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No of Questions - 07 CHARTERED ACCOUNTANTS OF SRI LANKA

## SCHOOL OF ACCOUNTING AND BUSINESS

 BSc. (APPLIED ACCOUNTING) GENERAL / SPECIAL DEGREE PROGRAMME
## YEAR I SEMESTER II - INTAKE VII (GROUP A) END SEMESTER EXAMINATION - JULY 2017

## QMT 10230 Business Statistics

| Date | $:$ | 25th July 2017 |
| :--- | :--- | :--- |
| Time | $:$ | 1.00 p.m. -4.00 p.m. |
| Duration | $:$ | Three $(03)$ hours |

## Instructions to Candidates:

- Write the Index Number in the space provided at the top of this sheet. Do not write your name anywhere in this question paper.
- Answer only FIVE (05) questions including Question No. 01
- Question No. 01 - Answer ALL questions in the paper itself and attach it to the answer script.
- All questions carry equal marks.
- The total marks for the paper is 100 .
- Use of scientific calculator is allowed.
- Standard Normal Z-table and Key Statistical Formulas are provided.
- Graph Sheets are provided on request.
- Answers should be written neatly and legibly.


## Question No. 01

Multiple Choice Questions; Choose the one alternative that best completes the statement or answers the question.

1. Which of the following is a non-numeric ordinal level data?
a. Family Income
b. Price of a commodity
c. Occupation category
d. Rating in beauty contest
e. Height of a Cricket player in inches
$\qquad$
2. In a survey, customers are asked to provide their gender; male or female. This data can be transferred as;
a. Continuous
b. Discrete
c. Nominal
d. Ordinal
e. None of the above
(........)
3. If you want to graphically assess whether there is a positive association between advertising costs and sales revenue during last ten years. The best way to evaluate this is to use a.
a. Contingency table
b. Scatterplot
c. Confidence interval
d. Side-by-side boxplot
e. Histogram
4. For a set of data, the difference between the highest and the lowest number is known as
a. Mean
b. Variance
c. Interquartile range
d. Range
e. Mean deviation
$\qquad$
5. Which of the following is not a time series data?
a. Monthly production of a company.
b. Daily sales at a medicine store.
c. Expenditure at home.
d. Daily deposits in a bank.
e. Annual rainfall.
(........)
6. Which of the following is NOT true for moving average method?
a. The method is simple if compared with Least Squares Method.
b. The effect of cyclical fluctuations is completely removed by the method.
c. The extreme values are always lost.
d. The method is suitable for forecasting.
e. It is not good for non-linear trend.
(........)
7. Which of the following is the median of stock prices of Alpha PLC during last ten trading days in the stock market, $87,92,96,91,85,102,112,101,105$, and 110.
a. 96
b. 101
c. 98.1
d. 97
e. None of the above
(........)
8. The $\qquad$ is often the preferred measure of central tendency if the data are severely skewed.
a. Mean
b. Mode
c. Mean Deviation
d. Median
e. Range
$\qquad$
9. If a test was generally very easy, except for a few students who had very low scores, then the distribution of scores would be $\qquad$
a. Positively skewed
b. Skewed to right
c. Negatively skewed
d. Not skewed at all
e. Symmetrical
$\qquad$
10. If arithmetic mean is multiplied by the coefficient of variation then resulting value is classified as,
a. Coefficient of determination
b. Standard deviation
c. Coefficient of deviation
d. Variance
e. Combined mean
(........)
11. A bank is interested in studying the number of people who use the ATM located outside its office late at night. The probability distribution that has the greatest chance of applying to this situation is the,
a. Normal distribution
b. Binomial distribution
c. Poisson distribution
d. Uniform distribution
e. Bernoulli distribution
12. Convenience sampling is an example of;
a. Random sampling
b. Stratified sampling
c. Cluster sampling
d. Probabilistic sampling
e. Non-probabilistic sampling
$(\ldots \ldots .$.
$(01$ mark * $12=12$ marks $)$
13. Determine whether the statement is true or false. If it is false, rewrite the correct statement.
a. Coefficient of determination $\left(\mathbf{R}^{2}\right)$ is showing the proportion of unexplained variation.
(True/False)
$\qquad$
$\qquad$
$\qquad$
b. Trend, Semi-average, moving average, and seasonal index are four distinct components of a time series.
(True/False)
$\qquad$
$\qquad$
$\qquad$
c. Probability distribution having shape of a bell and in which values of mean, median and mode lie in center of probability distribution is classified as Uniform Distribution
(True/False)
$\qquad$
$\qquad$
$\qquad$
d. Stratified random sampling method is formed by selecting one unit at random and then selecting additional units at evenly spaced intervals until the sample has been formed.
(True/False)
$\qquad$
$\qquad$
$\qquad$

## Question No. 02

i. Briefly describe different types of data collection methods with their merits and demerits. (06 marks)
ii. Share prices (in LKR) of two listed finance companies in a stock market for fifteen (15) weeks are given below.

