	Sr. No. 352104
Jan. 2023	
B.Com.(H)1st SEMESTER	
Business Mathematics (BCOMH-104)	
Time: 3 Hours	Max. Marks:75
Instructions :	*1.It is compulsory to answer all the questions (1.5 marks each) of Part - A in short.* *2Answer any four questions from Part -B in detail.* *3. Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

Que.1(a) Define (i)Set (ii) Equal Sets (iii) Disjoint Sets with two examples each.

(b)If A = {1,2,3,4},B= {2,4,6,8} and C = {3,4,5,6},then determine (i)A-B(ii)B-C .

(c)Find the sum of $1^2+2^2+3^2+4^2+\ldots\ldots\ldots+(18)^2$.

(d)Find the value of x: $\log_x 25 = 2$.

(e)Find the value of $(98)^5$.

(f)How many four digit numbers greater than 8000 can be formed from the digits 5,6,7,8,9.

(g)If the matrix A $=\begin{bmatrix}1 & -2 & 3\\ 5 & 1 & -4\end{bmatrix}$ and the matrix B $=\begin{bmatrix}2 & 3 & 5\\ 1 & 4 & -2\end{bmatrix}$,then find the value of the matrices A+B and A-B .

(h)Find the first derivative of the given function (w.r.t. x): f(x) = (7x+3)(4-3x).

(i)Evaluate the given integral: $\int(x^5 + 3x^2 - 5x)dx$.

(j)Find the value of ${}^{10}P_4$. (1.5*10 = 15)

PART-B

Que.2(a)If U = {1,2,3,4,5,6,7},A = {1,3,5,7}, B = {2,4,6} and C = {2,3,4,5}, then find the value of the following sets:

(i) $(A \cup B)$ (ii) $(A \cap B)$ (iii) $(A' \cap B')$(iv)$(A \cup B)'$. (8)

(b)Out of 1200 students of a college, 400 played cricket,350 played football and 512 played table tennis; 100 played both cricket and football;142 played football and table tennis; 95 played cricket and table tennis;50 played all three games. Then find

(i)How many students did not play any game?

(ii)How many students played only one game? (7)

Que.3(a)Find the sum of 'n' terms of the given series: 5+55+555+.....(8)

(b)Show that $\left\{\frac{9^{(n+\frac{1}{4})}.\sqrt{3.3^n}}{3\sqrt{3^{-n}}}\right\}^{1/n} = 27.$ (7)

Que.4(i)Find the numbers less than 1000 and divisible by 5 which can be formed withdigits 0, 1, 2, 3, 4, 5, 6, 7 such that each digit does not occur more than once in each number. (5)

(ii)Using Binomial theorem, expand $(x^2 + \frac{3}{x})^4$,where $x \neq 0$. (5)

(iii) 11 questions are set in the questions paper of Business Mathematics in a final examination. In how many different ways can an examinee choose 7 questions?(5)

Que.5(a)Solve the following system of linear equations with crammer's rule:

$$x-2y+3z = 11, 2x+y+2z = 10, 3x+2y+z = 9.$$ (8)

(b)(i)Average cost of each radio for producing 'x' radios is $x^2-10x+30$(in hundred taka).Find the marginal cost when $x = 6$.

(ii) Evaluate the given integral $\int_0^2 \frac{x}{x^2+4} dx$. (7)

Que.6(a)Find the inverse of the given matrix $A=\begin{bmatrix} 2 & -1 & 3 \\ 4 & 0 & -1 \\ 3 & 3 & 2 \end{bmatrix}$. (8)

(b)If A = {a,b,c} and B= {d,e} ,then prove that$A \times B \neq B \times A$. (7)

Que.7(a)A farmer agrees to repay debt of Tk. 6682 in a number of installments, each installment increasing the previous one by Tk. 5. If the first installment be of Tk. 1, find how many installments will be necessary to wipe out the loan completely? (10)

(b)If a and b be two roots of $2x^2 - 4x + 1 = 0$, then find the quadratic equation whose roots are $a^2 + b$ and $a + b^2$. (5)