

**Professional Course Examination, November/December 2019**  
 ( 1st Semester )

**BACHELOR OF COMPUTER APPLICATIONS**

**( Basic Mathematics )**

( Revised )

Full Marks : 75

Time : 3 hours

**( PART : A—OBJECTIVE )**

( Marks : 25 )

*The figures in the margin indicate full marks for the questions*

**SECTION—A**

( Marks : 15 )

1. Tick (✓) the correct answer in the brackets provided :  $1 \times 10 = 10$

(a) Which of the following is not a rational number?

(i)  $\frac{5897}{9874}$  ( )

(ii) 2.5698 ( )

(iii)  $\sqrt{2}$  ( )

(iv) 0 ( )

(b) If  $a$  and  $b$  are two integers such that their LCM and HCF are equal, then

(i)  $a = b$  ( )

(ii)  $a > b$  ( )

(iii)  $a < b$  ( )

(iv)  $a \leq b$  ( )

(c) The degree of the polynomial  $25x^2 + x^5 - 9x^3 + 2x^6 + x$  is

(i) 6 ( )

(ii) 5 ( )

(iii) 3 ( )

(iv) 2 ( )

(d) The ratio of  $a : b = 2 : 3$  and  $b : c = 5 : 4$ , then the value of the ratio  $a : c$  is

(i) 2:5 ( )

(ii) 5:6 ( )

(iii) 3:4 ( )

(iv) 4:3 ( )

(e) On selling a book for ₹ 810, John gains 8%. For how much did he purchase it?

(i) ₹ 870 ( )

(ii) ₹ 580 ( )

(iii) ₹ 690 ( )

(iv) ₹ 750 ( )

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

(i) 15 km ( )

(ii) 20 km ( )

(iii) 25 km ( )

(iv) 30 km ( )

(g) Which term of the Arithmetic progression 4, 9, 14, 19, ..... is 109?

(i) 18th term ( )

(ii) 25th term ( )

(iii) 20th term ( )

(iv) 22nd term ( )

(h) The sum of 8 terms of the Geometric progression 3, 6, 12, 24, ..... is

(i) 1024 ( )

(ii) 765 ( )

(iii) 609 ( )

(iv) None of the above ( )

(i) The addition of the matrices  $A = \begin{bmatrix} 1 & 0 \\ 3 & 2 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & 1 \\ 1 & 4 \end{bmatrix}$  is

(i)  $\begin{bmatrix} 1 & 1 \\ -2 & 2 \end{bmatrix}$  ( )

(ii)  $\begin{bmatrix} 2 & 0 \\ 3 & 8 \end{bmatrix}$  ( )

(iii)  $\begin{bmatrix} \frac{1}{2} & 0 \\ -\frac{3}{2} & \frac{1}{2} \end{bmatrix}$  ( )

(iv)  $\begin{bmatrix} 3 & 1 \\ 4 & 6 \end{bmatrix}$  ( )

(j) If matrix  $A = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$ , then  $3A$  is

(i)  $\begin{bmatrix} 6 & 3 \\ 9 & 12 \end{bmatrix}$  ( )

(ii)  $\begin{bmatrix} 1 & 2 \\ 0 & -1 \end{bmatrix}$  ( )

(iii)  $\begin{bmatrix} 5 & 3 \\ 6 & 7 \end{bmatrix}$  ( )

(iv)  $\begin{bmatrix} \frac{2}{3} & \frac{1}{3} \\ 1 & \frac{4}{3} \end{bmatrix}$  ( )

2. State whether the following statements are *True (T)* or *False (F)* by putting a Tick ( $\checkmark$ ) mark :

1  $\times$  5 = 5

(a) All integers are also natural number.

( T / F )

(b) The value of  $(a - b)^3$  is  $a^3 + 3a^2b - 3ab^2 - b^3$ .

( T / F )

(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  $P \left( 1 + \frac{R}{100} \right)^n$ .

