

Examiner's Report**Intermediate Examination - January 2014****(51) Business Mathematics & Statistics****SECTION - A****Question No. 01** - (Marks Allotted 30)**(A Compulsory Question)**

- (1) It was seen that the instructions had not been properly read and clearly understood when answering the questions. This was confirmed as the answer had been written instead of writing the number of the selected answer. In some instances both the answer and the number of the selected answer had been written in every other question, the English letter assigned to the question had been written instead of writing the number of the selected answer.
- (2) The opportunity of obtaining more marks was lost as answers had been written only for some parts and not for all 15 parts of the question. Candidates had kept blanks for the rest of the questions.
- (3) There were plenty of instances where marks were lost due to reasons such as errors in substituting numbers, errors in simplifying, errors as a result of being negligent with arithmetical signs such as plus (+) and minus (-) and multiplication (x) when answering questions.
- (4) When solving problems candidates had applied incorrect formula, omitted certain parts of the formula and substituted numbers to the formula incorrectly. Therefore, incorrect answers had been produced and had lost marks.
- (5) When writing the English letters assigned to the 15 questions, one after other some letters had been missed out in certain places. Accordingly, answers for those parts also missed out and marks were lost due to this reason.
- (6) In some instances the first answer had been struck off and another answer had been given. It was seen that the first answer was correct. Considerable number of candidates had lost marks due to this reason.
- (7) In general, marks were lost since the students did not have a clear understanding and knowledge on simplification of equations, factors, matrices, calculating degrees, range, median, compound interest rates, probability. Accordingly, they were unable to solve the problems relating to these areas and had given incorrect answers.
- (8) On the whole it is impossible to satisfy with the candidates' talent in answering questions, since most of the candidates did not have proper knowledge, understanding and enthusiasm in answering questions.
- (9) Since this question consists of 15 parts and 30% of the total marks of the question paper are allotted to this question and since most of the answers can be given with very short and simple calculations, most of the marks required to pass this subject can be obtained by correctly answering this question. Therefore, out of the three hours, it is possible to allocate approximately one hour to answer this question and it is important that candidates pay more attention and care in answering this question.

SECTION - B

Question No. 02 - (Marks Allotted 30)
(A Compulsory Question)

Part (a)

- (1) Although candidates should solve this question by using simultaneous equations, they had construct the equation incorrectly, resulted in incorrect answers.
- (2) Candidates had attempted to get the answer while writing the equation as $800x + 1,100 y = 6,600$.
- (3) Candidates had attempted to calculate the 2011 cost per unit of thermal power by deviding 2900 from 500 and 300 and they had calculated 2012 cost per unit of thermal power by deviding 3700 from 400 and 700, resulted in incorrect answers.
- (4) Low marks had been obtained due to the following reasons:
 - (i) Simplification errors (multiplication, subtraction and division).
 - (ii) Instead of stating the step by step calculation, just writing the final answer in the answer script.
 - (iii) Not attaching workings with the answer script.
- (5) Following were also the reasons for candidates to obtain low marks:
 - (i) Stopping the answer to the question midway.
 - (ii) Not using correct numbers.
 - (iii) Giving up on answering the question completely.

Part (b)

- (1) Candidates had not read the question properly. Therefore they had used arithmetic progression instead of geometric progression and also they had used incorrect formula, resulted in incorrect answers.
- (2) In calculating the answer for eighth round candidates had incorrectly consider $2/2 = 0$ and had incorrectly identified number of matches as 510, resulted in incorrect answer.
- (3) In converting the time in to hours, they had incorrectly devided the number by 360, 30 and 2 and had lost marks.
- (4) Although some students had correctly calculated the playing time, had not converted the time in to hours correctly while deviding the answer by 60.

Part (c)

- (1) Even though they had calculated the first and second year income correctly, they had incorrectly calculated third and fourth year income as Rs. 6 mn. Some other candidates had incorrectly calculated third and fourth year income as Rs. 7 mn and Rs. 8 mn.

- (2) Some candidates had calculated present value without considering the operating cost. Further they had incorrectly calculated present value for the fifth year and had lost marks.
- (3) Answer was incorrect as the year of the initial investment was considered as the year one.
- (4) Some candidates had considered operating cost of the first year for all years instead of calculating operating cost of each year, resulted in incorrect answers.
- (5) Some candidates had incorrectly calculated Net Present Value (NPV) since they add summation of present values and value of investment instead of deducting summation of present value from value of investment.
- (6) Some candidates had not answered the question “whether DBO plc should invest in this project” and had lost marks.

