

PAPER CODE: 3036

BSc SEM -1 (OLD / NEW COURSE)

JULY-SEP-2021

ESMAT – 11 : Business Mathematics - I : [MCQ Test]

[Set Theory & Functions]

કુલ સમય :- ૩૦ મીનીટ

કુલ પ્રશ્નો : ૨૫

વિદ્યાર્થીએ ટીક કરવાના પ્રશ્નો : ૧૮

નોંધ : વિદ્યાર્થીએ માત્ર ૧૮ પ્રશ્નો જ ટીક કરવાના રહેશે. જો વધારે ટીક કરેલ હશે તો પ્રથમ ૧૮ પ્રશ્નો જ ગણતરીમાં લેવામાં આવશે.

- (1) If $A = \{x \in \mathbb{N} / |x^3 - 2| \leq 25\}$ then $n(A) =$.
(a) 2 (b) 3 (c) 4 (d) 5
- (2) If $B = \{x \in \mathbb{Z} / |x| \leq 1\}$ then $B \neq$ _____.
(a) $\{0\}$ (b) $\{-1, 1\}$ (c) $\{-1, 0, 1\}$ (d) none of these
- (3) If $A = \{\phi, a\}$ then which of the following is not true?
(a) $\{\phi\} \in A$ (b) $\{\phi\} \in P(A)$ (c) $A \in P(A)$ (d) $\{a\} \subset A$
- (4) If $n(A) = 3$ and $n(B) = 6$ then the minimum number of elements in set $A \cup B$ is _____.
(a) 3 (b) 6 (c) 9 (d) none of these
- (5) The minimum value of $|x-3| + |x-2| + |x-5|$ is equal to _____.
(a) 3 (b) 7 (c) 9 (d) 15
- (6) If $f(x) = \log\left(\frac{1+x}{1-x}\right)$ and $g(x) = \log\left(\frac{3x+x^3}{1+3x^2}\right)$ then $f[g(x)] =$ _____.
(a) $-f(x)$ (b) $3f(x)$ (c) $[f(x)]^3$ (d) $-3f(x)$
- (7) The total number of injective mappings from a set with m elements to a set with n elements is _____, where $m \leq n$.
(a) m^n (b) n^m (c) $\frac{n!}{(n-m)!}$ (d) $n!$
- (8) If $n(U) = 700$, $n(A) = 200$, $n(B) = 300$ and $n(A \cap B) = 100$, then $n(A^c \cup B^c) =$ _____.
(a) 400 (b) 600 (c) 300 (d) 200
- (9) let $E = \{1, 2, 3, 4\}$ and $F = \{1, 2\}$, then the number of onto functions from E to F is _____.
(a) 14 (b) 16 (c) 12 (d) 8

(10) If $f(x) = \frac{3x+2}{5x-3}$, then _____.

- (a) $f^{-1}(x) = f(x)$ (b) $f^{-1}(x) = -f(x)$ (c) $(f \circ f)(x) = -x$ (d) $f^{-1}(x) = -\frac{1}{19} f(x)$

(11) If $f: \mathbb{R} \rightarrow \mathbb{R}$, $f(x) = x^2$, then f is _____.

- (a) injective but not surjective (b) surjective but not injective
(c) bijective (d) neither surjective nor injective

(12) If $g(f(x)) = |\sin x|$ and $f(g(x)) = (\sin \sqrt{x})^2$ then

- (a) $f(x) = \sin^2 x$, $g(x) = \sqrt{x}$ (b) $f(x) = \sin x$, $g(x) = |x|$
(c) $f(x) = x^2$, $g(x) = \sin(\sqrt{x})$ (d) f and g can't be determined

(13) If $A = \{2, 3, 5, 7\}$, $B = \{1, 2, 3, 8\}$ then $A^c \cup B^c =$ _____, where $U = \{1, 2, \dots, 8\}$.

- (a) $\{5, 7\}$ (b) $\{1, 8\}$ (c) $\{1, 4, 5, 6, 7, 8\}$ (d) U

(14) In a group of 52 persons, 16 drink tea but not coffee, while 33 drink tea. How many persons drink coffee but not tea?

- (a) 17 (b) 23 (c) 36 (d) 19

(15) The number of all possible subsets of $\{1, \{2, 3\}\}$ is _____.

- (a) 2 (b) 4 (c) 6 (d) 8

(16) For any sets A and B , $A - (A - B) =$ _____.

- (a) B (b) $A - B$ (c) $A \cap B$ (d) $A' \cap B'$

(17) The relation $\geq$ on the set I of all integers is _____.

- (a) symmetric (b) antisymmetric (c) equivalence (d) none of these

(18) If $f(x) = \frac{1}{x+1}$ then $f(-x) - f(x) =$ _____.

