EASTERN UNIVERSITY, SRI LANKA

Faculty of Commerce and Management

r Second Semester Examination in Bachelor of Business Administration / Bachelor of Commerce - 2016/2017 (Jan 2019)

(Proper)

COM 1033 Business Statistics

THREE (03) HOURS

o be completed by the candidate:

xamination Index Number: .....

Instructions to Candidates	For Examiner's Use only	
	Question No	Marks
his paper has **05** questions in **16** pages.		
nswer **all the questions** in **three** hours.	01	
alculators are permitted.		
Vrite your answers clearly in the spaces provided on the xamination paper.	02	
his paper should be handed over personally to the upervisor/ invigilator	03	
	04	
	05	
	Total	

derline the appropriate answer for the following questions from the given choices.

A numerical value that is used as a summary measure for a sample, such as sample mean, is known as a _____.

A. population parameter B. sample parameter C. sample statistic D. population mean

Which of the following does not represent a method to obtain primary source data?

A. Conducting an experiment
B. Looking in professional magazines
C. Sending a survey to customers
D. Making observations

A student evaluation of teaching effectiveness for a particular course asks students to respond to their level of agreement with several statements according to the scale 1 = Strongly Agree, 2 = Agree, 3 = Neutral, 4 = Disagree, and 5 = Strongly Disagree. The responses indicate what level of measurement?

A. Nominal B. Interval C. Ratio D. Ordinal

Number of employees according to human resource manager is an example of _____.

A. flowchart variable B. discrete variable C. continuous variable D. measuring variable

The sample mean of the following sample:

X	Frequency of X
2	1
3	2
4	3

A. 3 B. 2 C. 20/9 = 2.22 D. 20/6 = 3.33

Which of the following describes the middle part of a group of numbers?

A. Measure of variability
B. Measure of central tendency
C. Measure of association
D. Measure of shape

Which of the following is not a measure of central location?

A. Mean B. Median C. Variance D. Mode

Which of the following measures of central tendency tends to be most influenced by an extreme score?

A. Median B. Mode C. Mean D. None of these

According to the empirical rule, approximately what percent of the data should lie within $\mu \pm 2\sigma$?

A. 75% B. 68% C. 99.7% D. 95%

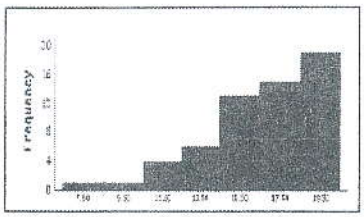
Which of the following divides a group of data into four subgroups?

A. Percentiles B. Deciles C. Median D. Quartiles

11. Which of the following techniques are applicable to quantitative data?

A. The ordered array
B. Frequency distributions
C. Stem-and-leaf display
D. All of these

12. Look at the following histogram. What shape would you say the data take?



A. Bimodal
B. Left-skewed
C. Right-skewed
D. Sym

Use the information below to answer the questions 13-15.

A student is taking a multiple-choice exam in which each question has four choices. Assuming knowledge of the correct answers to any of the questions, she has decided on a strategy in whic four balls (marked *A, B, C,* and *D*) into a box. She randomly selects one ball for each question ball in the box. The marking on the ball will determine her answer to the question. There are five questions on the exam.

13. What is the probability that she will get five answers correct?

A. 0.0010
B. 0.0146
C. 0.0879
D. 0.26

14. What is the probability that she will get at least four answers correct?

A. 0.9844
B. 0.0156
C. 0.7617
D. 0.23

15. What is the probability that she will get no answers correct?

A. 0.0010
B. 0.0146
C. 0.2373
D. 0.76

Use the information below to answer the questions 16-19.

The quality control manager of Deleven Cookies is inspecting a batch of chocolate-chip cookies th baked. If the production process is in control, the mean number of chip parts per cookie is 6.0.

16. What is the probability that in any particular cookie being inspected, less than five chip parts

A. 0.1606
B. 0.4457
C. 0.2826
D. 0.285

17. What is the probability that in any particular cookie being inspected, exactly five chip parts w

A. 0.0778
B. 0.1339
C. 0.1606
D. 0.089

18. What is the probability that in any particular cookie being inspected, five or more chip parts

A. 0.1606
B. 0.7149
C. 0.7174
D. 0.285

19. What is the mean and standard deviation of the probability distribution?

A. 6, 2.45
B. 30, 2.45
C. 2.45, 6
D. 2.45,

the information below to answer the questions 20-22.

et of final examination marks in a statistic course is normally distributed, with a mean of 73 and a standard iation of 8.

What is the probability of getting a marks below 91 on this exam?

A. 2.25 B. 0.0122 C. 0.4878 D. 0.9878

What is the probability that a student scored between 65 and 89?

A. 0.9772 B. 0.8185 C. 0.1587 D. 0.1815

That probability is 5% that a student taking the test scores higher than what marks?

A. 59 B. 95 C. 05 D. 86

Non Probability form of sampling is _____.

A. Random Sampling B. Non Random Sampling
C. Probability Sampling D. Quota Sampling

In sampling with replacement a sampling unit can be selected _____.

