EXAMINER'S REPORT

LEVEL I EXAMINATION - JANUARY 2026

(102) BUSINESS MATHEMATICS & STATISTICS

SECTION A

Question No. 01

This section consists of 10 multiple choice questions from question numbers **1.1** to **1.10**. In general, each candidate answered all 10 objective questions. A very small number of candidates had written the correct answer on the answer sheet instead of the number corresponding to the correct answer.

The following are some of the common errors / weaknesses identified with the answers given by the candidates for each sub-section:

1.1 The question requires finding the value of x in 6x+ 8= 3x + 29. This is a very simple problem related to solving an equation. A large number of candidates answered this question very successfully. Some candidates had incorrectly simplified it to 6x + 3x = 29+ 8 instead of 6x - 3x = 29 - 8.

1.2 This is an annual effective interest rate problem in financial mathematics. Most candidates provided the correct answer by substituting the values. However, some candidates omitted the statement 'interest is compounded quarterly.' As a result, they used an interest rate of 0.16 instead of 0.16/4 when solving the problem.

1.3 This question is related to probability. One person (Ramesh) has a probability of passing a driving test of 3/5, while another person (Kasun) has a probability of failing the test of 2/3. Candidates were required to find the probability that both of them pass the test.

A large number of candidates answered this question correctly. However, most of those who answered incorrectly mistakenly took Kasun's probability of failing (2/3) as the probability of passing. Some candidates had taken $\frac{3}{5}+\frac{2}{3}$ instead of $\frac{3}{5}\times\frac{1}{3}$.

1.4 This question was related to the price index. Most candidates answered it correctly. However, although many candidates obtained the correct answer by using the formula $\frac{p_1}{p_0}\times 100$, a small number of candidates gave incorrect answers due to confusing P_1 andP_0, by taking the base year (2020) price as P_1 and the 2025 price as P_0."

1.5 This problem is related to simple linear regression. Most candidates provided the correct answer by identifying the independent variable as X. The independent variable is one of the two main variables in a regression model. This was a relatively easy theoretical question. However, some candidates answered incorrectly by considering it as the dependent variable.

1.6 This question required finding the mode of a given frequency distribution. A considerable number of candidates stated the correct answer. Many candidates chose the class interval containing the median instead of the class interval containing the mode. Some candidates did not consider the lower-class boundary as L1 in the formula.

1.7 This is a problem related to indices in financial mathematics. When finding the values of $\sum p_1q_0$ and $\sum p_0q_0$, incorrect multiplication, use of incorrect formulas, and division errors were observed, which led some candidates to fail.

1.8 A very simple question related to simple interest. A majority of candidates had successfully answered the question. The answer was incorrect because the interest rate of 6% was substituted into formula S = x(1 + nr) as 0.6 instead of 0.06. Also, some candidates had substituted S = 130,000 instead of x = 130,000 in the above formula. Some candidates had interchanged the simple interest and compound interest formulas and had given incorrect answers.

1.9 This is a time series related problem. Given the seasonal index for 4 quarters, the estimated trend value for the second quarter is 9.420 multiplied by the seasonal index to get the answer. A majority of candidates successfully provided the correct answer.

1.10 When given the data it was expected to choose the correlation coefficient formula and substitute the given data into the correct formula and get the correct answer by trivializing. A majority of the candidates had given the correct answers. Some candidates marked the incorrect answer due to the disregard of the minus (-) sign while trivializing.

1.11 The candidates were expected to select the appropriate explanations for the terms (A)simple interest rate (B) Equally likely events (c) net present value (D) complementary event, on the left side and write them correctly in front of the English letter on the right side. A large number of candidates had selected all 04 statements correctly and successfully answered. Some candidates had switched their answers in B and D. Some candidates had wasted time by not following the instructions correctly and taking the time to rewrite the entire statements on the answer sheet.

1.12 This problem is related to the arithmetic progression in basic mathematics. Given the first term and the common ratio of arithmetic progression, the 12th term, T_{12}, was expected to be found. Although it was a very easy question, only a significant number of candidates provided the correct answer. Some candidates found the sum of the arithmetic progression, S_{12}, instead of T_{12}.

1.13 It was expected to find the value of x in the given probability distribution. It was expected to be solved by understanding that the sum of the probabilities of the probability distribution is 1. A significant number of candidates had not provided the correct answer. Some candidates had added the values of the given distribution and obtained 0.85 but had not subtracted it from 1 to obtain the value of x.

1.14 The statement "The direction in which the time series is going in the long run is trend" was expected to be stated as true or false. A majority of candidates understood the statement to be true and provided the correct answer.

1.15 A moderate number of candidates had stated false for the question that asked whether the statement "Quota sampling is a random sampling technique" was true or false.