| Week | Share Prices |  |
| :--- | :---: | :---: |
|  | Alpha Company PLC <br> (in LKR) | Beta Company PLC <br> (in LKR) |
|  | 115 | 90 |
| 2 | 110 | 110 |
| 3 | 115 | 100 |
| 4 | 120 | 105 |
| 5 | 125 | 110 |
| 6 | 115 | 115 |
| 7 | 125 | 120 |
| 8 | 110 | 145 |
| 9 | 135 | 130 |
| 10 | 130 | 125 |
| 11 | 145 | 135 |
| 12 | 160 | 140 |
| 13 | 155 | 145 |
| 14 | 160 | 140 |
| 15 | 175 | 150 |
|  |  |  |

Using the above data compute the following measures and compare your results in between these two competitive firms.
a. Mean,
b. Median,
c. Mode,
d. Range,
e. Standard Deviation

## Question No. 03

i. What do you mean by "Conditional Probability". Explain through an example
ii. Investor is expecting three possible outcome for his investment based on the economic condition in the country. Following table depict the joint probabilities of expected returns and possible economic conditions.

| Economic condition | High <br> return | Moderate <br> return | Low return | Total |
| :--- | :---: | :---: | :---: | :---: |
| Pessimistic | .04 | .13 | .04 | .21 |
| Normal | .10 | .11 | .06 | .27 |
| Good | .13 | .17 | .22 | .52 |
| Total | .27 | .41 | .32 | 100 |

a. What are the marginal probabilities of having
i. Pessimistic economy
ii. Normal economy and,
iii. Good Economy?
b. What are the marginal probabilities of getting
i. High
ii. Moderate and,
iii. Low Return?
c. Draw decision tree based on the information available in the table
d. Calculate the probabilities of getting high return when given that there is Pessimistic economic condition.
e. Getting low return when given that there is good economic condition.

## Question No. 04

i. There is a well experienced investment agent who believes there is $40 \%$ chance that he can make a successful deal with client he meets. There is only two possible outcomes of the meetings; successfully convert or fail to convert. In a Given day he met 5 clients.
a. What is the suitable probability distribution can be used in this case?
b. What is the probability of making less than 3 successful deals today?
(07 marks)
ii. Mean weight of students of a classroom is 65 kgs with a variance of 4 kgs . Historical experience indicates that weights can be approximated by the normal probability distribution. Education research indicates that students with over 80 kgs are limited. What percentage of the students will be over 80 kgs ?
(05 marks)
iii. Briefly explain the followings;
a. Poison Probability Distribution
b. Permutation and Combinations
c. Normal Distribution
d. Simple Random Sampling and Stratified Random Sampling
(02 marks *4 = 08 marks)
(Total 20 marks)

## Question No. 05

i. "Correlation and regression analysis can be used for various business and management decisions." Comment.
ii. Market price per share and Earnings per share of ten (10) listed manufacturing companies are given bellow.

| Company | Stock Prices per share <br> (LKR) | Earnings per <br> share(LKR) |
| :---: | :---: | :---: |
| 1 | 90 | 18.00 |
| 2 | 70 | 12.00 |
| 3 | 45 | 9.60 |
| 4 | 55 | 10.00 |
| 5 | 22 | 9.50 |
| 6 | 120 | 22.50 |
| 7 | 112 | 18.00 |
| 8 | 88 | 12.50 |
| 9 | 90 | 22.50 |
| 10 |  | 145.00 |

Using the above data, you are required to,
a. Draw a scatter diagram to show the nature of the relationship between Market price per share and Earnings per share.
b. Compute the relationship between Market price per share and Earnings per share and interpret your result.
c. Fit the regression model to show the impact of Earnings per share on Market price per share.
d. Estimate the Market price per share when Earnings per share will be Rs. 25 .
e. Determine the coefficient of determination and interpret your result.

## Question No. 06

i. A researcher wanted to measure the relationship between stock price per share of 36 listed manufacturing companies with selected determinants. He collected data from stock market reports and annual reports of selected companies. Further he entered data to SPSS package and recieved the following SPSS correlation output.

Correlations

|  |  | SP Stock Prices per share (LKR) | EPS Earnings per share (LKR) | DPS Dividend per share (LKR) | Market_Share Market Share in the Industry (\%) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| SP Stock Prices per share (LKR) | Pearson Correlation | 1 | . $870{ }^{\text {"1 }}$ | . $510^{\text {"1 }}$ | . $889{ }^{11}$ |
|  | Sig. (2-tailed) |  | . 000 | . 001 | . 000 |
|  | N | 36 | 36 | 36 | 36 |
| EPS Earnings per share (LKR) | Pearson Correlation | . $870^{\text {N" }}$ | 1 | . $680{ }^{\text {"18 }}$ | .797** |
|  | Sig. (2-tailed) | . 000 |  | . 000 | . 000 |
|  | N | 36 | 36 | 36 | 36 |
| DPS Dividend per share (LKR) | Pearson Correlation | . $510^{\text {N" }}$ | . $680^{\text {"17}}$ | 1 | . $526{ }^{\text {"1 }}$ |
|  | Sig. (2-tailed) | . 001 | . 000 |  | . 001 |
|  | N | 36 | 36 | 36 | 36 |
| Market_Share Market Share in the Industry (\%) | Pearson Correlation | . $889{ }^{\text {R" }}$ | . $797{ }^{\text {"* }}$ | . $526{ }^{\text {"18 }}$ | 1 |
|  | Sig. (2-tailed) | . 000 | . 000 | . 001 |  |
|  | N | 36 | 36 | 36 | 36 |

