Computer Science & Information Technology

Discrete Mathematics

DPP : 5

Set Theory and Algebra

Q1 Let f : A→B be a function, and let E and F be subsets of A. Consider the following statements.
S1: f(E ∪ F) = f(E) ∪ f(F)
S2: f(E ∩ F) ⊆ f(E) ∩ f(F)
S3: f(E ∩ F) = f(E) ∩ f(F) if function f is one-one.
Which of the following is true?
(A) Only S2 and S3 are true.
(B) Only S1 and S3 are true.
(C) Only S1 and S2 are true.
(D) All S1, S2 and S3 are true.

Q2 Let $f(x) = \frac{x}{x+1}$ and $g(x) = \frac{x}{1-x}$ then $(fog)^{-1}(x)$ = ?

Q3 Let A = R − {3}
B = R − {1}
Where R is the set of all real numbers if f: A → B such that $f(x) = \frac{x-2}{x-3}$, then
(A) f is one-one but not onto
(B) f is not one-one but onto
(C) f is bijection
(D) f is neither one-one nor onto

Q4 If the function f :[1, ∞) → [1, ∞) defined by $f(x)= 2^{x(x-1)}$ is invertible, then $f^{-1}(x)$ is :
(A) $\frac{1+\sqrt{1+2\log_2 x}}{4}$
(B) $\frac{1-\sqrt{1+2\log_2 x}}{4}$
(C) $\frac{1+\sqrt{1+4\log_2 x}}{2}$
(D) $\frac{1-\sqrt{1+4\log_2 x}}{2}$

Q5 The domain of the function:
$f(x) = \sin\left\{\log\left(\frac{\sqrt{4-x^2}}{(1-x)}\right)\right\}$ is :
(A) (− 2, 0)
(B) (− 2, 1)
(C) (− 2, 2) − {1}
(D) (0, 2) − {1}

Q6 Which of the following statements is /are True?
(A) A constant function is one-one iff domain of the functions has exactly one element
(B) A constant function is onto iff co-domain of the functions has exactly one element
(C) Every one-one function on a finite set A is bijection
(D) Every onto function on a finite set A is bijection

Q7 Let A = {a, b, c} and B = {1, 2, 3, 4}
Set C is defined as C = {f: A→B | 2 ∈ f(x) for some x ∈ A, and f is not one-one}
Then number of elements in set C are_____,

Q8 Let |A| = 6 and |B| = 3, then number of onto functions possible from set A to set B are_____

Answer Key

Q1	(D)	Q5	(B)
Q2	x	Q6	(A, B, C, D)
Q3	(C)	Q7	19~19
Q4	(C)	Q8	540~540