A. only once B. more than one time
C. less than one time D. None of above

The list of all units in a population is called _____.

A. Random sampling B. Sampling Frame C. Bias D. Parameter

Probability distribution of $\bar{X}$ is called its _____.

A. Expected value B. Standard error
C. Sampling distribution D. Standard deviation

A magazine conducts a survey and asks its readers to cut the questionnaire from the magazine, fill it and send it via mail. It is a type of _____.

A. Purposive Sampling B. Snowball Sampling
C. Sequential Sampling D. Convenience Sampling

Which of the following is not an example of non-sampling risk?

A. Failing to evaluate results properly
B. Use of an audit procedure inappropriate to achieve a given audit objective
C. Obtaining an unrepresentative sample
D. Failure to recognize an error

How is stratified sampling carried out?

A. Divide the population into homogeneous groups and select equally but randomly.
B. Assigning numbers to the population & selecting the numbers
C. Sample is made up of elements which are say 10^{th} from the previous selection
D. Population divides itself into groups and we select equally but randomly from each

30. A magazine conducts a survey and asks its readers to cut the questionnaire from the magazine send it via mail. It is a type of _____ sampling.

A. Purposive B. Snowball C. Sequential D. Co

31. A coefficient of correlation is computed to be -0.95 means that

A. The relationship between two variables is weak
B. The relationship between two variables is strong and positive
C. The relationship between two variables is strong but negative
D. Correlation coefficient cannot have this value

32. Let the coefficient of determination computed to be 0.39 in a problem involving one indep and one dependent variable. This result means that

A. The relationship between two variables is negative
B. The correlation coefficient is also 0.39
C. 39% of the total variation is explained by the independent variable
D. 39% of the total variation is explained by the dependent variable

33. A residual is defined as

A. $Y - \hat{Y}$ B. Error sum of square
C. Regression sum of squares D. Type I Error

34. If X and Y are independent to each other, the Coefficient of Correlation is _____.

A. -1 B. 0 C. +1 D. Non

35. Which one is equal to explained variation divided by total variation?

A. Sum of squares due to regression B. Coefficient of Determination
C. Standard Error of Estimate D. Coefficient of Correlation

36. Additive model for time series Y = _____.

A. T × S × C × I B. T - S - C - I C. T + S + C + I D. Non

37. In moving average method we cannot find trend values of some _____.

A. end periods B. middle periods
C. starting and end periods D. starting periods

38. A fire in a factory delaying production for some weeks is an example of _____

A. secular trend B. cyclical variation C. irregular effect D. seas

39. Graph of time series is called _____.

A. Line graph B. Trend C. Pareto Chart D. Histo

40. Time series data have a total number of _____ components.

A. three B. five C. six D. four

rite true or false in the given space for the following statements:

. Primary data are those that have been already collected for the purpose other than the problem at hand:_____

. In statistics, the entire set of people or objects of interest is called the population:_____

. The method used to graph a group frequency table is called a pie chart:_____

. The percent of total variation of the dependent variable Y explained by the set of independent variables X is measured by coefficient of correlation:_____

. Coefficient of Correlation values lies between 0 and 1:_____

. Two regression lines are parallel to each other if their slope is same:_____

. In a Least Square Regression line the quantity $\sum(Y - \hat{Y})$ is always zero:_____

. A rise in prices before Christmas is an example of cyclical variation:_____

. Seasonal variations are short term variations:_____

. The best fitted trend line is one for which sum of squares of residuals or errors is negative:

_____

or each of the following variables, determine whether the variable is categorical or numerical. If the ariable is numerical, determine whether the variable is discrete or continuous:

Variable	Categorical / Numerical	Discrete / Continuous
1. Amount of time spent to shopping in the bookstore	.....	.....
2. Number of text books purchased	.....	.....
3. Academic specialization	.....	.....

Fill in the blanks with appropriate answer chosen from the given list of choices:

54. Business statistics can be described as the collection, presenting, summarization, _____ reporting of numerical findings relevant to a business decision or situation.

55. _____ statistics involves methods of organizing, picturing and summarizing info data.

56. _____ are used when you want to visually examine the relationship be quantitative variables.

57. A measure of the variability in the mean from sample to sample is given by the _____ the mean.

58. The sampling procedure in which an interviewer is asked to interview 25 teachers, 50 public 25 farmers is called _____ sampling.

59. If the regression equation is equal to Y=23.6–54.2X, then 23.6 is the _____ whi _____ of the regression line.

60. Prosperity, recession, and depression in a business are examples of _____

List of Choices

- accidental
- analysis
- bar graphs
- cyclical
- descriptive
- inferential
- intercept
- population
- quota
- sample
- scatterplots
- seasonal
- slope
- standard deviation
- standard error
- stratified

(60 x 1

The following sample data set lists the number of minutes 50 internet subscribers spent on internet during their most recent session.

