Examiner's Report

AA1 EXAMINATION - JANUARY 2017

(AA12) QUANTITATIVE METHODS FOR BUSINESS

PART A

Question No. 01

General Matters:

- Candidates had not provided answers after clearly understanding for instructions relating to answering of questions given in the question paper. This was proved by writing the full answer instead of the number allotted to the answer for question Nos. **1.1** to **1.10** and also writing roman figures, not given in the question paper relating to answers.

- Certain candidates had answered only a few parts instead of the given 15 questions, thereby closing the opportunity to obtain more marks.

- Some candidates had struck off the written answers three times, but had failed to provide fresh answers thereby losing marks.

- Generally, due to lack of theoretical knowledge on ratios, simplification of equations, probability, simple and compound interest, correlation coefficient (r), and Time Series, candidates had failed to solve the problems correctly and submitted incorrect answers.

- The attention of candidates had not been focused to the fact that allocating 40% of the marks of the question paper to this question, a high percentage of marks to pass in this subject could have been obtained through this question and ability to answer correctly using short computations in comparatively shorter period of time. It is desirable that about 01 hour out of three hours for the full paper to be devoted by candidates to answer this section.

This OTQ section comprised of 10 multiple choice questions and 5 short questions with a 40 marks allocation. A few common weaknesses observed in answers to sub questions of this question are set out below:

1.1 This is a simple question testing knowledge on ratios. It is possible to arrive at the answer using knowledge on ratios after analyzing the question. Due to lack of knowledge on the concepts of ratios and inability to work out simple basic simplifications, some candidates had not been successful.

1.2 This is a problem in business mathematics regarding calculations of Present Value. Testing of knowledge relevant to calculations of Present Value of the annuity based on the given data has been done. Due to lack of understanding of the theory only a few candidates had selected the correct answer.

1.3 This is a question associated with multiplicative rule of probability. It could be answered easily through the use of a Tree diagram. About half of the number of candidates had answered successfully. Some candidates found this problem difficult due to lack of knowledge on probability concept and drawing tree diagrams.

1.4 This is a question regarding probability and expectation in statistics. Overall about half the number of candidates had answered satisfactorily. Although candidates should understand and use Expectation $E(x) = \sum Px\, x$, a considerable number of candidates had failed to answer using it.

1.5 This is a problem relating to compound interest and simple interest. About half of the number of candidates had answered successfully. Many candidates had not understood the methodology in the calculation of compound interest and simple interest. The methodology of a few candidates in simplifications was not at a satisfactory level.

1.6 This is a problem regarding correlation Coefficient (r). A large number of candidates had not been able to differentiate the four (4) scatter diagrams. Half of the number of candidates had chosen the correct statement. Candidates should understand the correlation coefficient between two variables and how to represent it in a diagram.

1.7 This is a problem relating to arithmetic progression. This is the easiest out of the 10 multiple choice questions. A large number of candidates had chosen the correct option. A considerable number of candidates had written the answer as 6 instead of option 3.

1.8 This is a problem relating to break-even sales quantity. About half of the number of candidates had written the correct answer. However, some candidates were not aware that breakeven sales for the month could be arrived at by calculating the contribution per unit through the difference between the sales price and variable cost of a unit and dividing the fixed cost for a month by that amount, according to commercial arithmetic. Some candidates were also not aware that the break-even sales quantity is arrived at the total sales revenue equals total cost.

1.9 This is a question relating to Time Series. It was noted that a lower percentage of candidates had chosen the correct option for this question. It was observed that the understanding of candidates on time series was at a low level.

1.10 This question also related to time series. A low percentage of candidates had written the correct answer. If the theory relating to time series had been understood, this question would have easily been answered.

Although short answers were expected to question numbers **1.11** to **1.15** and a large number of candidates had not answered in a satisfactory manner.

1.11 Calculation of selling price per unit based on information provided was expected. Many candidates had written satisfactory answers. Some candidates have calculated profit per unit. But they had given up answering half way being unable to find out the selling price due to the inability to calculate per unit cost adjusting with the profit margin

1.12 This question related to price relative. Overall large number of candidates had answered successfully. It is a matter for regret that some candidates had failed to make use of the formula to calculate the price relative, even though it is clearly given in the formulae sheets annexed to the question paper.

1.13 Limitations of Index Numbers were tested in this question, and it was evident from the answers that a majority of the candidates had not correctly understood the question.

