

THE INSTITUTE OF CHARTERED ACCOUNTANTS OF PAKISTAN

EXAMINERS' COMMENTS

SUBJECT	SESSION
Quantitative Methods	Foundation Examination - Spring 2014

General:

The overall performance was below average as the passing percentage was only around 28%. Generally the performance suffered on account of lack of conceptual understanding. However, failure to understand the question was also noted which in certain cases seemed to be the result of poor understanding of the English language. Another common area of weakness was the interpretation of result as a significant number of candidates chose to omit it altogether.

Question-wise comments:

Question 1(a)

This question was based on the concepts of ratio and proportion and simultaneous equations. According to the given situation, the ratio of boys and girls in a school was given as 7:6 respectively. Further, it was given that if the number of boys and girls increase by 10% and 15% respectively, the total number of boys in the school would exceed the number of girls by 120. The requirement was to find the total number of students in the school.

The solution required creating simultaneous equations based on the existing and the projected number of students after one year. It was a bit shocking to see that only about 20% of the candidates were able to form the equations correctly. However, almost all of these students secured full marks. About 15% of the students erred in forming the first relationship i.e. assuming the number of boys as 'x' and number of girls as 'y' they created the first equation as $7x = 6y$ instead of $6x = 7y$. Rest of the students had no clue. A significant number of students did not attempt the question.

Question 1(b)

This was a simple two marks question on factorization which was to be simplified by completing the square. More than half of the students were able to score full marks on this question.

Question 1(c)

In this question, the value of a car after 'x' years was expressed in terms of a linear equation in the slope intercept form. Majority of the students were able to meet the first requirement i.e. determined the slope and the y-intercept correctly but very few could interpret the results properly which reflected lack of conceptual understanding.

Question 2(a)

This was a comprehensive scenario based question on time value of money which tested almost all the key concepts thereof. The overall performance was highly unsatisfactory. Most of the students were able to gain few marks by making some of the calculations correctly but very few of them had a clear understanding of the approach towards obtaining the final result.

Question 2(b)

According to the scenario in the question, an investor wanted to invest Rs. 1.5 million. Two choices were available i.e. (i) 10% simple interest and (ii) 8% annual interest compounded semi-annually. The investor preferred option (ii) because it was less risky but he also wanted to earn a minimum of Rs. 140,000. The candidates were required to determine a combination whereby interest of Rs. 140,000 could be earned while restricting the investment under option (i) to the minimum.

The performance in this part was also quite unsatisfactory. The simplest way to solve the problem was to form an equation with a single variable. Very few students could solve the question in this manner. Some students solved it by forming 2 different equations involving 2 variables which required lot more time.

Question 3(a)

Performance on this differentiation question which involved natural log and exponential function was about average. The problem was to be solved in two parts. In first part the given expression was to be differentiated which was correctly done by most of the students. In the next step the value of 'x' and 'y' for $dy/dx = 5$ was to be determined. Here, a significant number of students were able to find the correct value of 'x' but very few could find the correct value of 'y'.

Question 3(b)

The requirement in this part of the question was to find out the maxima, minima and point of inflexion of a given function. The overall performance was average as majority of the students were able to determine the maxima and minima quite easily but did not have full command as regards the concept of point of inflexion and ended up with incorrect answers.

The most common mistake was that 2nd derivative was equated to zero instead of the 1st derivative, for finding the stationary points.

Question 4(a)

A practical situation was given and the candidates were required to form 3 equations and solve them using Cramer's rule. Majority of the students performed well. However many students who did not have clear understanding of Cramer's rule and applied other methods and lost the related marks. Many students erred in the formation of equations also.

Question 4(b)

This question was based on the concept of optimization where the objective function was to be maximized. Though the overall performance was good, a significant number of students erred in the formation of inequalities. Another common mistake was that many students only considered the point of intersection for profit maximization and ignored the other possibilities.

Question 5(a)

This question pertained to basic statistics. A set of values were given and the candidates were required to prepare group frequency distribution, cumulative frequency distribution and cumulative frequency polygon and to compute the median and the mode from the frequency distribution.

It seemed that the candidates were not well prepared for such a question which involved some of the very basic concepts of statistics. A number of errors were observed as follows:

- Many candidates did not convert the class intervals into class boundaries.
- A number of students did not follow the clear instruction that seven class intervals were to be formed.
- Many students prepared a frequency polygon instead of cumulative frequency polygon.
- Most of the students didn't bother to properly label the graph.
- Many students could not make out that the data was bi-modal.

Question 5(b)

This was a simple question on probability involving hyper geometric distribution. Many students tried to solve the question using binomial distribution. A number of students applied incorrect formula also.

Question 6

This question required the candidates to draw a 'Scatter Diagram' and compute Coefficient of Correlation and Probable Error of Coefficient of Correlation, from the same set of data.

Many students skipped the Scatter Diagram altogether whereas many others could not label it.

Most of the students computed the Coefficient of correlation correctly but failed to compute the Probable Error correctly mostly because of incorrect formula. Many candidates calculated Coefficient of Determination and denoted it as the Probable Error. As usual, a vast majority of students failed to interpret the results properly.

Question 7(a)

This part of the question required the computation of probability and was based on Binomial distribution.

The overall performance was good. However, a number of students took the value of 'p' in place of 'q' and vice-versa. Some students tried to apply the formula for Hyper geometric distribution and Poisson distribution.

Question 7(b)

This question based on Normal distribution proved quite difficult for the students because the format of the question was a bit different and only those students who had good conceptual understanding were able to solve it correctly.

The population standard deviation and the probability that the life of a bulb selected at random would exceed 3200 hours were given. The ultimate requirement was to determine the probability that the life of a bulb selected at random would be less than 2800 hours.

Since mean life of the bulbs was not given, the first step was to calculate it by working it backwards. Most of the candidates were unable to envisage the whole process and tried various alternatives without much success. Those who proceeded correctly usually got full marks except in few cases where the following types of errors were made:

- Values relating to two tailed test were used instead of one tailed test.
- Incorrect values were picked up from the Z-table.

Question 8(a)

This question comprised of two parts. In the first part, 95% confidence interval for population mean ' μ ' for normally distributed population was to be established. Majority students performed well on this part.

In the second part, the sample size for 99% confidence level was to be determined. Majority of the students knew the formula. However, a number of students erred in picking up the correct value of $Z_{\alpha/2}$. Some students determined the confidence interval at 99% confidence level, instead of sample size. Finally, most of the students failed to round up the final answer. It needs to be understood that sample size should always be mentioned in full number i.e. as a positive integer and since the requirement is to find the minimum sample size, if the formula results in a fraction, it should always be rounded upwards.

Question 8(b)

This question also comprised of two parts. The data pertained to two groups of students. In the first part most of the students correctly calculated the separate point estimates of each group but only few of them knew that the point estimate of the difference can simply be calculated by taking the difference of the two point estimates.

In the second part, where the requirement was to calculate the standard deviation of the difference of the population proportion, the performance was even poorer. Many students skipped it altogether whereas a number of students used incorrect formula or put the wrong values in the formula.

(THE END)