Section B

Question No. 02

(a) The problem is related to ratios in financial mathematics. A majority of candidates answered correctly. Some candidates had constructed the relationship correctly but had made a mistake in simplifying it. A limited number of candidates had constructed a pair of simultaneous equations and attempted to solve it.

(b) This is a problem given to test the knowledge of constructing and solving simultaneous equations. Many candidates were unable to obtain the correct answer due to errors in constructing and simplifying the two equations correctly. Some candidates had constructed one equation correctly but had incorrectly formed the second equation.

Some candidates had only written the answer without any working, stating that the price of a men's suit was Rs.2,000/- and the price of a women's suit was Rs.1,000/-.

(c) It was expected that the graph of the given inequalities, $2x - y \leq 6$, $x + 3y \leq 12$ and $x, y \geq 0$, would be drawn up on graph paper and the area where all the inequalities are satisfied would be identified.

Candidates were required to draw simple line graphs at $x = 0$ and $y = 0$ by finding the values of y and x for the above two equations. Only a moderate number of candidates were able to find the values correctly.

Although it was instructed to draw the graph-on-graph paper, some candidates drew the graph on the regular answer sheet. Some candidates had not marked the axes on the graph. They had also interchanged the x and y axes. Some candidates were unable to draw the complete graph and had drawn only part of it because they had not drawn the axes correctly.

Although values such as $y = -6$ were to be drawn, some candidates had not marked the negative values on the y- axis and had drawn only positive values. Candidates who had drawn the graph correctly had not correctly identified the region satisfying all the conditions. Some candidates had even shaded regions corresponding to negative values of the graph, because they did not understand that $x, y \geq 0$.

Question No. 03

This question was consisted of two parts (a) and (b) and the total marks awarded were 10.

(a) **(i)** In this problem, it was expected to find the profit function of **product C** given $TC = 1500 + 80q$and $TR = 1{,}400q - 6q^2$. A majority of candidates had correctly stated $TP = TR - TC$. Some candidates had changed $TP = TR - TC$ to $TC - TR$. Some candidates had written $TP = TR - TC$, but did not use the correct brackets when substituting the two functions and obtained a wrong answer.

It was taken as $TP = 1{,}400q - 6q^2 - 1500 + 80q$ instead of $TP = 1{,}400q - 6q^2 - (1500 + 80q)$.

(ii) This section also tested the candidates' knowledge of differentiation and their understanding that $\frac{d(P)}{dq} = 0$when profit is maximized.

A small number of candidates had correctly differentiated the profit function with respect to q, obtaining $\frac{d(P)}{dq} = -12q + 1320$, and correctly found the value of $q$such that $\frac{d(P)}{dq} = 0$.

Some candidates had mistakenly taken $-6q^2 + 1320q$instead of $1320 - 12q$ when differentiating the expression $-6q^2 + 1{,}320q - 1500$.

Some candidates had incorrectly attempted profit maximization by taking $TP = 0$, therefore $-6q^2 + 1{,}320q - 1500 = 0$, instead of $\frac{d(P)}{dq} = 0$.

A very limited number of candidates had mistakenly found the breakeven point by assuming $TR = TC$when maximizing profit.

(b) This section was expected to find a break-even quantity given total cost $TC = 2x^2 - 6x + 3{,}600$and total revenue $TR = 66x + 2x^2$. A moderate number of candidates answered this section correctly.

Although many candidates knew that $TR = TC$at the break-even point, a very limited number of candidates had taken $TR - TC$as the break-even quantity.

When writing and simplifying $TR = TC$, i.e. $66x + 2x^2 = 2x^2 - 6x + 3{,}600$, it was observed that some candidates incorrectly simplified it to $66x - 6x = 3{,}600$instead of $66x + 6x = 3{,}600$.

Question No. 04

(a) This question expected that the candidates would identify the least squares regression line given by $y = a + bx$ to represent the relationship between the advertising cost incurred for product "A" and the sales quantity for the last 7 months.

Candidates were expected to find the values of a and b using $\mathrm{b} = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - (\sum x)^2}$ and $a = \overline{\mathrm{Y}} - \mathrm{b} \times \overline{\mathrm{X}}$.

Most of the candidates had correctly found the values of $a$and $b$using the above formula.

Here, the values of $\sum x$, $\sum y$, $\sum xy$, and $\sum x^2$, as well as $\bar{X}$and $\bar{Y}$, were to be found using the given values of $x$and y. Although most of the candidates found the values of $a$and $b$correctly by substituting them into the formula, some candidates did not write the regression line in the form $y = a + bx$.

A very limited number of candidates had taken the values of $\bar{X}$and $\bar{Y}$incorrectly. Some candidates obtained wrong answers by substituting $\sum x^2$instead of $(\sum x)^2$ when finding the value of b.

When finding the value for a, some candidates had incorrectly calculated the value of $a$by substituting $\sum x$as 70 and $\sum y$as 98 instead of $\bar{X} = 10$and $\bar{Y} = 14$.