Part (d)

- (1) It was seen that most candidates had no clear understanding on “binomial theorem” and had left out one part or both parts. Further some other candidates had given incorrect answers and had lost marks.
- (2) Although it had instructed to write down the expansion of $(a + b)^3$, some candidates had write down the expansion as $(a+b) (a+b) (a+b)$ incorrectly. Also candidates had obtained incorrect answers due to errors in multiplication.
- (3) Candidates who had used the binomial theorem, had tried to solve the problem as 0C_3 , 0C_2 instead of writing the 3C_0 , 3C_1 and had given incorrect answers.
- (4) Some candidates had tried to solve the question by using pascal triangle. However candidates had obtained incorrect answers due to errors in + - signs.
- (5) In answering the part 2 of the question, they had written $(2x + 5y)^3$ as $2x^3$ and $5y^3$ therefore the answers were incorrect as they had used 2 instead of 2^3 and 5 instead of 5^3 .
- (6) Although it had instructed to write the expansion using the result of part one, candidates had not considered the instructions and had given incorrect lengthy solution for part 2.
- (7) Incorrect answers had been obtained due to the following common reasons:
 - Writing numbers erroneously
 - Multiplication errors
 - Calculating powers incorrectly
 - Errors in + - signs

Part (e)

- (1) Although this was a compulsory question, some candidates had given up on answering the question completely and some others had lost marks as they stopped the answer to the question midway.
- (2) Candidates had not differentiated the cost function to find out the marginal cost. Some candidates had used intergration and also used maximum number of units for the constant, resulted in incorrect answers and had lost marks.

- (3) Some candidates had posted numbers given in the question incorrectly. Some other candidates had not used the differentiated number but used another answer and had lost marks.
- (4) Some candidates had failed even to calculate revenue function by multiplying demand function by price.
- (5) Some candidates had not known the function, “Marginal Profit = Marginal Revenue – Marginal Cost” and were unable to find out the answer.

Question No. 03 - (Marks Allotted 20)
(A Compulsory Question)

Part (a)

- (1) Although this was a compulsory question, a considerable number of students had not answered this question and had lost marks.
- (2) In constructing the table to calculate (x), (y), (xy) & (x²) columns, students had lost marks due to the following reasons:
 - (i) Not copying the numbers given for calculation to the answer script correctly.
 - (ii) Not writing the result of the multiplications correctly.
 - (iii) In adding number columns vertically, writing those summations incorrectly.
- (3) Candidates had made mistakes in substituting numbers to the formula. Also addition and multiplication errors resulted in incorrect answers.
- (4) Instead of using given formula candidates had obtained incorrect answers while using incorrect formula and had lost marks.
- (5) Some candidates had failed even in calculating \bar{x} (mean value of x) and \bar{y} (mean value of y).
- (6) Even those who had correctly calculated values ‘b’, had not attempted to find out the value ‘a’ and some others had left out this part.
- (7) Even those who had correctly calculated ‘a’ & ‘b’ value had not written equation of regression line correctly and had lost marks.
- (8) Equation of regression line was incorrect due to wrong ‘a’ & ‘b’ values. It was seen that some candidates had written only the answer instead of providing step by step calculations.
- (9) It was seen that candidates had not correctly understood the question (expected marks of part **B**, if a student scores 85 for part **A**) and therefore they had given incorrect answers and had lost marks.
- (10) Due to the following reasons students had not obtained full marks:
 - (i) Stopping the answer to the question midway.
 - (ii) Solving only a part of the question.
 - (iii) Not attempting second part of the question.
 - (iv) Giving up on answering the question completely.

Part (b)

- (1) Due to the following reasons students had calculated incorrect answers for cumulative frequency column (more than):
 - (i) Incorrectly copying the numbers given for calculation to the answer script in constructing the table.
 - (ii) Not considering the value 250 at the point of 0 in constructing cumulative frequency column (more than).
 - (iii) Considering the value 250 at the point of 10.
- (2) Although it had instructed to draw the cumulative frequency curve (more than), most of the candidates had drawn ogive (less than), histogram etc. and had lost marks.
- (3) Due to the following reasons students had not obtained full marks for graphs:
 - (i) Changing axes when drawing the graph.
 - (ii) Had not name the axes correctly.
- (4) The following reasons were affected to low marks:
 - (i) Using mean values when stating value of 'x'.
 - (ii) Incorrectly drawing two axes.
 - (iii) Not drawing the cut-off point in the graph.
- (5) Since they had not used graph papers when drawing graphs, they had not drawn cut-off point correctly.
- (6) It was seen that candidates had made several mistakes since they had not read the question carefully. Those reasons directly affected to low marks.

Section - C

Question No. 04 - (Marks Allotted 10)
(An Optional Question)

Part (a)

- (1) Candidates had not identified total revenue function and total cost function to solve the problem. Although the question had to be solved by using arithmetic series while reading and understanding the question properly, had used geometric series and had lost marks.
- (2) Due to the following reasons students had given incorrect answers:
 - (i) Not using unit ranges according to the instructions.
 - (ii) Not finding the variable cost (VC) correctly while substituting numbers.
 - (iii) Multiplication errors & using incorrect values when attempting to find out the fixed cost (FC).

