | 03                                  | (3 : 1 : 1)         |           |           |           |           |                          |           |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
| b.                                  | Applying the concept of Median (Me) and Mode (Mo) get a meaning interpretation of the data given below of monthly salary distributed in certain locality.   | 07                                  | (3 : 1 : 1)         |           |           |           |           |                          |           |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
|                                     | <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>Salary in Rs</td> <td>0-500</td> <td>500-1000</td> <td>1000-1500</td> <td>1500-2000</td> <td>2000-2500</td> <td>2500-3000</td> <td>3000-3500</td> <td>3500-4000</td> </tr> <tr> <td>No of Families</td> <td>50</td> <td>80</td> <td>40</td> <td>25</td> <td>25</td> <td>15</td> <td>10</td> <td>5</td> </tr> </table>   | Salary in Rs                        | 0-500               | 500-1000  | 1000-1500 | 1500-2000 | 2000-2500 | 2500-3000                | 3000-3500 | 3500-4000 | No of Families | 50                  | 80 | 40 | 25 | 25 | 15 | 10 | 5  |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
| Salary in Rs                        | 0-500   | 500-1000                            | 1000-1500           | 1500-2000 | 2000-2500 | 2500-3000 | 3000-3500 | 3500-4000                |           |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
| No of Families                      | 50  | 80                                  | 40                  | 25        | 25        | 15        | 10        | 5                        |           |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
| c.                                  | Make use the Geometric mean (G.M) and the Harmonic mean (H.M) for the following data to give meaningful results.  | 10                                  | (3 : 1 : 1)         |           |           |           |           |                          |           |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
|                                     | <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>Cost of the Articles (Rs)</td> <td>110</td> <td>115</td> <td>118</td> <td>119</td> <td>120</td> </tr> <tr> <td>No of Articles Purchased</td> <td>4</td> <td>11</td> <td>21</td> <td>6</td> <td>3</td> </tr> </table>  | Cost of the Articles (Rs)           | 110                 | 115       | 118       | 119       | 120       | No of Articles Purchased | 4         | 11        | 21             | 6                   | 3  |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
| Cost of the Articles (Rs)           | 110   | 115                                 | 118                 | 119       | 120       |           |           |                          |           |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
| No of Articles Purchased            | 4   | 11                                  | 21                  | 6         | 3         |           |           |                          |           |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
| 2. a.                               | Write the comparison between correlation and regression concepts.   | 03                                  | (4 : 2 : 2)         |           |           |           |           |                          |           |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
| b.                                  | Analyze the performance of Ranbaxy pharmacy company by considering the two variable viz., cost of advertisement and sales, calculate the correlation between the variables and interpret.   | 07                                  | (4 : 2 : 2)         |           |           |           |           |                          |           |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
|                                     | <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>Cost of Advertisement (Rs in Lakhs)</td> <td>38</td> <td>64</td> <td>90</td> <td>82</td> <td>76</td> <td>28</td> <td>98</td> <td>36</td> <td>78</td> </tr> <tr> <td>Sales (Rs in Lakhs)</td> <td>48</td> <td>54</td> <td>86</td> <td>62</td> <td>68</td> <td>60</td> <td>92</td> <td>52</td> <td>84</td> </tr> </table>   | Cost of Advertisement (Rs in Lakhs) | 38                  | 64        | 90        | 82        | 76        | 28                       | 98        | 36        | 78             | Sales (Rs in Lakhs) | 48 | 54 | 86 | 62 | 68 | 60 | 92 | 52 | 84 |              |    |    |    |    |    |    |    |    |    |  |  |
| Cost of Advertisement (Rs in Lakhs) | 38  | 64                                  | 90                  | 82        | 76        | 28        | 98        | 36                       | 78        |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
| Sales (Rs in Lakhs)                 | 48  | 54                                  | 86                  | 62        | 68        | 60        | 92        | 52                       | 84        |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
| c.                                  | Analyze the significance of scores obtained by 9 salesmen of a company in an intelligence test and their weekly sales (in'000) as well as obtain the regression coefficient to estimate when test score x=65.   | 10                                  | (4 : 2 : 2)         |           |           |           |           |                          |           |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
|                                     | <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>Salesman</td> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>E</td> <td>F</td> <td>G</td> <td>H</td> <td>I</td> </tr> <tr> <td>Test Score</td> <td>50</td> <td>60</td> <td>50</td> <td>60</td> <td>80</td> <td>50</td> <td>80</td> <td>40</td> <td>70</td> </tr> <tr> <td>Weekly Sales</td> <td>30</td> <td>60</td> <td>40</td> <td>50</td> <td>60</td> <td>30</td> <td>70</td> <td>50</td> <td>60</td> </tr> </table> | Salesman                            | A                   | B         | C         | D         | E         | F                        | G         | H         | I              | Test Score          | 50 | 60 | 50 | 60 | 80 | 50 | 80 | 40 | 70 | Weekly Sales | 30 | 60 | 40 | 50 | 60 | 30 | 70 | 50 | 60 |  |  |
| Salesman                            | A   | B                                   | C                   | D         | E         | F         | G         | H                        | I         |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
| Test Score                          | 50  | 60                                  | 50                  | 60        | 80        | 50        | 80        | 40                       | 70        |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
| Weekly Sales                        | 30  | 60                                  | 40                  | 50        | 60        | 30        | 70        | 50                       | 60        |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |
| 3. a.                               | Explain the components of time series.  | 03                                  | (4 : 3 : 3)         |           |           |           |           |                          |           |           |                |                     |    |    |    |    |    |    |    |    |    |              |    |    |    |    |    |    |    |    |    |  |  |

**Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PO – Programme Outcome)**

- b. Evaluate the trend value by finding 3 yearly moving average show the trend on a graph. **07** (4 :3 : 3)

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sales	1230	1060	1240	1300	1450	1160	1430	1320	1260	1120

- c. Evaluate below given the figures of production (in thousand Quintals) of a sugar factory analyze it by the least square method. **10** (4 :3 : 3)

Year	2001	2002	2003	2004	2005	2006	2007
Production	672	824	968	1205	1464	1758	2058

4. a. Conceptually explain null and alternative hypothesis. **03** (4 :4 : 4)

- b. The mean life of sample of 400 bulbs produced by a company is found to be 1600 hours with a standard deviation of 150 hours. Construct and test the hypothesis that the mean life of the bulb produced in general is higher than the mean life of 1570 hours at  $\alpha=0.01$ ( at 1% Level of significance). **07** (4 :4 : 4)

- c. The management of the factory contends that the mean sound intensity in factory is less than 120 decibel. A 23 random measurement have 117 decibel and standard deviation of 8 decibel. Test at 1% level of significance ( $\alpha=0.01$ ), Whether test contention of the management is accepted? Construct and test the hypothesis. **10** (4 :4 : 4)

5. a. What do you mean by measures of dispersion, Where do you apply in business scenario? **03** (3 :1 : 1)

- b. Calculate by applying the mean deviation of the sales of the sarees for the data collected for the following months given in the table below. **07** (3 :1 : 1)

Saree Sales	50-100	100-150	150-200	200-250	250-300	300-350
No of Months	11	23	44	19	8	7

- c. Write the inference by analyzing the prices of X and Y share given below, Which is more stable **10** (3 :1 : 1)

Price of X	55	54	52	53	56	58	52	50	51	49
Price of Y	108	107	105	105	106	107	104	103	104	101

6. a. Explain the concept of scatter plot. How do you analyze it? **03** (4 :2 : 2)

- b. Give your opinion to what extend does the significance of scores given by 3 judges for TEN competitors in the following order. Use the rank correlation of which pair of judges has the nearest approach to common tastes in beauty contest **07** (4 :2 : 2)

Judge 1	1	6	5	10	3	2	4	9	7	8
Judge 2	3	5	8	4	7	10	2	1	6	9
Judge 3	6	4	9	8	1	2	3	10	5	7

**Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PO – Programme Outcome)**

- c. Evaluate the regression between the two variable agriculture and production index and whole sale price index for 5 years, finally obtain an estimate of whole sale price when the agriculture and production index is 125. **10** (4 :2 : 2)

Agriculture and production index	104	110	112	114	120
Whole sale Price index	106	116	140	175	173

7. a. Write your inference about time series mention its applications **03** (4 :3 : 3)
- b. Analyze following table relates to the tourist arrival (in Millions) during 1994 to 2000 in India: Fit a straight line trend by the method of least square and estimate the number of tourists that would arrive in the year 2004. **07** (4 :3 : 3)

Year	1994	1995	1996	1997	1998	1999	2000
Tourist arrival (Y)	18	20	23	25	24	28	30

- c. Analyze the data on prices (Rs in per kg) of a certain commodity during 2000 to 2004 are shown below: Compute the seasonal indexes by the average percentage method. **10** (4 :3 : 3)

Quarter	Years				
	2000	2001	2002	2003	2004
I	45	48	49	52	60
II	54	56	63	65	70
III	72	63	70	75	84
IV	60	56	65	72	66

8. a. Develop the solution for the coaching class for CET entrance examination evaluate students' performance. A randomly 10 students were select and were given a test before coaching and they were also were given a test after coaching. The test scores are as follows: How can you conclude the coaching is effective by consider at 5% level of significance. **10** (5 :5 : 5)

Before Coaching	35	39	47	53	27	19	36	46	8	17
After coaching	41	37	45	56	31	21	47	41	5	12

- b. Develop the hypothesis for the following data related to the number of units of an item produced per shift by two workers A and B for a number of days. Can it be inferred that worker A is more stable compared to worker B? Answer using the F-test at 5 per cent level of significance. **10** (5 :5 : 5)

A:	19	22	24	27	24	18	20	19	25	--	--
B:	26	37	40	35	30	30	40	26	30	35	45

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