ASSOCIATION OF ACCOUNTING TECHNICIANS OF SRI LANKA

EXAMINER'S REPORT

LEVEL I EXAMINATION - JANUARY 2021

(102) BUSINESS MATHEMATICS & STATISTICS

This Question paper consist of 3 **Sections A,B** and **C**.

A total of 40 marks is allocated to **Section A** comprising 15 compulsory Objective Test Questions (O.T.Qs.), with 10 multiple choice questions numbers **1.1** to **1.10** for 30 marks at 3 marks per question, and 5 short questions, numbers **1.11** to **1.15** for a total of **10** marks.

A few shortcomings generally observed in the answers provided by candidates to part of question 01 are set out below:

SECTION A

Question No. 01

This is an Objective Testing Question and total of 40 marks were awarded. This question covered the total syllabus of the subject. The question consisted of 10 multiple choice questions numbered **1.1** to **1.10**. The expectation was to select the most correct answer and write down the number relevant to the correct answer in the given booklet. But it was observed that some of the students have written down the answer in the booklet instead of writing down the number relevant to the correct answer. Further, some students have marked the correct answers in the exam paper and attached it to the answer script.

Below mentioned are the general observations made against the sub-sections of Question No. 1:

1.1 This question related to percentages. From this question, it was expected to get the correct answer by taking 45% from the 18,000 and then deducting it from the total amount. But most of the students have selected the wrong answer (answer no. 1) only by calculating 45% from the 18,000. Though this was a simple question, most of the students did not score well due to misunderstanding the question.

1.2 This question was about price relativity. The expectation was to find out the price relativity in the year 2020 by considering 2018 as the base year. Most of the students have failed due to inability to select the correct equation.

1.3 This question related to correlation co-efficient. The expectation was to select the correct equation and substitute the given figures correctly to it.

$$x = \frac{[n\sum xy - \sum x \sum y]}{\sqrt{\{[n\sum x^2 - (\sum x)^2] \times [n\sum y^2 - (\sum y)^2]\}}}$$

Most of the students failed in substituting and solving the figures. It was observed that most of the students have not practiced mathematical calculations and due to that reason they have failed to obtain a correct answer.

1.4 This question tested the measures of central tendency. It was expected to find out the mode from the given data array. Some students have selected 7 as the mode due to not computing the frequency.

1.5 This question related to simple interest.

$$I = \frac{Ptr}{100}$$

It was expected to calculate the total interest for 2 years by substituting figures for the above equation. Even though this was a simple question, some students have failed due to the incorrect substitutions and incorrect computations.

1.6 This question related to compound interest. The expectation was to compute the present value of an annuity at the end of 5th year. But, most of the students have misunderstood the question and used incorrect equations.

1.7 This question related to probability. The expectation was to find out the $P(A \cup B)$ by using the equation $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ correctly. Even though, a considerable number of students answered successfully, a fewer number of students failed in selecting the correct equation, in substituting as well as in solving the equation.

1.8 This question related to compound interest and the expectation was to find out the maturity value at the end of 2 years by using quarterly compounded interest rate. However, students failed in answering this question due to incorrect simplification of the equation.

1.9 This question related to time series. The expectation was to calculate the quarterly forecasted sales value for 4 quarters assuming a multiplicative model. It was observed that students did not have proper understanding on time series.

1.10 The expectation of this question was to find out the installment of a loan by using below equation.

$$A = \frac{SR^n(R-1)}{\{R^n - 1\}}$$

It was observed that some students failed to substitute the correct figures to the equation.

Questions **1.11** to **1.15** are short questions

1.11 This question was to test the knowledge on definitions of some terms such as, seasonal variation, moving average, base year and price index under Financial Mathematics. It was observed that some candidates did not have proper understanding on the question.

1.12 This question tested the knowledge on coefficient of skewness. It was expected to substitute figures to the following equation,

$$S_{k1} = \frac{3(\text{Mean - Median})}{\text{Standard Deviation}}$$

It was observed that most of the students have misunderstood the relationship between variance and standard deviation.

Most of the students failed to identify that Standard Deviation =$\sqrt{\text{Variance}}$, and as a result substituted variance directly to the above equation was a common mistake made by majority of the students.

1.13 This question related to arithmetic progression. The expectation was to find out the 10^{th} term of the given arithmetic progression by using, $T_n = a + (n - 1)\,d$.

However, it was observed that some students have selected the wrong equation $S = \frac{n}{2}\{2a + (n-1)d\}$ and some have substituted incorrect first term and common difference to the equation.

1.14 It was required to state whether the given statement on marginal revenue and the marginal cost is "True" or "False" . It should be understood by the students that MC=MR, when profit is maximized.

1.15 It was required to state whether the given statement on least square regression is "True" or "False". .

As $y = 3.59x + 6.72$, when x increased by 1 unit, y will increase by 3.59 units. Since the radiant is 3.59, the statement could be considered as "True".

SECTION B

The following matters were observed in the evaluation of answers of this section which consisted of 4 compulsory questions.

Question No. 02

(a) This question expected to find the value of x by solving of a simple equation $[3(4x + 2) = 30]$. Generally, most of the students have successfully obtained full marks for this question.