50	19	72	46	36	40	23	56	31	21
39	41	37	17	39	30	17	51	7	56
20	62	11	54	69	18	54	7	42	33
30	29	67	22	88	80	34	39	44	77
41	56	59	31	28	78	29	73	53	44

Construct the following that have ***seven*** classes.

a) Frequency distribution
b) Relative frequency distribution
c) Cumulative frequency distribution

Mintues ($)	Tally	Frequency	Relative Frequency	Cumulative Frequency
Total	-			-

(03 Marks)

The following is a stem-and-leaf display representing the amount of gasoline purchased in gallons, for a sample of 25 cars that use a particular service station in a city.

9	147
10	02238
11	125556677
12	223489
13	02

a) Place the data into an ordered array.

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(01 Mark)

b) Which of two displays seems to provide more information? Discuss.

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c) What amount of gasoline is most likely to be purchased?

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iii) The following table represents the North American power generation in 2018:

Source	%
Coal	47
Hydropower	13
Natural gas	19
Wind	01
Nuclear	19
Other	01

Construct a Pareto chart and interpret it.

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Interpretation

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(3 Marks)

(Total: 10 Marks)

The operations manager of a plant that manufactures tires wants to compare the actual inner diameters of two grades of tires, each of which is expected to be 575 millimetres. A sample of five tires of each grade was selected, and the results representing the inner diameters of the tires, ranked from smallest to largest, are as follows:

Grade X					Grade Y				
568	570	575	578	584	573	574	578	577	575

a) For each of the two grades of tires, compute the mean, median, and standard deviation.

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b) Which grade of tire is providing better quality? Explain.

The following data represents the overall miles per gallon (MPG) of 2016 SUVs priced under $30,000.

23, 20, 21, 22, 18, 18, 17, 17, 19, 19, 19, 17, 21, 18, 18, 18, 17, 17, 16, 20, 16, 22

a) Compute the first quartile (Q1), the second quartile (Q2), the third quartile (Q3) and the interquartile range.

(02 Marks)

b) Construct a boxplot and describe the shape of it.

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Q4

In a country, the average income level and the household consumption during the previous 10 ye the table below.

Income ($ '000)	24	13	31	28	35	11	23	10	9
Consumption ($ '000)	16	9	15	17	24	11	15	7	4

a) Find the least squares regression equation from the above-mentioned data.

Income ($ '000)	Consumption ($ '000)	XY	X^2
24	16		
13	9		
31	15		
28	17		
35	24		
11	11		
23	15		
10	7		
9	4		
16	12		

Regression Equation: .....

(05 Marks)

b) Interpret the intercept and slope of the regression equation.

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c) If the expected income level for the next two years are (A) $ 25,000 (B) $ 37,000, predict household consumption for the next two years.

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d) Discuss the reliability of the predictions you made in part (c)

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following table shows the quarterly sales (in $ millions) of Deleven Restaurant for three years.

Year	Q1	Q2	Q3	Q4
2016	6.7	4.6	10.0	12.7
2017	6.5	4.6	9.8	13.6
2018	6.9	5.0	10.4	14.1

a) Calculate the 4-quarter centered moving averages for this data.

Year	Quarter	Production (Y)	4-Quarter MA	4 Quarter CMA	Specific Seasonal
2016	1				
	2				
	3				
	4				
2017	1				
	2				
	3				
	4				
2018	1				
	2				
	3				
	4				

(2 Marks)

b) Find the seasonal indices for each of the four quarters using the ratio to moving average method.

Year	Q1	Q2	Q3	Q4
2016				
2017				
2018				
Total				
Mean				
Adjusted				

Correction factor: .....

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Seasonal Indices:

Q1:		Q2:		Q3:		Q4:	

c) Find the deseasonalized sales figures for the four quarters of 2018.

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d) Forecast the sales figures for the four quarters of 2019 using trend forecasts of $11 million, $11.66 million and $12 million.

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Standard Normal Probabilities

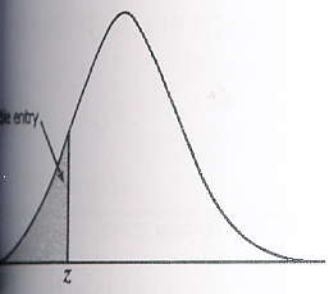

Table entry for z is the area under the standard normal curve to the left of z.

.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002
.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003
.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
.0010	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0007	.0007
.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0010	.0010
.0019	.0018	.0018	.0017	.0016	.0016	.0015	.0015	.0014	.0014
.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0021	.0020	.0019
.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026
.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036
.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048
.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367
.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455
.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559
.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681
.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823
.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985
.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170
.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148
.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641

Standard Normal Probabilities

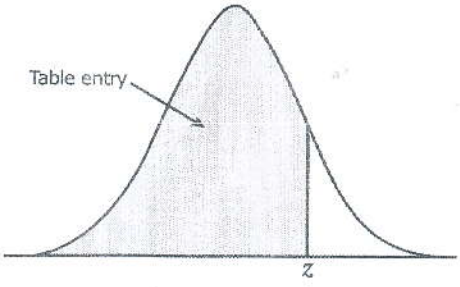

Table entry for z is the area under the standard normal cur
to the left of z.

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998