1.14 and **1.15** relate to problems of conditional probability. A few number of candidates had answered correctly. A substantial number of candidates had no idea of general rules in interpreting probability, $P(A/B) = \frac{P(A \cap B)}{P(B)}$

A considerable number of candidates had no idea of the basic concept of probability that it should take values between 0 and 1. They had obtained probabilities with the values of figures more than 1. The possibility of using probability theory, Tree diagrams, Venn diagrams to solve this type of problem was available.

PART B

This section consisted of 4 compulsory questions.

Question No. 02

This question consisted of 2 parts. Total 10 marks had been allocated.

(a) It was required to identify the total cost function and the total revenue function when the demand function, fixed cost and the variable cost function were given. Overall, about half number of candidates had answered successfully. The knowledge level on differentiation apparently to be at a low level. A large number had given up working at the solution half way.

(i) The reasons for incorrect answers were not copying the equation given in the question correctly and not arriving at the correct total cost function (by adding up variable cost and fixed cost) by the candidates. There were also candidates who failed to identify the total revenue function by multiplying the given demand function for a week by the weekly output. There were incorrect answers due to errors in simplifications in deducting the cost function from the revenue function and misunderstanding of plus (+) and minus (-).

(ii) Some candidates failed to earn marks due to errors in the profit function resulting in the use of the incorrect answer for differentiation. Though some candidates obtained the answer by differentiating the profit function, they were unable to calculate the number of units maximizing to profit. As an alternative method it was possible to calculate the number of units to maximize the profit through calculations of the marginal cost and marginal revenue (MC = MR).

(b) This part required calculation of the value of installment per annum on a loan. A considerable number of candidates had gone wrong being unable to apply the correct formula, while other had made mistakes in simplifying. Some had made certain mistakes in applying the formula even though the correct formula had been selected. It is important to select and understand the correct formula out of those given in formulae sheets with the question paper. Some had made errors in calculations with the discounting factor.

Question No. 03

Part (a) consisted of a question on price index and part (b) on pie charts. About half number of candidates had written satisfactory answers. Only a few had completed answering the part relating to pie chart.

(a) The following errors were observed in the presentation of the statistical table to calculate the Base-weighted Price Index (Laspeyre's Price Index) for year 2015 with 2014 as the base year:

- Not correctly copying to the answer booklet the figures given in the question.
- Not writing down correctly the answers arrived at by multiplying figures.
- Incorrectly writing down the totals of figures added vertically.
- Some candidates had to forego marks by incorrectly copying down the formula.
- Even though the table of figures had correctly been formulated, some candidates made mistakes by attempting to solve the problem by interchanging denominator and numerator in the process of substitution of figures in the table into the formula.
- Certain candidates had to forego marks by applying (Paasche's) Current-weighted Price index method instead of Laspeyre's Price Index method specifically mentioned in the question.
- Some candidates failed to score full marks because of showing only the table with figures, or writing only the answers, or having stopped answering the question half way through.

(b) Even though the question specifically stated that drawing a pie chart was not necessary some candidates had wasted time by drawing that. A considerable number of candidates had failed to identify the units generated each month, probably due to not understanding the question by reading it carefully. Many candidates failed to compute the monthly power generation as a percentage of total power generation during 06 months. Some failed to compute the power generation for each month in degrees by multiplying the relevant monthly percentage by 360^0 in order to draw the pie chart.

Question No. 04

(a) Calculation of the mean and the standard deviation from the data given was expected.

(i) Instead of the simple method of dividing the $\sum fx$ *from* the value of $\sum f$ to calculate the mean, some candidates had divided from $\sum x$, and some others from n (the number of terms) and had made mistakes in the answers.

Some candidates had made mistakes in the answers due to non-calculation of the mid-point and by mixing up the values of (x) and (f).

(ii) Even candidates who formulated the statistical table with fx, x^2, fx^2 in an easy manner to calculate the standard deviation, had made errors in the totals and in writing down the answers arrived from multiplication of figures.

Wrong answers were also observed due to non-use of the correct formula for standard deviation, not writing the formula completely and incorrect substitution of figures.

It had not been possible to obtain correct answers by making calculations disregarding the square foot by symbol ($\sqrt{\ }$) and inability to calculate $\sqrt{\ }$ correctly.

