BCA/1/CC/02

Student's Copy

Professional Course Examination (Odd), 2023

(1st Semester)

BACHELOR OF COMPUTER APPLICATIONS

Course No. : BCA/1/CC/02

(Basic Mathematics)

Full Marks: 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(PART : A—OBJECTIVE)

(Marks: 25)

SECTION-A

(Marks: 15)

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

1. The HCF of 204, 1190 and 1445 is (a) 17 *(b)* 18 () () (c) 19 () (d) 21 () 2. $\frac{3}{8}$ of 168 15 5 ? 549 9 235 (a) 107 *(b)* 174 () () (c) 1 () (d) 296 () 3. The average of first 50 natural numbers is (a) 12.25 () *(b)* 21.25 () *(c)* 25 ((d) 25.5())

4. If one-third of one-fourth of a number is 15, then three-tenth of that number is

(a)	35	()	(b)	36	()
(c)	45	()	(d)	54	()

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- 5. *A* and *B* can do a work in 12 days, *B* and *C* in 15 days and *C* and *A* in 20 days. If *A*, *B* and *C* work together, they will complete the work in
 - (a) 5 days () (b) $7\frac{5}{6}$ days () (c) 10 days () (d) $15\frac{2}{3}$ days ()
- 6. A boat running downstream covers a distance of 16 km in 2 hours while for covering the same distance upstream, it takes 4 hours. What is the speed of the boat in still water?
 - (a) 4 km/hr () (b) 6 km/hr ()
 - (c) 8 km/hr () (d) Data inadequate ()

7. The sum of 24 terms of the AP 1, 3, 5, 7,... is

(a)	576	()	(b)	672	()
(c)	584	()	(d)	626	()

8. The geometric mean between the numbers 5 and 125 is

- *(a)* 15 ()
- *(b)* 10 ()
- *(c)* 25 ()
- (d) 35 ()

9. A matrix having the same number of rows and columns is called

- (a) scalar matrix ()
- (b) square matrix ()
- (c) equal matrix ()
- (d) diagonal matrix ()
- 10. If any two rows or columns of a determinant are identical, then its value is

(a)	changed		()	(b)	unchange	d		()
(c)	one	()		(d)	zero	()		

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- **B.** State whether the following statements are *True* (*T*) or *False* (*F*) by putting a Tick (\checkmark) mark : $1 \times 5 = 5$
 - 1. $\sqrt{2}$ $\sqrt[3]{3}$.

T / F ()

/

F

F

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- 2. Half of 1 percent written as a decimal is 0.005.
- 3. By selling an article for ₹ 100, a man gains ₹ 15. Then his gain % is $17\frac{1}{4}$ %.
- 4. A sequence in which each term except the first one differs from its preceding term by a constant is called geometric progression.
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(T / F

5. A square matrix A is said to be symmetric if AΑ. Τ /

SECTION-II

- **C.** Answer the following questions :
 - 1. (a) Insert two fractions between $\frac{5}{9}$ and $\frac{1}{4}$.

OR

- (b) Find the LCM of 24, 36 and 40.
- 2. (a) Two-fifth of one-third of three-seventh of a number is 15. What is 40 percent of that number?

OR

(b) Divide :

 x^2 14x 31 (x 10)

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 $2 \times 5 = 10$

3. (a) A train 150 m long is running with a speed of 68 kmph. In what time will it pass a man who is running at 8 kmph in the same direction in which the train is going?

OR

- (b) If the simple interest on a sum of money at 5% per annum for 3 years is ₹ 1200, find the compound interest on the sum for the same period at the same rate.
- 4. (a) Find the 10th and *n*th terms of the GP 12, 4, $\frac{4}{3}$, $\frac{4}{9}$,....

OR

(b) How many terms are there in the AP 10, 13, 16,, 43?

5. *(a)* If

	2	2	4
Α	1	3	4
	1	2	3

show that A^2 A.

OR

(b) If

	3	5
Α	2	0
	4	6

verify that $(2A) \quad 2A$.

(PART : B—DESCRIPTIVE)

(Marks: 50)

1. (a) Simplify :

$$3\frac{1}{4}$$
 $1\frac{1}{4}$ $\frac{1}{2}$ $2\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{6}$

