



Seat No. _____

PAPER CODE : CCL-8287**B. Sc. (Sem. I) Examination****March - 2022****Mathematics : ESMAT-11****(Set Theory & Function) (New Course)**

Total Time : 25 Minutes

Total Questions : 20

Total Marks : 35

Students need to Tick only : 18

Students need to tick only 18 questions. If more than 18 questions are ticked, the first 18 questions will only be evaluated.

- 1 The number of non-empty subsets of $\{a, b, c, d\}$ is
(A) 3 (B) 16
(C) 15 (D) 4
- 2 Which one of the following is correct ?
(A) $\{1\} \in \{1, 3\}$ (B) $1 \cup \{1, 2\}$
(C) $\{1\} \subset \{0, \{1\}, 2\}$ (D) $\{1, 2\} \subseteq \{2, 1\}$
- 3 If $A = \{3m | m \in N\}$ and $B = \{3^m | m \in N\}$ then $A \cap B =$ _____ and
 $A \cup B =$ _____
(A) B, A (B) A, B
(C) A, A (D) B, B
- 4 If $U = \{1, 2, 3, \dots, 10\}$, $A = \{1, 3, 5, 7\}$, $B = \{1, 2, 3, 4, 5\}$ then
 $(A' \cup B') =$ _____
(A) $\{2, 4, 6, 8, 10\}$ (B) $\{2, 6, 7, 8, 9, 10\}$
(C) $\{2, 4, 6, 7, 9, 10\}$ (D) $\{2, 4, 6, 7, 8, 9, 10\}$

- 5 Which of the following is an infinite set ?
- (A) $\{x|x \in N, x < 50\}$
 (B) $\{x:x \in I, x < 50\}$
 (C) $\{x|x \in I, x \text{ is a factor of } 50\}$
 (D) None of above
- 6 If $A = \{a, b\}$ then the power set of $A =$ _____
- (A) $\{a^a, b^b\}$ (B) $\{a^b, b^a\}$
 (C) $\{\phi, \{a\}, \{b\}, \{a, b\}\}$ (D) None of these
- 7 The symmetric difference of two sets A and B is
- (A) $(A-B) \cap (B-A)$ (B) $(A-B) \cup (B-A)$
 (C) $(A \cap B) - (A \cup B)$ (D) None of above
- 8 $\{x:x \in R, -4 < x \leq 6\} =$ _____
- (A) $(-4, 6)$ (B) $[-4, 6]$
 (C) $[-4, 6)$ (D) $(-4, 6]$
- 9 $n(A) + n(B) - n(A \cap B) =$ _____
- (A) $n(A \cup B)$ (B) $n(A \cap B)$
 (C) $n(A)$ (D) $n(B)$
- 10 $A \cup (A \cap B) =$ _____
- (A) A (B) B
 (C) A' (D) ϕ

11 The range of the function $f: R \rightarrow R, f(x) = x^2$ is

(A) R^+

(B) $R^+ \cup \{0\}$

(C) R

(D) None of these

12 If $f: R \rightarrow R, f(x) = 3x + 2$, then $f^{-1}(x) =$ _____

(A) $\frac{x-2}{3}$

(B) $\frac{x-3}{2}$

(C) $2x-3$

(D) $\frac{x+2}{3}$

13 Which of the following functions is one-one ?

(A) $f: R \rightarrow R, f(x) = x^2$

(B) $f: R^+ \rightarrow R^+, f(x) = |x|$

(C) $f: R \rightarrow R, f(x) = |x|$

(D) $f: R \rightarrow R, f(x) = x^2 - 2$

14 Which of the following function is onto ?

(A) $f: N \rightarrow N, f(x) = x + 1$

(B) $f: Z \rightarrow Z, f(x) = 2x - 1$

(C) $f: R \rightarrow R, f(x) = 3x + 2$

(D) None of the above

15 Which of the following function is one-one and onto ?

(A) $f: N \rightarrow N, f(x) = x + 2$

(B) $f: Z \rightarrow Z, f(x) = 3x - 1$

(C) $f: R \rightarrow R, f(x) = x^2$

(D) $f: N \times N \rightarrow N \times N, f(m, n) = (n, m)$

16 If $f: A \rightarrow B$ and $g: C \rightarrow D$ then $g \circ f$ exists if _____

(A) $B \subset D$

(B) $A \subset B$

(C) $C \subset D$

(D) $B \subset C$

- 17 $A = \{1, 2, 3\}$, $B = \{4, 5, 6\}$, $f: A \rightarrow B$ and $g: B \rightarrow A$ and
 $f = \{(1, 4), (2, 5), (3, 6)\}$, $g = \{(4, 1), (5, 2), (6, 3)\}$ then $\text{gof} =$ _____
- (A) I_A (B) I_B
 (C) B (D) None of the above

- 18 $f: R \rightarrow R$, $f(x) = x^2$ then $f^{-1}(x) =$ _____

- (A) x^2 (B) \sqrt{x}
 (C) x (D) None of the above

- 19 $f: R \rightarrow R$, $f(x) = x^2 + x + 1$ and $g: R \rightarrow R$, $g(x) = x - 1$ then

$(\text{fog})(x) =$ _____

- (A) $x^2 - x + 1$ (B) $x^2 + x + 1$
 (C) $x^2 + x - 1$ (D) $-x^2 + x + 1$

- 20 $f: N \rightarrow Z$, $f(n) = \begin{cases} \frac{n}{2}, & n \text{ is even} \\ \frac{1-n}{2}, & n \text{ is odd} \end{cases}$ then $f(5) =$ _____

- (A) 2 (B) -2
 (C) 0 (D) $\frac{5}{2}$

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