(b) Part (i) of this question required drawing of the total cost function and total revenue function on a graph paper, while part (ii) required identification of the break-even number of units through that graph. Some candidates had foregone marks by calculating the number of break-even units without a graph disregarding instructions in the question paper. There were shortcomings in drawing the graphs such as changing of axis, non-marking of points and non-use of correct scales in numbering of points in the graph.

Further, there were candidates who were unable to calculate the correct total cost and correct total revenue for the given range of units. Some candidates had made mistakes in attempting to draw graphs without using graph paper.

Certain other candidates, though the correct total cost function and the total revenue function had been drawn, were unable to identify and show the break-even number of units using the graph.

The overall performance of candidates on this question appeared to be at a general level.

Question No. 05

This was a question on Net Present Value (NPV). In an overall consideration performance of candidates appeared to be satisfactory. Some candidates had calculated IRR instead of NPV. Reasons for not receiving marks proved to be due to lack of knowledge on NPV, and not solving the problem up to completion.

Certain candidates had gone wrong in the answers, because the scrap value of each machine at the end of the 4 years had not been added into the cash flow.

Certain other candidates got their marks reduced for failure to get the discounting factor values correctly, simplification errors and disregarding the plus (+) and minus (-) figures.

As regards part (b) some candidates failed to obtain marks for not making a recommendation regarding the machine to be acquired. Candidates should understand that a recommendation has to be made according to the plus or minus value received for the NPV.

PART C

Question No. 06

This question comprised of 3 parts relating to statistics. Less than half number of candidates had answered satisfactorily. In part (B), the weakness of candidates to select the correct formula and substitute correctly was apparent. In part (C) only a small number of candidates had drawn graphs in a satisfactory manner.

(A) Part (a)

A considerable number of candidates had not correctly marked the mean and the standard deviation, when a normal distribution curve is drawn to demonstrate the area under mean $\pm$ standard deviation ($\mu \pm \sigma$) to indicate the area covered under the specified area.

Part (b)

Identification of the minimum marks for a distinction based on data supplied was necessary. Only a few candidates had obtained the relevant value by making the correct Z score area in the normal distribution curve. Although the formula $Z = \frac{x - \mu}{\sigma}$ to calculate

the minimum marks required for a distinction (x) was given in Formulae Sheet, attached to the question paper, many candidates had not made use of it.

(B) This was an easy question. Although the values of $\sum x$, $\sum y$, $\sum xy$, $\sum x^2$ had been worked out and given in the question and the formulae for Regression coefficient (a and b) were given in the Formula Sheets, selecting of formula and correct substitution by candidates was at a low level. Although some candidates had computed values for "a" and "b", substitution of those values to the formula $y = a + bx$ and identification of the regression line had not been done.

(C) A few common mistakes generally observed were as follows:

(1) Due to lack of knowledge about scatter diagrams the following weaknesses in formulating those could be seen:

- Drawing the graph changing the axes.
- Joining the points with one another in the graph.
- Not marking the correct points.
- Less marking of several points.
- Not naming the axes of the graph.
- Not using correct scale in naming axes.
- Errors have occurred in drawing graphs because of not using graph paper.

(2) A considerable number of candidates had to forego marks due to their failure to identify the positive correlation between x and y and for writing irrelevant answers.

(3) Due to use of incorrect formula for calculation of correlation coefficient and making mistakes in the values of $\sum x$, $\sum y$, $\sum xy$, $\sum x^2$, $\sum y^2$ by going to calculate those disregarding the values already given for them, candidates had wasted time for such exercise unnecessarily. Although calculators had been used for working out calculations errors have been occurred in square root calculations. Even those candidates who approached solutions correctly, errors have occurred by disregarding the square root symbol.

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General matters for which attention should be drawn to improve performance level of candidates:

1. Studying well the full contents of the new syllabus completely paying more attention to newly introduced subject matters.
2. Workings should be clearly shown along with answers wherever applicable.
3. Naming of graphs properly and explaining clearly as well as copying and application of formulae should be done with utmost care.
4. Handwriting should be legible and the numbers of questions should be correctly written.
5. Following correctly the instructions given in the question paper.
6. Perusal of past question papers and suggested answers would help sharpening of knowledge and experience.
7. Proper management of time is important.
8. Re-checking of question numbers etc. before handing over answer scripts is a must.
9. Appearing for the examination with a firm determination of passing the examination with due preparation.

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