

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

(i) 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 (✓) 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 $\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix} = 0$.

OR

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(c) Debbie sells two watches for ₹ 1955 each, gaining 15% on one and losing 15% on the other. Find her gain or loss percent in the whole transaction.

(d) Find the compound interest on ₹ 12,500 for 2 years, compounded annually at 8% per annum.