1476/I

B.C.A. (PART-I) 1ST SEMESTER EXAMINATION, 2021-22

B.C.A.

PRINCIPLES OF MATHEMATICS

BCA-102

Paper : II

0141

Time : 3 Hrs.
समय : 3 घण्टे

Max. Marks : 70
अधिकतम अंक : 70

अनुक्रमांक (अंकों में) :
Roll No. (In Figures)

अनुक्रमांक (शब्दों में) : _____

Roll No. (In Words) : _____

अभ्यर्थी का नाम : _____

Student Name : _____

कक्ष परिप्रेक्षक के हस्ताक्षर / Invigilator's Signature : _____

Note : (i) Answer ***five*** questions in all.
(ii) Question No.1 is compulsory.
(iii) Answer remaining ***four*** questions, selecting ***two*** from each Section **A** and **B**.
(iv) All Questions carry equal marks.
(v) Symbols have their usual meaning.

1. (a) Verify De Morgna's law for A and B, where :
$A = \{1,2\}$
$B = \{2,3,4\}$

(b) If $A=\{2,5\}$, $B=\{2,3\}$, evaluate $A \times B$ and $B \times A$.

(c) Show that $f : R \to R$ defined by $f(x) = 3x-1$, is an one-one function.

(d) Find the value of $\Delta = \begin{vmatrix} 3 & 4 & 2 \\ 6 & 0 & 1 \\ 1 & 7 & 3 \end{vmatrix}$

SECTION-A

2. Let $n(A) = n(B) = m$, and let $f : A \to B$ is a function, prove that the following three statements are equivalent :
(a) f is one to one
(b) f is onto
(c) f is bijection

3. If $A = \frac{1}{9}\begin{bmatrix} -8 & 1 & 4 \\ 4 & 4 & 7 \\ 1 & -8 & 4 \end{bmatrix}$
Show that $A^{-1} = A^T$

4. Describe progression in mathematics and solve the following :
(i) If in any decreasing arithmetic progession the sum of all i^{th} term, except for the first term, is equal to –36.
(ii) The sum of all its terms, except for the last term is zero and
(iii) The difference of the tenth and the sixth term is equal to –16 then what will be first term of its series.

5. $f(x) = x - 9$, $g(y) = y^2$,
Find (i) $f \circ g(x)$; (ii) $g \circ f(y)$
(iii) $f \circ f(y)$; (iv) $g \circ g(y)$

SECTION-B

6. (a) Given that A is the set of books and a Rb iff 'a cost more that b' or 'a contains more pages than b'
Check the set A for (i) Reflexivity
(ii) Symmetry and
(iii) Transitivity

(b) Find the area of trangle : (3,8) , (–5, –3) and (2, –7) using determinants of matrix.

7. (a) Find the sum of all numbers divisible by 6 in between 100 to 400.

(b) Show that the matrix $A = \begin{bmatrix} 0 & x & y \\ -x & 0 & z \\ -y & -z & 0 \end{bmatrix}$ is skew symmetric.

8. (a) In his end of year examination, Sushil scored the following :
Physics – 84%, English – 70%, Hindi – 75%, Mathematics – 84%, Chemistry – 85%
What was the mode ?

(b) Manoj agree to work at the rate of Rs. 10/- on the first day, Rs. 20/- on the second day, Rs. 40/- on third day and so on. How much will Manoj get if he starts working on the 1st of April and finishes on the 20th of April ?

9. Write notes on any two of the following :
(a) Proper Subset
(b) Symmetric Relation
(c) Measure of Central Tendency