

**CMA JANUARY 2022 EXAMINATION  
FOUNDATION LEVEL  
BUSINESS QUANTITATIVE ANALYSIS**

Course Code	: TA112	Total Marks	: 100
Reading Time	: 15 minutes	Writing Time	: 180 minutes

**Instructions to Candidates**

- You **MUST NOT** write anything during the reading time.
- You should attempt ALL questions.
- Answers should be properly structured and relevant.
- Carefully read ALL the requirements and sub-questions before attempting a specific question.
- ALL answers must be written in the answer book.
- **AVOID WRITING/MARKING** on the question paper at any time which may cause disciplinary action.
- Start answering each question from a fresh sheet.
- Answers should be clearly numbered with the sub-question number.

**Allowable Materials**

- Writing Stationeries
- Non-programmable Calculator

**Assessment Structure**

			<i>Sub-question</i>	<i>Marks</i>	<i>Expected Time Required</i>
Section A	Question 1	Multiple Choice Questions	10	10	16 minutes
	Question 2	Modified True/False	10	10	15 minutes
	Question 3	Essay/Computational/Case	-	10	18 minutes
	Question 4	Essay/Computational/Case	2	10	18 minutes
	Question 5	Essay/Computational/Case	-	10	18 minutes
Section B	Question 6	Multiple Choice Questions	10	10	16 minutes
	Question 7	Modified True/False	10	10	15 minutes
	Question 8	Essay/Computational/Case	-	10	18 minutes
	Question 9	Essay/Computational/Case	2	10	18 minutes
	Question 10	Essay/Computational/Case	-	10	18 minutes
		Revision			10 minutes
		Total		100	180 minutes

**RESTRICTED USE**

This paper **MUST NOT BE REMOVED** from the examination venue

***Do not turn the page until instructed***

## SECTION A [50 MARKS]

THERE ARE 5 (FIVE) QUESTIONS IN THIS SECTION FROM BUSINESS MATHEMATICS. ANSWER ALL THE QUESTIONS IN THE ANSWER SCRIPT FOLLOWING THE EXAMPLE PROVIDED FOR THE SPECIFIC QUESTION.

---

### QUESTION 1

[10 × 1 = 10 MARKS]

There are ten (10) multiple-choice questions with five options. Pick the option that best explains the given question. Write your answer on the answer script [DO NOT PUT ANY MARK ON THE QUESTION PAPER]. Follow the example given below in providing your answer.

**Example:**

- (i) ICMAB stands for the –
- (a) Institute of Cost Management Accounting of Bangladesh
  - (b) Institute of Cost and Management Accountants of Bangladesh
  - (c) Institute for Cost Managers and Accounting of Bangladesh
  - (d) Institute of Cost Management Accountants of Bangladesh
  - (e) Industrial Cost Management Accountants of Bangladesh

**Answer: (i) (b)**

- (i) A credit card company is charging an annual percentage rate of 26.8%. What three monthly rate is it equivalent to?
- (a) 6.70%
  - (b) 8.93%
  - (c) 6.10%
  - (d) 8.24%
  - (e) 7.25%
- (ii) Prices of land have been rising by 18% per annum, what does that equate to as a rise over 9 months?
- (a) 13.50%
  - (b) 1.13%
  - (c) 13.22%
  - (d) 24.69%
  - (e) 6.13%
- (iii) When  $a = 4$  and  $x = 3$ ,  $(3a^3x)^2$  is equal to:
- (a) 1,728
  - (b) 82,944
  - (c) 331,776
  - (d) 5,184
  - (e) 32,024
- (iv) Which of the following statements is/are true for a Sinking Fund?
- (a) A Sinking Fund is an investment of a constant annual amount.
  - (b) A Sinking Fund is an investment of a declining annual amount.
  - (c) A repayment mortgage is a type of Sinking Fund.
  - (d) A Sinking Fund is a type of annuity.
  - (e) Sinking Fund is a type of revenue.
- (v) A bond increases in value from Tk. 400 to Tk. 500 over a 6- year period. Find the percentage increase per annum.
- (a) 25 percent
  - (b) 4.17 percent
  - (c) 3.79 percent
  - (d) 3.81 percent
  - (e) 6.18 percent

