



SABARAGAMUWA UNIVERSITY OF SRI LANKA
FACULTY OF MANAGEMENT STUDIES
 BSc DEGREE PROGRAMME IN BANKING & INSURANCE
 YEAR I SEMESTER II EXAMINATION – MARCH/APRIL 2017

BUSINESS STATISTICS – BI 1223

Time allowed: **THREE (3) hours**

BI/BM/EBM/FM/MM 1223 MM 1243

Answer any **FIVE (05)** questions. Graph papers will be provided and calculation are allowed.

- 1 a) Describe the difference between census method and sample method giving suitable examples. (06 Marks)
- b) What are the strength and weakness of a pie chart? (04 Marks)
- c) Briefly explain discrete variable and continuous variable. (04 Marks)
- d) Briefly describe stratified sampling technique and cluster sampling technique with examples. (06 Marks)
- 2 a) Calculate mode, median and 6th decile of the following data.

No. of days absent (Below)	05	10	15	20	25	30	35	40	45
No. of Students	29	224	465	582	634	644	650	653	655

(12 Marks)

- b) The following data related to the profits /losses earned by Engineering Companies in Sri Lanka during 2015-2016.

Profit/ Losses (Rs. Million)	No. of Companies
-10 to 0	190
0 to 10	240
10 to 20	490
20 to 30	870
30 to 40	310
40 to 50	270

Calculate the mean and standard deviation of profits /losses.

(08 Marks)

- 3 a) From the data given below, calculate the coefficient of correlation between the density of population and death rate.

City	Area in sq. kms	Population in '000	Death rate
A	150	300	20
B	180	900	80
C	100	400	60
D	60	420	70
E	120	720	100
F	80	240	40

What conclusion do you draw from the result?

(10 Marks)

- b) Ten competitors in a dancing test were ranked by three judges **P**, **Q** and **R** in the following order:

Competitor	A	B	C	D	E	F	G	H	I	J
Judge										
P	1	6	5	10	3	2	4	9	7	8
Q	3	5	8	4	7	10	2	1	6	9
R	6	4	9	8	1	2	3	10	5	7

Using rank correlation method, discuss which pair of judges have the nearest approach to common tastes in dancing.

(10 Marks)

- 4 a) A panel of judges **A** and **B** graded seven entrepreneurs and independently awarded the following marks:

Entrepreneur	1	2	3	4	5	6	7
Judge							
Marks by A	40	34	28	30	44	38	31
Marks by B	32	39	26	30	38	34	28

An eighth entrepreneur was awarded 36 marks by judge **A** while judge **B** was not present.

If judge **B** were also present, how many marks would you expect him to award to the eighth entrepreneur assuming that same degree of relationship exists in their judgment?

(10 Marks)

- b) Out of 600 car-owners investigated, 400 owned Toyota cars and 300 owned Lancer cars; 50 owned both Toyota and Lancer cars. Is this data correct? Justify your answer.

(03 Marks)

- c) Records indicate that of the 300 persons attended an office automation conference,

120 visited Exhibit A

115 visited Exhibit B

87 visited Exhibit C

30 visited Exhibits A and B

27 visited Exhibits B and C

22 visited Exhibits A and C

12 visited Exhibits A, B and C

- How many persons who attended the conference visited none of the exhibits?
- How many persons who attended the conference visited only one of the exhibits?
- How many persons who attended the conference visited at least one of the exhibits?
- How many persons who attended the conference visited exactly two of the exhibits?
- How many persons who attended the the conference visited at least two of the exhibits?

(07 Marks)

- 5 During the period 2013-2016, the amounts of the production of tea (in millions of kgs) of a company are shown below.

Quarter \ Year	2013	2014	2015	2016
I	300	340	410	570
II	400	440	540	760
III	350	390	460	740
IV	330	370	470	690

- a) Draw a scatter diagram for this data.

(03 Marks)

- b) Find three quarterly moving average trend for the above data and plot the trend

values on the scatter diagram.

(06 Marks)

- c) Calculate the amounts of production of tea corrected for seasonal movements using the additive model and plot the seasonally adjusted data on the same diagram.

(11 Marks)

- 6 a) The probability that an undergraduate will get the prize for best performance in Management is 0.46 and the probability that he will get the prize for best performance in Statistics is 0.56. It is also estimated that the probability of receiving both prizes is 0.16. Find the probability that the undergraduate will receive at least one of these prizes.

(03 Marks)

- b) In a manufacturing company, out of the total output 20%, 30% and 50% of the items are produced respectively by machines A, B and C. It is found that machines A, B, C produce respectively, 8%, 6% and 5% defective items in their productions. If an item selected at random from a day's production is found to be defective, find the probability that it was manufactured by machine A.

(06 Marks)

- c) Saliya Automobile Sales Company has accumulated the following information relative to its 300 sales of automobiles.

Method of payment Type of automobile purchased	Cash (C)	Installment (I)
New (N)	45	165
Used (U)	75	15

- i Construct the joint probability table for this situation.