- (3) Candidates had given incorrect answers for total revenue (TR) due to multiplication & substitution errors.
- (4) Due to the following reasons students had incorrectly calculated total cost function, total revenue function & equilibrium point:
 - (i) Not using graph papers when drawing graphs.
 - (ii) Drawing vertical & horizontal axes incorrectly.
 - (iii) Marking incorrect values
- (5) Although candidates had drawn the graphs by using graph papers, they had not obtained full marks due to the following reasons.
 - (i) Drawing vertical & horizontal axes incorrectly.
 - (ii) Posting values incorrectly
 - (iii) Drawing only two functions
 - (iv) Not stating the number of equilibrium units while marking the equilibrium

Part (b)

- (1) It was seen that candidates had a very poor knowledge on probability when closely monitor the method which they had used to solve the problem. However this is simple & easy question on probability.
- (2) Students had obtained incorrect answers since they had drawn the third branch of the tree diagram and had drawn separate tree diagrams for internal & external parts.
- (3) Due to the following reasons students had given incorrect answers;
 - (i) Considering internal applicants as $\frac{1}{2}$ & external applicants as $\frac{1}{2}$ when marking probability values in the tree diagram
 - (ii) Using $\frac{7}{10}$ & $\frac{3}{10}$ as values of the first part of the tree diagram
- (4) In calculating answers, marks were lost due to following reasons:
 - (i) Instead of calculating the probability that the manager appointed is a female applicant, candiadtes had attempted to calculate the probability that the manager appointed is an internal applicant.
 - (ii) Instead of multiplying numbers when calculating probability, they had added numbers.

Question No. 05 - (Marks Allotted 10)
(An Optional Question)

Part (a)

- (1) Candidates had obtained low marks due to the following reasons:
 - (i) Low knowledge on ratios.
 - (ii) Attempting the question without reading & understanding properly.
 - (iii) Stopping the answer to the question midway.

- (2) Some candidates had calculated total number of workers as 1000. They had considered $5/9 = 1000$ since $4/9 = 800$. They had ignored the fact that total number of workers is equal to the summation of total number of male workers & total number of female workers.
- (3) Although candidates had calculated the required number of female workers, they were not able to find out the proposed number of female workers to be recruited to the factory, resulted low marks.
- (4) Although some other candidates had calculated the total number of workers as 2,200, they were not able to find out the correct answer 400, after deducting 1,800 from 2,200, resulted low marks.

Part (b)

- (1) In constructing the table to calculate the Laspeyre's price index and Paasche's price index, students had lost marks due to the following reasons:
 - (i) Incorrectly copying the numbers given for calculation to the answer script.
 - (ii) Not writing the result of the multiplications correctly.
 - (iii) In adding number columns vertically, writing those summations incorrectly.
- (2) Candidates had calculated separate price indices for each item instead of calculating the total price index. Also they had not given the price index as a percentage. Those reasons affected to low marks.
- (3) Even those who had correctly constructed the table had written formula incorrectly, had made posting errors (numerator & denominator) when substituting total values of table to the formula, resulted low marks.
- (4) Candidates had no clear understanding about formula relating to two different price indices. Therefore they had calculated Laspeyre's price index by appearing the formula of Paasche's price index and Paasche's price index by appearing the formula of Laspeyre's price index and had lost marks.
- (5) Some candidates had left out the question completely and some other candidates had stopped the answer to the question midway and it affected to low marks.

Question No. 06 - (Marks Allotted 10)
(An Optional Question)

Part (a)

- (1) Candidates had made mistakes in additions and multiplications in calculating (fx) value when multiplying median (x) of the voter's age by frequency of number of voters (f).
- (2) Instead of using very easy formula $\bar{x} = \frac{\sum f}{fx}$ candidates had given incorrect answers while using complex formula and had lost marks.
- (3) Instead of using summation of $\sum f$ (36), some candidates had used number of terms n (7) in order to calculate the mean and had obtained incorrect answer. Therefore they had lost marks.

- (4) Incorrect answers had been obtained due to the following reasons:
- (i) Not using a formula correctly though there are several formulas to obtain the standard deviation (Most of the students had neglected the square root sign).
 - (ii) Using the incorrect formula.
 - (iii) Using the values incorrectly.
 - (iv) Multiplication & subtracting errors.
- (5) Due to the following reasons students had not obtained full marks:
- (i) Calculating only the value of mean by some candidates
 - (ii) Neglecting the standard deviation part
 - (iii) Doing only a part of the standard deviation and left out the rest of the part
 - (iv) Calculating the variance only without calculating standard deviation

Part (b)

- (1) Candidates had not given answers for these parts since they had no clear understanding about difference between simple interest & compound interest, method of calculation, formula that should be used to calculate.
- (2) Even those who had given answers to this part had not considered the “half of his savings” part of the question. Also they had written formulas incorrectly and had not solved equations correctly and had given incorrect answers.
- (3) Some candidates had calculated the percentage of interest while considering the fact that Sandun invested total savings in each bond and earned the interest given in the question.
- (4) Some other candidates had not solved the problem completely and had stopped the answer to the question midway. Posting errors and not solving the formula correctly also affected to low marks.

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