SETS

Multiple Choice Questions

Q1 The number of subsets of a set containing n-elements is
$(a)\ n$ $(b)\ n^2 (c)\ 2^n (d) 2^n - 1$

Q2 For any two sets A and B, $A \cap (A \cup B) =$
(a) A (b) B (c) ϕ (d) none of these

Q3 If A= {1,3,5,B} B={2,4} ,then
(a) $4 \in A$ (b) $\{4\} \subset A$ (c) $B \subset A$ (d) none of these

Q4 Let A={x: $x \in R$, x>4} and B={x: $x \in R$, x<5}.Then $A \cap B =$
(a) (4,5] (b) (4,5) (c) [4,5) (d) [4,5]

Q5 Let A and B be two sets such that n(A)=16 ,n(B)=14 , n(AUB)=25 .Then $n(A \cap B)$ =
(a) 30 (b) 50 (c) 5 (d) none of these

Q6 If A={1,2,3,4,5}, then the number of proper subsets of A is
(a) 120 (b) 30 (c) 31 (d) 32

Q7 In set builder form empty set is represented by
(a) { } (b) ϕ (c) {x: $x \neq x$ } (d) {x: x=x}

Q8 For two sets A and B , AUB = A iff
(a) $B \subseteq A$ (b) $A \subseteq B$ (c) $A \neq B$ (d) none of these.

Q9 In a city 20 % of population travel by car ,50% travel by bus and 10% travels by both Car and bus. Then percentage of persons travelling neither by car nor bus is:-
(a) 80% (b) 40% (c) 60% (d) 70%

Q10 Two finite sets have m and n elements. The number of subsets of the first set is 112 more than that of second . Then the values of m and n are respectively.
(a) 4,7 (b)7,4 (c) 4,4 (d) 7,7

Q11 Which of the following collections is not a set?
(a) collection of natural number less than 15
(b) collection of solution of equation $x^2-5x+6=0$
(c) collection of prime numbers between 5 and 60.
(d) collection of good students of class XI.

Q12 The set of all prime numbers is
(a) a finite set (b) a singleton set (c) an infinite set (d) none of these.

Q13 Which of the following statement is true ?
(a) $0 \in \{\ \}$ (b) $0 \subset \{\ \}$ (c) $0 \in \{0\}$ (d) $0 \subset \{0\}$

Q14 When set $A = \emptyset$, then number of elements in P(A) is
(a) 1 (b) 2 (c) 0 (d) none of these,

Q15 If sets A and B are defined as $A = \left\{(x, y): y = \frac{1}{x}, where\ x \neq 0\ and\ x \in R\right\}$
$and\ B = \{(x, y): y = x, x \in R\}$, then
(a) $A \cap B = A$ (b) $A \cap B = B$ (c) $A \cap B = \emptyset$ (d) $A \cup B = A$

Q16 If A and B are finite sets such that $A \subset B$, then
(a) $n(A \cup B) = n(A)$ (b) $n(A \cap B) = n(B)$ (c) $n(A \cup B) = n(B)$ (d) none of these.

Q17 Let A,B,C be three sets such that AUB=AUC and $A \cap B = A \cap C$,then
(a) A=B (b) B=C (c) A=C (d) A=B=C

Q18 Let A={a,b,c} B={b,c,d} C={a,b,d,e}, then $A \cap (B \cup C) =$
(a) { c } (b) {a,b,c} (c) {b,c,d} (d) {a,b,d,e}

Q.No. 19 to 23 (Case Study - 1)

In a group of 50 students, number of students playing Hockey, Cricket and football were found to be as follow: Cricket -17,
Football -13,
Hockey -15,
Cricket and Football-9,
Football and Hockey-4,
Hockey and Cricket-5,
All three games-3
On the basis of above information, answer the following:

Q19 **Then number of students who play cricket only are** :
(a) 8 (b) 6 (c) 5 (d) None of these.

Q20 **Then number of students who play Hockey only are** :
(a) 9 (b) 7 (c) 6 (d) None of these

Q21 **Then number of students who play Hockey and Cricket but not football**:
(a) 5 (b) 4 (c) 2 (d) None of these.