- ii Find

$P(N)$

$P(U)$

$P(C)$

$P(I)$

$P(N \cap C)$

$P(C/N)$

$P(N/C)$

- iii Determine whether N and C are statistically independent events.

(11 Marks)

7 a) If 30 percent of the workers at a large manufacturing plant drive their personal car to work each day, what is the probability that in a randomly selected sample of eight workers -

- i Exactly two drive their personal car to work each day?
- ii More than two drive their personal car to work each day?
- iii Fewer than two drive their personal car to work each day?

(09 Marks)

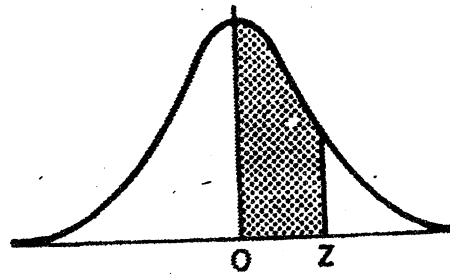
b) The monthly account balances for the charge-card department of a financial institution have a normal distribution, with a mean balance of Rs. 100.00 and a standard deviation of Rs. 25.00.

- i What proportion of the accounts have a balance in excess of Rs. 125.00?
- ii What proportion of the accounts have a balance between Rs. 50.00 and Rs. 150.00?
- iii What proportion of the accounts have a balance between Rs. 40.00 and Rs. 80.00?
- iv The 20 percent of the accounts with the largest balances have a balance that exceeds what rupee amount?

(11 Marks)

Area Under Normal Curve

$$z = \frac{x - \bar{x}}{\sigma}$$



z	0	1	2	3	4	5	6	7	8	9
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0754
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2258	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2518	0.2549
0.7	0.2580	0.2612	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2996	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990

	0	1	2	3	4	5	6	7	8	9	Mean Differences									
10	0090	0041	0086	0128	0170	0212	0253	0294	0334	0374	4	8	12	17	21	25	29	33	37	41
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755	4	8	11	15	19	23	26	30	34	38
12	0792	0838	0884	0929	0974	1019	1064	1108	1152	1196	3	7	10	14	17	21	24	28	31	35
13	1139	1171	1206	1239	1271	1303	1335	1367	1399	1430	3	6	10	13	16	19	23	26	29	32
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732	3	6	9	12	15	18	21	24	27	30
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014	3	6	8	11	14	17	20	22	25	28
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279	2	5	8	11	13	16	18	21	24	27
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529	2	5	7	10	12	14	17	20	22	25
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765	2	5	7	9	12	14	16	19	21	24
19	2768	2810	2833	2856	2878	2900	2923	2945	2967	2989	2	4	7	9	11	13	16	18	20	23
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	2	4	6	8	10	12	14	16	18	20
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	2	4	6	8	10	12	14	16	18	20
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	2	4	6	8	10	12	14	15	17	19
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784	2	4	6	7	9	11	13	15	17	19
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	2	4	5	7	9	11	12	14	16	18
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	2	3	5	7	9	10	12	14	15	17
26	4190	4166	4183	4200	4216	4232	4249	4265	4281	4298	2	3	5	7	8	10	11	13	15	17
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	2	3	5	6	8	9	11	13	14	16
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	2	3	5	6	8	9	11	12	14	16
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	1	3	4	6	7	9	10	12	13	15
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900	1	3	4	6	7	9	10	11	13	15
31	4914	4928	4942	4955	4969	4983	4997	5011	5023	5038	1	3	4	6	7	8	10	11	12	14
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172	1	3	4	5	7	8	9	11	12	14
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	1	3	4	5	6	8	9	10	12	14
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	1	3	4	5	6	8	9	10	11	13
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551	1	2	4	5	6	7	9	10	11	13
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670	1	2	4	5	6	7	8	10	11	13
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	1	2	3	5	6	7	8	9	10	12
38	5798	5809	5821	5832	5843	5854	5866	5877	5888	5899	1	2	3	5	6	7	8	9	10	12
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	1	2	3	4	5	6	7	8	9	10
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	1	2	3	4	5	6	8	9	10	12
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	1	2	3	4	5	6	7	8	9	11
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	1	2	3	4	5	6	7	8	9	11
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	1	2	3	4	5	6	7	8	9	11
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522	1	2	3	4	5	6	7	8	9	11
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618	1	2	3	4	5	6	7	8	9	11
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6711	1	2	3	4	5	6	7	8	9	11
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	1	2	3	4	5	6	7	8	9	11
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	1	2	3	4	5	6	7	8	9	11
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	1	2	3	4	5	6	7	8	9	11
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1	2	3	3	4	5	6	7	8	9
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1	2	3	3	4	5	6	7	8	9
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1	2	3	3	4	5	6	7	8	9
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1	2	3	3	4	5	6	7	8	9
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	1	2	3	3	4	5	6	7	8	9

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