(b) This question tested the knowledge on simultaneous equations. It was expected to remove one variable and convert two equations into one simple equation and then solve the simple equation to get the value of one variable. Then substitute it to one equation and find out the

value of the other variable. But, it was observed that some students had no proper understanding on solving simultaneous equations.

(c) It was expected to calculate the selling price of the product in the year 2023 by easily using the formula,

$$S = a\ \frac{\{1 - r^n\}}{\{1 - r\}}$$

But, most of the students have calculated the price annually. When doing this, some students have made some calculation errors and spent more time on this question.

Question No. 03

(a) The expectation of the question was to identify the total cost function and total revenue function, when fixed cost and monthly variable cost and demand function were given. However, most of the students have not correctly identified,

that the Total cost = Variable Cost + Fixed Cost

Also they were unable to identify that Total Revenue = Demand Function (D) X No. Of units (q)

Further, it is expected to find out the number of units at which the profit is maximized. Accordingly, students must have knowledge of differentiating the "profit function", and identify the profit maximization point where MR=MC.

(b) In this question most of the students have failed to identify that, break-even point can be obtained when by TR=TC. Therefore, students must have studied as to how to solve the two quadratic functions.

Question No. 04

(a) Least square regression was tested from this question and was expected to determine the linear relationship by using y=a + bx. Accordingly, students were required to substitute the figures to below equation.

$$\text{b} = \frac{[n \sum xy - \sum x \sum y]}{[n \sum x^2 - (\sum x)^2]} \text{ and } \text{a} = \bar{y} - b\bar{x}$$

But, it was observed that students have made mistakes when substituting figures to the above equation and some have tried to show the relationship using graphical method. It was suggested that students need to answer past papers and practice them.

(b) It was expected to substitute the given figure to the equation of least square of regression line found in **part (a)**. However, some students have made mistakes in substituting correct figures to the equation.

Question No. 05

Measures of central tendency was tested from this question. Most of the students have not identified the correct equations. It was suggested that students need to properly understand the applications of following equations separately.

$$\text{Median} = MD = L_1 + \frac{n/2 - F_M}{f_M}$$

$$\text{Mean} = \bar{x} = \frac{\sum_{z=1}^{n} fixi}{\sum_{z=1}^{n} fi}$$

$$\text{Standard of Deviation } (S) = \frac{\sum_i fx^2 - x^2}{\sum f} \quad \text{or} \quad S = \frac{\sum f_i f (x_c - x)^2}{\sum fi}$$

SECTION C

Question No. 06

This question comprised of 3 **Sections A, B** and **C**.

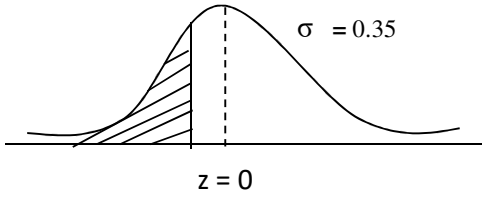
(A) The expectation of this question was to calculate the Net Present Value (NPV) of two projects and select the best viable project by comparing calculated NPVs. Accordingly, students were expected to consider 10% as the discount factor for both the projects. It was observed that most of the students have not deducted initial investment from the present value and hence arrived at wrong NPVs. As a result, most of them had made the wrong project selection decision.

(B) It was required to find the Expected Value using E(*x*) = (Probability x Pay off). However, it was observed that students were lack with the knowledge of using " 3 ".

(C) Probability was tested from this question. It was observed that some students have failed to present data correctly in the Venn diagram. Also students must have studied as to how to calculate conditional probability using Venn diagram.

(D) This question related to normal distribution.

Students were expected to calculate the value of z by using the formula, $Z = \frac{x-\mu}{\sigma}$ and to obtain the probability P = P (x<1) = P (z<1)



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General matters for attention to improve performance level of candidates:

(1) Study the full contents of the syllabus completely paying more attention to any newly introduced subject matter.

(2) Workings should be clearly shown along with answers where applicable.

(3) It is required to correctly apply the basic mathematical rules and simplifications in copying formulae and in substitutions. Use the most convenient formula when several formulae could be applied to answer certain questions. Further, when formulae are copied, it should be done without changing "+" and "-" signs.

(4) Some candidates may obtain final answer using calculators. However, it is appropriate to present the final answer showing the steps correctly, writing the formula and substituting the values in it. In doing so, there is a possibility of scoring the marks for steps even when the final answer may not be correct.

(5) It should be noted to correctly apply the mathematical principles in solving equations and calculus of functions.

(6) Handwriting should be legible and the numbers of questions should be correctly and clearly written.

(7) Follow the instructions given in the question paper'

(8) Perusal of past question papers and suggested answers would help sharpening knowledge and experience.

(9) Proper management of time is important.

(10) Re-check the question numbers before handing over the answer scripts.

(11) There were instances when answers to new questions had been started in a small space at the end of the previous answer without starting the next answer on a new page. Each answer should be started on a new page at all times for easy reference'

(12) Appear for the examination with a firm determination of passing the examination with due preparation.

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