- (vi) The expression  $(x^2)^3/x^5$  equals
- 0
  - 1
  - $x$
  - $x^2$
  - $x^3$
- (vii) Which of the following should be added to make  $x^4 + 64$  a perfect square
- $4x^2$
  - $16x^2$
  - $8x^2$
  - $-8x^2$
  - $-16x^2$
- (viii) Which of the following two sets are equal?
- $A = \{1, 2\}$  and  $B = \{1\}$
  - $A = \{1, 2\}$  and  $B = \{1, 2, 3\}$
  - $A = \{1, 2, 3\}$  and  $B = \{2, 1, 3\}$
  - $A = \{1, 2, 4\}$  and  $B = \{1, 2, 3\}$
  - Both C and D
- (ix) In logarithm, the property of  $\log_b(b)$  is equal to
- zero
  - one
  - minus one
  - two
  - None of the above
- (x) How many 3-digit numbers can be formed from the digits 2, 3, 5, 6, 7 and 9, which are divisible by 5 and none of the digits is repeated?
- 5
  - 10
  - 15
  - 20
  - 25

## QUESTION 2

[10 x 1 = 10 MARKS]

There are ten (10) statements given under the question. Identify the statements as True or False. If the statement is false, rewrite the statement on the answer script to make it 'True'. Reasoning is NOT required. Follow the example given below in providing your answer.

**Example:**

(a) If every element of a set A is also an element of a set B then set B is called sub-set of set A.

**Answer:**

**(a) False. If every element of a set A is also an element of a set B then set A is called sub-set of set B.**

**Note:**

- You will not get any mark if you simply rewrite as ICMAB *does not* stand for the Industrial Cost Management Accountants of Bangladesh.
- If the statement is true, you need NOT to rewrite the statement rather only mention that the statement is *True*.

- (a) Graph of a linear polynomial is a parabola
- (b) 6 is a solution of the inequality  $-2x < 10$
- (c) The set  $\{1, 2\}$  is the symmetric difference of  $A = \{1, 2, 3\}$  and  $B = \{3, 4, 5\}$
- (d) A collection of 11 best hockey player of Bangladesh is a set.
- (e) The growth process which is characterized by constant decrease in percentage of values is referred as exponential growth process.
- (f) The function which describes increase of 7% in country population is classified as life function.
- (g) The letters of the word 'LEADER' can be arranged in 360 ways
- (h) The letters of the word 'CORPORATION' can be arranged in 50400 ways so that the vowels always come together.
- (i) Internal rate of return is the discount rate at which net present value is zero.
- (j) A sinking fund is an investment of a declining annual amount.

**QUESTION 3**

**[5+5 = 10 MARKS]**

- (a) In a recent survey of 525 people in Dhaka city, it is found that 350 read newspapers, 215 listened radios and 140 watched televisions, additionally 75 read the newspapers and watched televisions, 40 listened radios and watched televisions and 100 read the newspapers and listened radios. If 25 used all three sources of news, how many people utilized none of the three? Also, show your result using Venn diagram.
- (b) An experiment was conducted with a particular type of small animal. The logarithm of the amount of oxygen consumed per hour was determined for a number of the animals. It was found that  $\log y = \log 5.934 + 0.885 \log x$  where y is the number of micro liters of oxygen consumed per hour and x is the weight of the animal (in grams). Solve for y and observe when  $y = 0$ .

**QUESTION 4**

**[5+5 = 10 MARKS]**

- (a) A man buys a house worth Tk. 2,50,000. The contact is that he will pay Tk. 1,00,000 immediately and the balance in 15 annual equal installments with 10% per annum compound interest. How much he will have to pay annually?
- (b) A question paper consists of 10 questions divided into two parts A and B. Each part contains five questions. A candidate is required to attempt six questions in all of which at least 2 should be from part A and at least 2 from part B. In how many ways can the candidate select the questions if he can answer all questions equally well?

