

**CMA DECEMBER, 2019 EXAMINATION
 BUSINESS LEVEL
 SUBJECT: GE 03. FUNDAMENTALS OF BUSINESS MATHEMATICS**

Time Allocated: Three hours

Total Marks: 100

Instructions to Candidates

You are required to answer ALL questions.		
Answers should be properly structured, relevant and computations need to be shown.		
You are strongly advised to carefully read ALL the question requirements before attempting the question concerned (that is all parts and/or sub-questions).		
ALL answers must be written in the answer book. Answers written on the question paper will not be submitted for marking.		
Start answering each question from a fresh sheet. Your answers should be clearly numbered with the sub-question number then ruled off, so that the markers know which sub-question you are answering.		
No of questions	No of sub-questions	Marks allocation
10	Maximum 03	10 per each question

TURN OVER

You are advised to spend no longer than 18 minutes on each question. Each question will carry 10 marks.

QUESTION 1

- (a) The salary of A and B is equal. If A gets 65% allowance of his basic salary and B gets 80% of basic salary, what is the salary of A if the basic salary of B is Tk.1,100?
- (b) A survey was conducted by a manufacturing company to enquire the maximum price at which persons would be willing to buy their product. The following table gives the stated prices (in BDT) by persons:

Price (in BDT)	80-90	90-100	100-110	110-120	120-130
No. of Persons	11	29	18	27	15

Calculate coefficient of skewness and interpret its value.

[Marks: (5+5) = 10]

QUESTION 2

- (a) Solve the linear equation: $2x-3y-5 = 0$ and $x-4y-5 = 0$.
- (b) Calculate the NPV at spreadsheet: Where Investment 10000 at $t=0$, Get Returns of 4000 at $t=1$, 5000 at $t=2$ and 4500 at $t=3$, discount rate 10%

	A	B	C	D	E	F	G
1	NPV Calculation						
2							
3	Discount Rate		@10%				
4							
5	Year		0	1	2	3	
6	Cash Flow		-10,000	4,000	5,000	4,500	
7	Discount Rate @10%						
8	Present Value						
9	NPV Calculation						

From the above spreadsheet find the NPV at C9 by excel format?

[Marks: (5+5) = 10]

QUESTION 3

- (a) Mr. Shahriar wants to purchase a new Bike FZ. He wishes to accumulate Tk. 250,000 by 4 years from now in order to purchase the Bike. How much does he need to end at the end of each month of the next 4 years? Assume that interest rate is 12% and compounded monthly.
- (b) Mr. Nadim recently admitted in Institute of Cost and Management Accountants of Bangladesh (ICMAB). Due to his financial difficulties, he has taken an insurance policy for the education for 5 years. The insurance company will pay to Mr. Nadim BDT. 10,000 per month for next 5 years. If the interest rate is applicable 10%, then find the present value of all installments.

[Marks: (5+5) = 10]

QUESTION 4

- (a) What are the scope of Cost and Management Accountants to apply spreadsheet knowledge in normal Business work?
- (b) The distribution of monthly income of 4,000 employees follows normal distribution with mean Tk. 6,000 and standard deviation Tk. 10,000.

Requirements:

- (i) Number of employees having income more than Tk. 7,000
- (ii) The number of employees having income less than Tk. 5,000
- (iii) The least monthly income among the highest paid 100 employees.

[Marks: (4+6) = 10]

TURN OVER

QUESTION 5

- (a) An analysis of the monthly wages paid to workers in the firms A and B belonging to the same industry gives the following results:

Particulars	Firm A	Firm B
No. of workers	500	600
Average monthly wage(Tk.)	480	475
Variance of distribution of wages(Tk.)	400	625

- (i) Which firm pays a larger wage bill?
(ii) In which firm is there greater variability in individual wages?
(iii) Find the combined wage of the two firms taken together.
- (b) The management of Fine Electronics Company is considering to purchase an equipment to be attached with the main manufacturing machine. The equipment will cost BDT. 60,000 and will increase annual cash inflow by BDT 22,000. The useful life of the equipment is 6 years. After 6 years it will have no salvage value. The management wants a 20% return on all investments.

Requirements:

- (i) Compute net present value (NPV) of this investment project.
(ii) Should the equipment be purchased according to NPV analysis?

[Marks: (5+5) = 10]

QUESTION 6

- (a) Below are given figures of production (in thousand quintals) of a sugar factory.