- (a) $\frac{x-2}{1+x}$ (b) $\frac{2x-2}{1+x}$ (c) $\frac{x-2}{1-x}$ (d) $\frac{2x-2}{1-x}$

(19) If $f(x) = y = \frac{ax+b}{cx-a}$ then $f(y) = x =$ _____.

- (a) $\frac{ay+b}{cy-a}$ (b) $\frac{ay-b}{cy+a}$ (c) $\frac{ax+b}{cx-a}$ (d) $\frac{ax-b}{cx-a}$

(20) If $A = \{1, 2, 3\}$, $B = \{2, 3, 4\}$ and $f: A \rightarrow B$, $f = \{(1, 2), (2, 3), (3, 4)\}$

$g: B \rightarrow B$, $g = \{(2, 2), (3, 0), (4, 2)\}$ then $f \circ g =$ _____.

- (a) $\{(3, 2/3)\}$ (b) $\{(0, 3)\}$ (c) $\{(2, 3/2)\}$ (d) $\{(2, 3/4)\}$

- (21) If $f(x) = 2x^2 - 5x + 4$ then for which value of x is $2f(x) = f(2x)$?
 (a) ± 1 (b) ± 2 (c) ± 3 (d) none of these
- (22) If $f(x) = x^2 - x$ then $f(a+1) =$ _____.
 (a) $-f(a)$ (b) $f(-a)$ (c) $f(a) + 1$ (d) $1 - f(a)$
- (23) If $f(x) = 2x^2 - 1$ and $g(x) = x - x^2$ then $g(f(2)) =$ _____.
 (a) 42 (b) 24 (c) -42 (d) -24
- (24) For which value of x , $(f \circ g)(x) = (g \circ f)(x)$ where $f(x) = x + 1$, $g(x) = 2x$.
 (a) 1 (b) -1 (c) 0 (d) does not exist.
- (25) $f: \mathbb{R} \rightarrow \mathbb{R}^+$, $f(x) = \log_e x$ and $g: \mathbb{R}^+ \rightarrow \mathbb{R}$, $g(x) = e^x$ then $g \circ f =$ _____.
 (a) $I_{\mathbb{R}}$ (b) I^+ (c) x (d) e
- (26) Which of the following is not one-one function?
 (a) $f: \mathbb{N} \rightarrow \mathbb{Z}$, $f(x) = 3x - x^2$ (b) $g: \mathbb{N} \rightarrow \mathbb{N}$, $g(x) = 2x^2 + 3$
 (c) $h: \mathbb{Z} - \{2\} \rightarrow \mathbb{Z}$, $h(x) = \frac{x^{2+x-6}}{x-2}$ (d) $t: \mathbb{R} \rightarrow \mathbb{R}$, $t(x) = 2t + 3$
- (27) The function $f: [-\pi/2, \pi/2] \rightarrow [-1, 1]$, $f(x) = \sin x$ is
 (a) one-one, into (b) one-one, onto (c) many-one, into (d) many-one, onto
- (28) The range of function $f(x) = \frac{x^2}{1+x^2}$ is
 (a) $[1, \infty)$ (b) $[0, 1)$ (c) $[-1, 1]$ (d) $(0, 1]$
- (29) The domain of function $f(x) = \log(1-x) + \sqrt{x^2 - 1}$ is _____.
 (a) $(1, \infty)$ (b) $(-\infty, -1]$ (c) $[-1, 1]$ (d) $(0, 1)$
- (30) The period of function $f(x) = \cos(x^2)$ is _____.
 (a) 2π (b) $4\pi^2$ (c) $\pi^2/4$ (d) None of these
- (31) The period of function $f(x) = \tan(3x+2)$ is _____.
 (a) π (b) $2\pi/3$ (c) $\pi/3$ (d) None
- (32) If $f(x) = [x]$ and $g(x) = |x|$, then $(g \circ f)(-5/3) - (f \circ g)(-5/3) =$ _____.
 (a) $1/3$ (b) $-1/3$ (c) $2/3$ (d) $-2/3$
- (33) If $A \subset B$ then $A' \cup B' =$ _____.
 (a) A' (b) B' (c) $A' \cap B'$ (d) None of these
- (34) If A and B are subsets of set X , then
 (a) $A \cup B = X \Rightarrow A' = B$ (b) $A \cup B = X \Rightarrow B' = A$
 (c) $A \cup B = X \Rightarrow A \cap B = \phi$ (d) $A \cup B = X$ and $A' = B \Rightarrow A \cap B = \phi$
- (35) If $f: \mathbb{Q} \rightarrow \mathbb{Q}$, $f(x) = 3x + 5$, then $f^{-1}(x) =$ _____.
 (a) $3x - 5$ (b) $\frac{1}{3x+5}$ (c) $\frac{1}{3}(x-5)$ (d) None of these