**QUESTION 5**

**[5+5 = 10 MARKS]**

- (a) Star Ltd. has Tk. 10,00,000 allocated for capital budgeting purposes. The following proposals and associated profitability indexes have been determined.

Project	Amount	Profitability index
1	Tk. 3,00,000	1.22
2	Tk. 1,50,000	0.95
3	Tk. 3,50,000	1.20
4	Tk. 4,50,000	1.18
5	Tk. 2,00,000	1.20
6	Tk. 4,00,000	1.05

Which of the above investments should be undertaken? Assume that the projects are invisible and there is no alternative use of the money allocated for capital budgeting.

- (b) A project costs Tk. 36,000 and is expected to generate cash inflows of Tk. 11,200 annually for 5 years. Calculate the IRR of the Project.

---

**END OF SECTION A**

---

## SECTION B [50 MARKS]

THERE ARE 5 (FIVE) QUESTIONS IN THIS SECTION FROM BUSINESS STATISTICS. ANSWER ALL THE QUESTIONS IN THE ANSWER SCRIPT FOLLOWING THE EXAMPLE PROVIDED FOR THE SPECIFIC QUESTION.

### QUESTION 6

[10 × 1 = 10 MARKS]

There are ten (10) multiple-choice questions with five options. Pick the option that best explains the given question. Write your answer on the answer script [DO NOT PUT ANY MARK ON THE QUESTION PAPER]. Follow the example given below in providing your answer.

**Example:**

- (i) ICMAB stands for the –
- (a) Institute of Cost Management Accounting of Bangladesh
  - (b) Institute of Cost and Management Accountants of Bangladesh
  - (c) Institute for Cost Managers and Accounting of Bangladesh
  - (d) Institute of Cost Management Accountants of Bangladesh
  - (e) Industrial Cost Management Accountants of Bangladesh

**Answer: (i) (b)**

- (i) The interval between the upper quartile and the lower quartile is known as the:
- (a) Mean.
  - (b) Interquartile range.
  - (c) Standard deviation.
  - (d) Mode.
  - (e) None of these.
- (ii) Which of the following are advantages of using the standard deviation?
- (a) It has an exact algebraic formula.
  - (b) It is not distorted by data being skewed.
  - (c) It is the most widely used measure of spread.
  - (d) It is not affected by open-ended intervals.
  - (e) Both A and C
- (iii) Which of the following method could be used to check whether there is in fact a linear relationship between the variables.
- (a) Scatter diagram
  - (b) Time series analysis
  - (c) Coefficient of variation
  - (d) Regression analysis
  - (e) None of these
- (iv) From past records it is known that 10 per cent of items from a production line are defective. If two items are selected at random, what is the probability that only one is defective?
- (a) 0.09
  - (b) 0.10
  - (c) 0.18
  - (d) 0.20
  - (e) 0.81
- (v) A statement made about a population for testing purpose is called?
- (a) Statistic
  - (b) Hypothesis
  - (c) Level of Significance
  - (d) Test-Statistic
  - (e) None of these.
- (vi) If the Critical region is evenly distributed then the test is referred as?
- (a) Two tailed
  - (b) One tailed
  - (c) Three tailed
  - (d) Zero tailed
  - (e) None of the above

- (vii) Consumer price index is equal to:  
 (a) Laspeyre's price index  
 (b) Paasche's price index  
 (c) Fisher's ideal index  
 (d) Bowley's price index  
 (e) All of the above
- (viii) If one event is unaffected by the outcome of another event, the two events are said to be  
 (a) Dependent  
 (b) Independent  
 (c) Mutually exclusive  
 (d) All of the above  
 (e) Both (b) and (c)
- (ix) Which of the following is a necessary condition for use of a Poisson distribution?  
 (a) Probability of one arrival per second is constant.  
 (b) The number of arrivals in any 1-second interval is independent of arrivals in other intervals.  
 (c) The Probability of two or more arrivals in the same second is zero.  
 (d) All of these  
 (e) (b) and (c) but not (a)
- (x) A time series of annual data can contain which of the following components?  
 (a) Secular Trend.  
 (b) Cyclical fluctuation.  
 (c) Seasonal variation.  
 (d) All of these  
 (e) (a) and (b) but not (c)

#### QUESTION 7

[10 × 1 = 10 MARKS]

There are ten (10) statements given under the question. Identify the statements as True or False. If the statement is false, rewrite the statement on the answer script to make it 'True'. Reasoning is NOT required. Follow the example given below in providing your answer.