Year	1976	1977	1978	1979	1980	1981	1982
Production ⁹ (In quintals)	77	88	94	85	91	98	90

- (i) Fit a straight line by the least squares method, and tabulate the trend values
(ii) Eliminate the trend. What components of the time series are thus left over?
(iii) What is the monthly increase in the production of sugar?
- (b) Two factories manufacture the same machine part. Each part is classified as having either 0, 1, 2 or 3 manufacturing defects. The joint probability distribution for this is given below:

Manufacturer	Number of defects			
	0	1	2	3
Manufacturer A	0.1250	0.0625	0.1875	0.1250
Manufacturer B	0.0625	0.0625	0.1250	0.2500

- (i) A part is observed to have no defects. What is the probability that it was produced by manufacturer A?
(ii) A part is known to have been produced by manufacturer A. What is the probability that the part has no defect?
(iii) A part is known to have two or more defects. What is the probability that it was manufactured by A?
(iv) A part is known to have one or more defects. What is the probability that it was manufactured by B?

[Marks: (5+5) = 10]

TURN OVER

QUESTION 7

- (a) The supervisor of a manufacturing process believed that assembly-line speed (in feet/minute) affected the number of defective parts found during on-line inspection. To test this theory, management had the same batch of parts inspected visually at a variety of line speeds. The following data were collected:

Line Speed	20	20	40	30	60	40
Number of Defective Parts Found	21	19	15	16	14	17

Requirements:

- (i) Develop the estimated regression equation that relates line speed to the number of defective parts found.
- (ii) Use the equation developed in part (i) to forecast the number of defective parts found for a line speed of 50 feet per minute.
- (b) The president of a small manufacturing firm has been concerned about the continual growth in manufacturing costs over the past several years. The following is a time series of the cost per unit (in BDT.) for the firm's leading product over the past eight years:

Year	1	2	3	4	5	6	7	8
Cost per Unit (BDT.)	20.00	24.50	28.20	27.50	26.60	30.00	31.00	36.00

Requirements:

- (i) Graph this time series. Does a linear trend appear?
- (ii) Develop the equation for the linear trend component for the time series. What is the average cost increase per year?

[Marks: (5+5) = 10]

QUESTION 8

- (a) The following table gives group index numbers and corresponding group weights with regard to cost of living for a given year. Construct the overall cost of living index for the year.

Group	Index No	Weight
Food	350	5
Fuel & Lighting	220	1
Clothing	230	1
Rent	160	1
Misc.	190	2

How is the overall index number altered?

- (i) If all the group index numbers are changed in the same ratio.
- (ii) If all the group weights and group indices are changed in the same ratio.
- (iii) If all the group index numbers are increased by 10 and all the weights doubled?
- (b) The personal manager of a large manufacturing firm finds that 15% of the firm's employees are senior executives and 25% of the firm's employees are from ICMAB who completed between 600 marks to 1,000 marks. He also discovers that 5% of the firm's employees are both senior executives and from ICMAB (who completed between 600 marks to 1,000 marks). What is the probability of selecting a senior executive if the selection is confined to Students of ICMAB who completed between 600 marks to 1,000 marks.

[Marks: (5+5) = 10]

TURN OVER

QUESTION 9

Mr. Kabir, a fellow professional accountant, has joined as a Chief Financial Officer in a multilateral Bank in January 01, 2019 from where he gets Tk. 500,000 per month as his salary. Previously he worked in a local bank in Bangladesh as a Chief Financial Officer, where his monthly salary was Tk. 350,000. Mr. Kabir has received an amount of Tk. 50 lac as his end service benefit from his previous bank. He is now planning to invest this money in a way so that he gets maximum benefits. He will open some DPS in a Bank which needs monthly installment around Tk. 250,000-260,000. He has the following options:

Investment all end service amount to a local bank as Fixed Deposit with interest rate 10% and tenor 3 years. Again he is also planning to open some DPS in a bank and option are as follows:

- (a) He can invest in millionaire scheme with monthly payment of Tk. 23,500 and tenor is 3 years or
- (b) He can open a crorepati scheme in a bank with monthly installment of Tk. 245,000 and tenor is 3 years.
- (c) He can open an DPS in a local bank by investment all of his end service amount with monthly installment Tk.250,000 and duration of the investment is 3 years. At the end of the duration, he will receive total Tk. 190,000,000 (one crore and ninety lac)

Requirements:

- (i) Evaluate the Option (a) and Option (b).
- (ii) Recommend at what DPS scheme Option (a) and Option (b), Mr. Kabir will need to invest to get the maximum benefit.
- (iii) Evaluate the Option (c) and find out the rate of return from that investment.

[Marks: (5+5) = 10]

QUESTION 10

- (a) A manufacturer claimed that at least 95% of the equipments which he supplied to a factory conformed to specifications. An examination of a sample of 200 pieces of equipment revealed that 18 were faulty. Test his claim at a significant level of (a) 0.05 and (b) 0.1
- (b) The odds that a book on business mathematics will be favorably reviewed by 3 independent critics are 3 to 2, 4 to 3 and 2 to 3, respectively. What is the probability that, of the three reviews?
 - (i) All will be favorable.
 - (ii) Exactly one review will be favorable, and
 - (iii) At least one of the reviews will be favorable.

[Marks: (5+5) = 10]

END OF QUESTION PAPER