**. Correlation is significant at the 0.01 level (2-tailed).
a. Construct three hypotheses to test the relationship between stock price per share and the selected other variables.
b. Test each hypothesis using the above information in the SPSS correlation matrix and discuss the nature and degree of relationship between stock price per share and the selected other variables.
(06 marks)
ii. Two Judges A and B ranked 10 contestants in a beauty contest as given below.

| Contestant | H | I | J | K | L | M | N | O | P | Q |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Rank by A | 3 | 5 | 2 | 6 | 1 | 8 | 4 | 7 | 9 | 10 |
| Rank by B | 1 | 4 | 3 | 8 | 2 | 9 | 5 | 6 | 10 | 7 |

Determine whether there is a relationship between the rank of Judge-A and Judge-B on above beauty contest.
iii. A researcher interested to know the impact of selected determinants of market value per share. He analyzed data through SPSS software and his linear regression outputs are given below.

Variables Entered/Removed ${ }^{\text {a }}$

| Model | Variables Entered | Variables Removed | Method |
| :--- | :--- | :---: | :--- |
| 1 | Market_Share Market Share in the Industry (\%), DPS <br> Dividend per share(LKR), EPS Earnings per share <br> $(\text { LKR })^{\mathrm{b}}$ | . | Enter |

a. Dependent Variable: SP Stock Prices per share (LKR)
b. All requested variables entered.

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| :--- | :--- | ---: | ---: | ---: |
| 1 | $.934^{\mathrm{a}}$ | .871 | .859 | 12.89477 |

a. Predictors: (Constant), Market_Share Market Share in the Industry (\%), DPS Dividend per share(LKR), EPS Earnings per share(LKR)

ANOVA ${ }^{\text {a }}$

| Model |  | Sum of Squares | df | Mean Square | F | Sig. |
| :--- | :--- | ---: | ---: | ---: | ---: | :--- |
| 1 | Regression | 36085.756 | 3 | 12028.585 | 72.342 | $.000^{\mathrm{b}}$ |
|  | Residual | 5320.799 | 32 | 166.275 |  |  |
|  | Total | 41406.556 | 35 |  |  |  |

a. Dependent Variable: SP Stock Prices per share (LKR)
b. Predictors: (Constant), Market_Share Market Share in the Industry (\%), DPS Dividend per share(LKR), EPS Earnings per share(LKR)

Coefficients ${ }^{\text {a }}$

| Model |  | Unstandardized Coefficients |  | StandardizedCoefficientsBeta | t | Sig. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | B | Std. Error |  |  |  |
| 1 | (Constant) | -12.097 | 6.755 |  | -1.791 | . 083 |
|  | EPS Earnings per share(LKR) | 3.129 | . 704 | . 542 | 4.448 | . 000 |
|  | DPS Dividend per share(LKR) | -1.318 | . 834 | -. 137 | -1.581 | . 124 |
|  | Market_Share Market Share in the Industry (\%) | 6.772 | 1.345 | . 529 | 5.034 | . 000 |

a. Dependent Variable: SP Stock Prices per share (LKR)

Using the above SPSS outputs, you are required to,
a. Interpret the value for coefficient of determination (adj. ${ }^{2}$ ),
b. Write down the estimated least square regression line.
c. Explain the overall significance level of the regression model.
d. Construct statistical hypotheses to test the impact of selected determinants on above dependent variable and determine the level of significance of each individual independent variable.
(Total 20 marks)

## Question No. 07

i. Briefly explain different types of analytical models for time series data.
(04 marks)
ii. Gamma limited is producing and selling Ice cream. Quarterly Profit (LKR in Mn) of the company during last four years is given below;

| Year | $\mathbf{1}^{\text {st }}$ Quarter | $\mathbf{2}^{\text {nd }}$ Quarter | $\mathbf{3}^{\text {rd }}$ Quarter | $\mathbf{4}^{\text {th }}$ Quarter |
| :--- | :---: | :---: | :---: | :---: |
| $\mathbf{2 0 1 3}$ | 73 | 70 | 82 | 78 |
| $\mathbf{2 0 1 4}$ | 73 | 68 | 85 | 82 |
| $\mathbf{2 0 1 5}$ | 77 | 73 | 85 | 79 |
| $\mathbf{2 0 1 6}$ | 78 | 71 | 95 | 88 |

Using the above time series data, you are required to,
a. Draw a time-series plot
b. Estimate the Ordinary Least Square (OLS) trend line.
c. Use the trend equation to forecast the profit of Gamma Limited for the first quarter of year 2017.
d. Compute four quarter moving averages and central moving averages of profit and mark them on the same graph.
e. Determine seasonal index for each quarter using ratio to moving average method.
(16 marks)
(Total 20 marks)

