

S.No. : 383

BCAT 124

No. of Printed Pages : 04

Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 1109

Roll
No.

--	--	--	--	--	--	--	--	--	--

BCA Examination 2018-19

(Even Semester)

MATHEMATICS - II

Time : 3 Hours]

[Maximum Marks : 100

Note : (i) Attempt all questions.

SECTION - A

1. Fill in the blanks. 1 × 10 = 10

(a) If A and B are adjoint sets then $A \cap B =$
.....

(b) If $n(A) = 0$ then $n_p(A) =$

(c) If R is a symmetric relation then $x R y =$
.....

(d) Relation R is transitive if

(e) If $f(x) = 3x - 5, \forall x \in R$ then $f^{-1}(5)$
.....

[P. T. O.

- (f) Bijective function is also known as
- (g) In a poset, if greatest element exist then it is
- (h) Complemented distributed lattices is called
- (i) The poset (\geq, \leq) is
- (j) The set P_3 of all permutation on 3 symbols is finite group of order.....

B. State True and False.

- (a) If A is any non- empty set then $A \cap \phi = A$
- (b) Number of proper subsets of a set having n elements is 2^n .
- (c) Every relation which is transitive must be reflexive.
- (d) There are $2^n (n-1)$ reflexive relations on a set having n elements.
- (e) The function $f(x) = ax+b, \forall x \in R$ is injective.
- (f) Composition of function is commutative.

- (g) If $A = \{1,2\}$ then $(P(A), \subseteq)$ is lattice.
- (h) Every modular lattices is distributed.
- (i) Every group is monoid.
- (j) Every subgroup of a cyclic group is cyclic.

SECTION – B

1. Attempt any three questions. $3 \times 10 = 30$

- (a) State and prove Demorgon's laws.
- (b) Relation R is defined on set of real numbers as $R = \{(x,y) : (x-y) \text{ is multiple of } 3\}$. Prove that R is an equivalence relation.
- (c) Define function and its types with examples.
- (d) Define lattice and its types with example.
- (e) Prove that $G = \{1, w, w^2\}$ is a multiplicative group where w is cube root of unity.

SECTION – C

1. Attempt any one part each question : $10 \times 2 = 20$

- (a) Prove that

$$A \times (B \cap C) = (A \times B) \cap (A \times C).$$

/P. T. O.

(b) For any sets A and B prove that :

$$A - B = (A \cap B')$$

4. (a) Prove that relation R is defined as :

$(a,b) R (c,d) \Rightarrow ad = bc$. Prove that R is equivalence relation.

(b) Define recursive function with example.

5. (a) If $f(x) = x^2 + 1, \forall x \in \mathbb{R}$ and $g(x) = 2x, \forall x \in \mathbb{R}$ verify that $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$.

(b) Prove that $f(x) = 5x+7, \forall x \in \mathbb{R}$ is invertible. Hence find its inverse.

6. (a) Define partial order relation with example.

(b) Draw Hasse diagram for $(P(S), \subseteq)$ where $S = \{a, b, c\}$. Hence prove that it is lattice.

7. (a) Prove that $G = \{1, -1, j, -j\}$ is a multiplicative group.

(b) Define Ring with example.