**Example:**

(a) If every element of a set A is also an element of a set B then set B is called sub-set of set A.

**Answer:**

**(a) False. If every element of a set A is also an element of a set B, then set A is called sub-set of set B.**

Note:

- You will not get any mark if you simply rewrite as ICMA does *not* stand for the Industrial Cost Management Accountants of Bangladesh.
- If the statement is true, you need NOT to rewrite the statement rather only mention that the statement is *True*.

- (a) The arithmetic mean measures the variability of the data.  
 (b) In a negatively skewed distribution, the mean is smaller than the median.  
 (c) The linear relationship between x and y is strong if r is close to +1 or -1.  
 (d) If the correlation coefficient is 0.8, then the coefficient of determination is 89.  
 (e) A normal distribution has a mean of 55 and a variance of 14.44. The probability of a score of 59 or more is approximately 0.15.  
 (f) The event "Successive tosses of a coin" is independent.  
 (g) Type -1 error occurs when we accept  $H_0$  if it is True.  
 (h) Alternative Hypothesis is also referred to as Research Hypothesis.  
 (i) Fisher's index number is based on AM of Laspeyre's and Paasche's index.  
 (j) In the theory of time series, shortage of certain consumer goods before the annual budget is due to seasonal variation.

**QUESTION 8****[5+5 = 10 MARKS]**

- (a) Calculate the coefficient of correlation between price and sales from the following data:

Price (Tk.)	100	90	85	92	90	84	88	90
Sales (100)	5	6	7	6	7	8	8	9

- (b) Marks obtained by 10 students in their graduation and the ICMAB entrance test were found as given below:

Graduation (x)	50	52	55	60	62	65	65	66	70	75
Entrance test (y)	52	50	57	65	65	62	65	65	71	78

From the paired data, find the regression equation of  $y$  on  $x$ .**QUESTION 9****[4+6 = 10 MARKS]**

- (a) A market survey conducted in four cities pertained to preference for brand A soap. The responses are shown below:

	Rajshahi	Chattogram	Dhaka	Jashore
Yes	45	55	60	50
No	35	45	35	45
No opinion	5	5	5	5

- (i) What is the probability that a consumer selected at random preferred brand A?  
(ii) What is the probability that a consumer preferred brand A and was from Dhaka?  
(iii) What is the probability that a consumer preferred brand A given that he/she was from Dhaka?  
(iv) Given that a consumer preferred brand A, what is the probability that he/she was from Jashore?
- (b) Discuss the distinctive features of the binomial, Poisson and normal distributions.

**QUESTION 10****[5+5 = 10 MARKS]**

- (a) Calculate index number from the following data using (i) Laspeyre's method, (ii) Paasche's method, (iii) Bowley's method; (iv) Fisher's ideal formula and (v) Marshall Edge worth method:

	Base year		Current year	
	Kilo	Rate (Tk.)	Kilo	Rate (Tk.)
Bread	10	3	8	3.25
Meat	20	15	15	20.00
Tea	2	25	3	23.00

- (b) A tax Firm is interested in comparing the quality of work at two of its regional offices. By randomly selecting samples of tax returns prepared at each office and verifying the sample returns accuracy, the firm will be able to estimate the proportion of erroneous returns prepared at each office. Independent random samples from the two offices provide the following information.

	Sample size	Number of returns with errors
Office I	250	35
Office 11	300	27

Conduct a hypothesis test to determine whether the error proportions differ between the two offices. ( $\alpha=0.10$ )**END OF SECTION B**