Here, even though $n = 7$, some candidates had taken $n = 6$and $n = 8$.

(b) In this section, it was expected to calculate the expected sales quantity when the advertising cost is Rs. 12,000 using the regression line $y = a + bx$ obtained in part (a).

The values of $x$and $y$are given in thousands (000'), so only 12 should be substituted into the equation $y = a + bx$. The value of y thus obtained should be multiplied by 1000. A minority of candidates had correctly substituted $x = 12$. The majority of candidates had taken $x = 12{,}000$.

Question No. 05

(a) It is expected to determine the mean, median and standard deviation from the given group frequency distribution.

The median was expected to be calculated using the data given in this part. A minority of candidates used the formula $Md = L_1 + \left[\frac{\frac{n}{2} - FC}{FM}\right] \text{x } C$ and correctly obtained the answer.

Although the majority of candidates had correctly substituted the values of F_c, f_m, and c into the above formula, they had incorrectly obtained the value of L_1.

Although the class interval containing the median was correctly identified as 20–29, its lower limit was incorrectly taken as 20 instead of 19.5.

Some candidates had incorrectly answered by taking the value of $n$as 6 instead of 40.

(b) A majority of candidates used the formula $\bar{x} = \frac{\Sigma fx}{\Sigma f}$ and provided the correct answer and obtained the total marks.

Candidates who had correctly taken the mid-points (x) of the class intervals had correctly obtained the value $\sum fx$.

The value of $\sum fx$ was incorrect because some candidates made a mistake when multiplying the value of f by the value of x.

(c) Only a minority of candidates had correctly found the standard deviation.

Some candidates had obtained the variance instead of standard deviation due to not taking the mark in √ when writing the $\sqrt{\frac{\Sigma fx^2}{\Sigma f} - (\frac{\Sigma fx}{\Sigma f})^2}$ and $\sqrt{\frac{\Sigma f(x-\bar{x})^2}{\Sigma f}}$ formulas.

Some candidates had given incorrect answers by using $(\sum fx)^2$ instead of $\sum fx^2$.

Section C

Question No. 06

This section consists of four parts **(A), (B), (C),** and **(D),** with a total allocation of 20 marks.

(A)

(a) When a bank had given a loan to **Lakshitha** to be settled in 5 equal annual installments at an annual interest rate of 14%, the annual installment of the loan was expected to be calculated using the formula $A = \frac{SR^n(R-1)}{(R^n-1)}$.

Due to incorrect substitution into the above formula and not simplifying correctly until the end, the majority of candidates were unable to obtain full marks.

(b) This section tested knowledge of compound interest. A considerable number of candidates answered successfully. Some candidates failed to obtain full marks as they did not deduct the Rs.50,000/- deposit from the total amount they calculated at the end of the 3rd year.

(B) A majority of candidates successfully provided the correct answer to this section, which tested their knowledge of finding the net present value of an investment project. Some candidates had lost marks because they did not subtract the initial investment from the net cash inflows.

Some candidates had given a negative NPV value of 155,171 − 155,171 = −5,171 instead of 155,171 − 150,000 = 5,171. A minority of candidates added cash inflows for all 5 years and multiplied it by $\frac{1}{(1+0.1)^5}$ without calculating the discount factor for each year, resulting in incorrect answers.

(c)

(a) This section was expected to test knowledge related to probability. Only an average number of candidates gave correct answers. Some candidates' answers were incorrect due to not correctly presenting the given data in a tree diagram.

Some candidates obtained the wrong answer by taking $\frac{2}{10} + \frac{4}{12}$ instead of $\frac{2}{10} \times \frac{4}{12}$ when calculating the probability of both marbles being red.

(b) This section required candidates to calculate the probability that at least one marble is red. Although some candidates had correctly taken it as $\left(\frac{2}{10} \times \frac{4}{12}\right) + \left(\frac{2}{10} \times \frac{8}{12}\right) + \left(\frac{8}{10} \times \frac{4}{12}\right)$, some candidates had simplified it incorrectly.

Candidates should be more interested in solving probability-related problems and the use of tree diagrams.

(D) This question tested the knowledge related to normal distribution. A majority of the candidates had correctly taken $Z = \frac{7500 - 6000}{500} = 3$ using $Z = \frac{x - \mu}{\sigma}$.

Only a moderate number of candidates had taken (0.5 - 0.4987) and obtained the answer as 0.0013. Only a minority of candidates had multiplied that value by 10,000 and obtained the answer as 13.

Some candidates had obtained the wrong answer by changing the values to X = 600, μ = 7,500. Some other candidates had taken the value of X as 10,000.

Candidates should also be more interested in finding correct probability values using the table of a standard normal distribution.

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

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

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

(8) Proper management of time is important.

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

(10) 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'

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

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