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3

(b) If

		$x rac{\sqrt{5} \sqrt{3}}{\sqrt{5} \sqrt{3}} ext{and} y rac{\sqrt{5} \sqrt{3}}{\sqrt{5} \sqrt{3}}$	
		find the value of $x^2 y^2$.	3
	(c)	$(18)^{35}$ $(27)^{35}$ 6^{35} 2x, find the value of x.	4
		OR	
2.	(a)	Reduce $\frac{128352}{238368}$ to its lowest terms.	3
	(b)	Four children A, B, C and D divide a bag of sweets. A takes $\frac{1}{3}$ of them,	
		<i>B</i> takes $\frac{2}{5}$ th of the remainder and the rest is equally shared between <i>C</i>	
		and D . What fraction of the sweets did C or D get?	3
	(c)	Find $\sqrt{64009}$ and $\sqrt[3]{\sqrt{0\ 000064}}$.	4
3.	(a)	Find the value of k for which the system of equations	
		$3x \ y \ 1, \ (2k \ 1) \ x \ (k \ 1) \ y \ (2k \ 1)$	
		has no solution.	5
	(b)	Solve for x and $y : 10x 3y 75, 6x 5y 11$.	3
	(c)	If 35% of a number is 175, then what percent of 175 is that number?	2
		OR	
4.	(a)	Solve : $4x^3 2x^2 36x 18 0.$	4
	(b)	A fraction becomes $\frac{2}{3}$ when 1 is added to both its numerator and	
		denominator. And it becomes $\frac{1}{2}$ when 1 is subtracted from both the	
		numerators and denominators. Find the fraction.	3
	(c)	In a mixture of 60 litres, the ratio of milk and water is $2:1$. If this ratio is to be $1:2$, then find the quantity of water to be further added.	3

5

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- **5.** (*a*) A shopkeeper sells one transistor for ₹ 840 at a gain of 20% and another for ₹ 960 at a loss of 4%. Find his total gain or loss percent.
 - (b) A started a business investing ₹ 45,000. After 3 months, B joined him with a capital of ₹ 60,000. After another 6 months, C joined them with a capital of ₹ 90,000. At the end of the year, they made a profit of ₹ 16,500. Find the share of each.
 - (c) While covering a distance of 24 km, a man noticed that after walking for 1 hour and 40 minutes, the distance covered by him was $\frac{5}{7}$ of the remaining distance. What was his speed in metres per second?

OR

6. (a) Study the following table carefully and answer these questions :Number of candidates appeared and qualified in a competitive examination from different States over the years :

Year/	1997		1998		1999		2000		2001	
State	App.	Qual.								
М	5200	720	8500	980	7400	850	6800	775	9500	1125
N	7500	840	9200	1050	8450	920	9200	980	8800	1020
Р	6400	780	8800	1020	7800	890	8750	1010	9750	1250
Q	8100	950	9500	1240	8700	980	9700	1200	8950	995
R	7800	870	7600	940	9800	1350	7600	945	7990	885

- *(i)* Combining the States *P* and *Q* together in 1998, what is the percentage of the candidates qualified to that of the candidates appeared?
- *(ii)* Find the percentage of the total number of qualified candidates to the total number of appeared candidates among all the five States in 1999.
- (*iii*) What is the percentage of candidates qualified from State *N* for all the years together, over the candidates appeared from State *N* during all the years together?
- *(iv)* What is the average of candidates who appeared from State *Q* during the given years?

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		(v) In which of the given years the number of candidates appeared from State <i>P</i> has maximum percentage of qualified candidates?	5
		(vi) Total number of candidates qualified from all the States together in 1997 is approximately, what percentage of the total number of candidates qualified from all the States together in 1998?	1
7. (e	a)	The sum of three numbers in GP is $\frac{39}{10}$ and their product is 1. Find the	
		numbers.	4
(1	b)	Find the sum of the series 8 88 888 to n terms.	3
(0	c)	The 5th and 13th terms of AP are 5 and -3 respectively. Find this AP and obtain its 16th term.	3
		OR	
8. (a)	Insert three numbers between $\frac{1}{3}$ and 432 so that the resulting	
		sequence is a GP.	3
(1	b)	Find the sum of 20 terms of the AP $\sqrt{2}$, $2\sqrt{2}$, $3\sqrt{2}$	3
(0	c)	If a , b , c are in AP, show that	
		$(b \ c \ a), (c \ a \ b), (a \ b \ c)$	
		are in AP.	4
9. (a)	Find the inverse of the matrix given below :	5
		2 1 1	
		3 0 1	
		2 6 0	
(1	Ъ)	Using properties of determinants, prove that	
		$\begin{vmatrix} x & x^2 & yz \end{vmatrix}$	
		$y y^2 zx$ $(x y)(y z)(z x)(xy yz zx)$	
		$\begin{vmatrix} z & z^2 & xy \end{vmatrix}$	3
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(c) Find the matrix X such that 2A B X 0 where

Λ	3 1 and R			2 1	
A	0	2		0 3	2

OR

10. (a) Solve the following system of equations using matrix method : 6

(b) If

			1	2	3	1	
[1	x	1]	4	5	6	2	0
			3	2	5	3	

find *x*.

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