Professional Course Examination, January 2021
(First Semester)
BACHELOR OF COMPUTER APPLICATIONS
Paper : Basic Mathematics (Revised)
. BCA/1/CC/02

Full Marks: 75
Time: 3 Hours

PART A: OBJECTIVE

1. Tick the correct answer in the bracket provided: **(1x10=10)**

a) The set of numbers {0,1,2,3,…..} is called
 i) natural numbers
 ii) integers
 iii) whole numbers
 iv) rational numbers

b) What type of number is π
 i) irrational number
 ii) rational number
 iii) natural number ‘
 iv) None of the above.

c) The degree of the polynomial $x^3-7x^7+x^2+7x^8+2x-7$ *is*
 i) 8
 ii) 3
 iii) 7
 iv) 2

d) In a certain room, there are 28 women and 21 men. What is the ratio of women to the total number of people?
 i) 4:5
 ii) 4:7
 iii) 3:4
 iv) 5:7

e) In Biden gets 55% of total valid votes in an election. If the total votes were 9000, what is the number of valid votes that the other candidate Donald gets if 30% of total votes were declared invalid?
 i) 3457
 ii) 2785
 iii) 4570
 iv 2835

f) The speed of a train is 90kmph. Then the distance covered by it in 10 minutes is

i) 15
ii) 20
iii) 25
iv) 30

g) The 23rd term of the Arithmetic progression 7,5,3,1…..is
i) -15
ii) -25
iii) -45
iv) -37

h) The Geometric mean between the numbers 5 and 125 is
i) 30
ii) 25
iii) 75
iv) None of the above.

i) The inverse of the matrix $\begin{bmatrix} 1 & -3 \\ -2 & 6 \end{bmatrix}$ is
i) does not exists
ii) $\begin{bmatrix} 1 & 0 \\ -1 & 3 \end{bmatrix}$
iii) $\begin{bmatrix} 7 & 1 \\ 0 & 5 \end{bmatrix}$
iv) $\begin{bmatrix} 2 & -\frac{1}{3} \\ 0 & 7 \end{bmatrix}$

j) The value of the determinant $\begin{bmatrix} 2 & 3 & 4 \\ 5 & 6 & 8 \\ 6 & 9 & 12 \end{bmatrix}$ is
i) 0
ii) 125
iii) 45
iv) 236

2. Say whether the following statements are True or False **(1x5=5)**

a) The smallest natural number is 0.
b) The roots of the equation $x^2+x+1=0$ are real numbers.
c) If P is the principal, R the rate of interest compounded annually and time is *n* years, then the amount is given by the formula P $(1+\frac{R}{100})^n$
d) The constant difference between two consecutive terms of Arithmetic progression is called common ratio.
e) The value of a determinant remains unchanged if its rows and columns are interchanged.

SECTION -B

1. Answer the following questions: **(2x5=10)**

a) Find the HCF of the two numbers 125 and 500?

OR

b) Find any number between $\frac{7}{12}$ and $\frac{4}{5}$.

2. a) Show that 1 is a root of the equation $2x^2-x-1=0$

OR

b) If 0.7:x =5:8, then find the value of x.

3. a) What percentage is 25gm of 1.5kg?

OR

b) If Rs.4 becomes Rs.10 in 50 years at simple interest, find the rate of interest p.a.

4. a) Which terms of the Arithmetic progression 5,8,11,14,…. is 320?

OR

b) Find the geometric mean between the numbers a^3b and ab^3.

5. a) If 12A = $\begin{bmatrix} 2 & -9 & 0 \\ 0 & 24 & -1 \\ 18 & 5 & -7 \end{bmatrix}$ then find A.

OR

b)Find the value of the determinant $\begin{bmatrix} 1 & 3 & 5 \\ 0 & 2 & 1 \\ 0 & 7 & 1 \end{bmatrix}$

PART B - DESCRIPTIVE

1. i) Find the HCF and LCM of the numbers 120, 15 and 50. **(4)**
   ii) Find the cube root of 1728 **(3)**
   iii) Find two rational number between $\frac{1}{4}$ and 2. **(3)**

OR

2. i) Write the following numbers in ascending order (smallest to largest) 2, $\sqrt{3}, \frac{2}{3}$, $\sqrt{3}, \frac{1}{11}$. **(4)**
   ii) Change the number $0.\overline{09}$= 0.09090909…into fractions. **(6)**

3. i) Multiply $(2x^3+7x^2-12x-3)$ by (x^2-x-1) **(3)**
   ii) Factorize $6x^2-16x+10$ **(4)**
   iii) Sam scored 36 marks out of 60. Express the marks in percentage. **(3)**

OR

4. i) Divide $(9x-6x+x^3-)$ *by(x +1).* **(3)**
   ii) Factorize $4x^2+12x+5$ **(4)**
   iii) Find 10% of 1 hour. **(3)**

5. i) A shopkeeper bought 600 oranges and 400 bananas. He found 15% of oranges and 8% of bananas were rotten. Find the percentage of fruits in good condition. **(6)**
   ii) Find the compound interest on Rs.10,000 for 5 years, compounded annually at 12% per annum. (4)

OR

6. i) John buys an old scooter for Rs.4700 and spends Rs.800 on its repairs. If he sells the scooter for Rs.5800, find his gain percent. **(6)**
   ii) Find the compound interest on Rs.2500 for 4 years, compounded annually at 10% per annum. **(4)**

7. i) Find the sum of 24 terms of the Arithmetic progression 1,3,5,7…. **(5)**
ii) Insert three numbers between 3 and 19 such that the resulting sequence is an Arithmetic progression. **(5)**

OR

8. i) Insert three numbers between 1 and 256 so that the resulting sequence is a Geometric progression . **(5)**
ii)Find two positive numbers a and b whose Arithmetic mean and geometric mean are 34 and 16 respectively. **(5)**

9. i) If $A=\begin{bmatrix}3 & 5\\ 7 & -9\end{bmatrix}$ and $B=\begin{bmatrix}6 & -4\\ 2 & 3\end{bmatrix}$, then find the value of 4A-3B? **(5)**

ii) Evaluate $\begin{bmatrix}7 & 1 & 12\\ -2 & 6 & 15\\ -1 & 4 & 37\end{bmatrix}$ **(5)**

OR

10. i) If $A=\begin{bmatrix}5 & 4\\ 2 & 3\end{bmatrix}$ and $B=\begin{bmatrix}3 & 5 & 1\\ 6 & 8 & 4\end{bmatrix}$, find the value of AB. **(5)**

ii) Show that $\begin{bmatrix}1 & a & b+c\\ 1 & b & c+a\\ 1 & c & a+b\end{bmatrix}$=0. **(5)**