( T / F )

(d) For any two positive numbers  $a$  and  $b$ , Geometric mean  $\leq$  Arithmetic mean.

( T / F )

(e) Every unit matrix is also a scalar matrix.

( T / F )

SECTION—B

( Marks : 10 )

3. Answer the following questions :

(a) Which of the numbers  $\frac{7}{-8}$  and  $\frac{-5}{6}$  is greater?

(b) Divide  $8x^2y^3$  by  $-2xy$ .

(c) What percentage is 36 mm of 1.2 m?

(d) Which term of the Geometric progression 5, 10, 20, 40, ..... is 5120?

(e) If  $7A = \begin{bmatrix} 5 & 14 & 2 \\ 0 & -21 & 3 \\ 1 & 0 & -7 \end{bmatrix}$ , then find A.

( PART : B—DESCRIPTIVE )

( Marks : 50 )

The figures in the margin indicate full marks for the questions

1. (a) Find the value of  $x$  :

$$\left(\frac{15}{7} \times \frac{-21}{10}\right) \times \frac{-5}{6} = x \times \left(\frac{-21}{10} \times \frac{-5}{6}\right)$$

(b) Find the square root of 784.

(c) Find two rational numbers between 4 and 5.

OR

(d) The product of two numbers is  $\frac{-28}{27}$ . If one of the numbers is  $\frac{-4}{9}$ , find the other.

(e) Evaluate  $\sqrt[3]{\frac{216}{2197}}$ .

- (f) From a rope 11 m long, two pieces of length  $2\frac{3}{5}$  m and  $2\frac{3}{10}$  m are cut off. What is the length of the remaining rope? 3
2. (a) Multiply  $(3x^3 - 5x^2 - x + 1)$  by  $(4 - 6x + 3x^2)$ . 3
- (b) Factorize  $x^2 + 10x + 24$ . 4
- (c) Two numbers are in the ratio 5:8. If the sum of the numbers is 182, find the numbers. 3
- OR**
- (d) Divide  $9x - 6x^2 + x^3 - 2$  by  $x + 1$ . 3
- (e) Factorize  $x^2 - 10x + 24$ . 4
- (f)  $\frac{2}{3}$  of a number is 20 less than the original number. Find the number. 3
3. (a) David purchased two shirts for ₹ 750 each. He sold these shirts, gaining 6% on one and losing 4% on the other. Find his gain or loss percent in the whole transaction. 6
- (b) Find the compound interest on ₹ 8,000 for 3 years, compounded annually at 5% per annum. 4
- OR**
- (c) Debbie sells two watches for ₹ 1,955 each, gaining 15% on one and losing 15% on the other. Find her gain or loss percent in the whole transaction. 6
- (d) Find the compound interest on ₹ 12,500 for 2 years, compounded annually at 8% per annum. 4

4. (a) Find the sum of 23 terms of the Arithmetic progression 5, 9, 13, 17, ..... .
- (b) Insert four numbers between 4 and 19 such that the resulting sequence is an Arithmetic progression.
- (c) Find the Geometric mean between 27 and 243.

OR

- (d) Find the sum of all odd integers from 1 to 101.
- (e) Insert two numbers between 3 and 81 so that the resulting sequence is a Geometric progression.

5. (a) Find a matrix  $X$ , if  $X + \begin{bmatrix} 4 & 6 \\ -3 & 7 \end{bmatrix} = \begin{bmatrix} 3 & -6 \\ 5 & -8 \end{bmatrix}$ .

- (b) Evaluate  $\begin{vmatrix} 2 & 7 & 65 \\ 3 & 8 & 75 \\ 5 & 9 & 86 \end{vmatrix}$ .

OR

- (c) Find a matrix  $X$  such that  $2A + B + X = 0$ , where  $A = \begin{bmatrix} -1 & 2 \\ 3 & 4 \end{bmatrix}$  and  $B = \begin{bmatrix} 3 & -2 \\ 1 & 5 \end{bmatrix}$ .

- (d) Show that  $\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix} = 0$ .