Q22 **Then number of students who play atleast one of the three games**
(a) 25 (b) 20 (c) 35 (d) 30

Q23 **Then number of students who play none of the three games**
(a) 20 (b)22 (c) 25 (d) none of these

Q.No. 24 to 28 (Case Study - 2)

Subject wise result of 30 students of a class is mentioned as follows:
15 students passed in English, 12 students passed in Mathematics, 8 students passed in science, 6 students passed in English and Mathematics, 7 students passed in Mathematics and science, 4 students passed in English and Science, 4 students passed in all three subjects.

On the basis of above information, answer the following:

Q24 **Then number of students who passed in English and Mathematics but not in science**.
(a) 5 (b) 3 (c) 2 (d) none of these.

Q25 **Then number of students who passed in Science and Mathematics but not in English**
(a) 3 (b) 2 (c) 4 (d) none of these.

Q26 **Then number of students who passed in Mathematics only**.
(a) 4 (b) 3 (c) 5 (d) none of these.

Q27 **Then number of students who passed in more than one subject**.
(a) 7 (b) 8 (c) 9 (d) none of these.

Q28 **Then number of students who passed in none of the three subjects.**
(a) 8 (b) 10 (c) 9 (d) none of these.

ANSWERS

1.(c)	**2.(a)**	**3.(d)**	**4.(b)**	**5.(c)**	**6.(c)**	**7.(c)**	**8.(a)**	**9.(b)**
10.(b)	**11.(d)**	**12.(c)**	**13.(c)**	**14.(a)**	**15.(c)**	**16.(b)**	**17.(b)**	**18.(b)**
19.(a)	**20.(a)**	**21.(c)**	**22.(d)**	**23.(a)**				
24.(b)	**25.(a)**	**26.(b)**	**27.(c)**	**28.(a)**				

Relations and Functions

Set-1

Multiple Choice Questions

Q1 Two functions f and g are said to be equal if f

(a) domain of f = domain of g

(b) co-domain of f = co-domain of g

(c) f(x) = g(x) for all x

(d) all of above

Q2 If $f(x) = ax + b$, where a and b are integers, $f(-1) = -5$ and $f(3) = 3$, then a and b are equal to

(a) $a = -3, b = -1$ (b) $a = 2, b = -3$

(c) $a = 0, b = 2$ (d) $a = 2, b = 3$

Q3 The domain and range of real function f defined by $f(x) = \sqrt{x-1}$ is given by

(A) Domain = $(1, \infty)$, Range = $(0, \infty)$

(B) Domain = $[1, \infty)$, Range = $(0, \infty)$

(C) Domain = $[1, \infty)$, Range = $[0, \infty)$

(D) Domain = $[1, \infty)$, Range = $[0, \infty)$

Q4 Domain of $\sqrt{a^2 - x^2}$, (a > 0) is

(a) $(-a, a)$ (b) $[-a, a]$ (c) $[0, a]$ (d) $(-a, 0]$

Q5 If $g(x) = ax + b$, where a and b are integers, $g(1) = 1$ and $g(2) = 3$, then a and b are equal to

(a) $a = 2, b = 1$ (b) $a = -2, b = 1$

(c) $a = 2, b = -1$ (d) $a = -2, b = -1$

Q6 A function f(x) is said to be an odd function if

(a) f(-x) = f(x) (b) f(-x) = -f(x)

(c) f(-x) = k × f(x) where k is a constant (d) None of these

Q7 Let $n(A) = m$, and $n(B) = n$. Then the total number of non-empty relations that can be defined from A to B is

(a) m^n (b) $n^m - 1$ (c) $mn - 1$ (d) $2^{mn} - 1$

Q8 Which of the following is an even function:

(a) $f(x) = \sqrt{x}$ (b) $f(x) = \frac{1}{x}$ (c) $f(x) = |x|$ (d) $(x-2)^2$

Q9 Let A = {1, 2} and B = {3, 4}. Then number of relations from A to B.

(a) 16 (b) 4 (c) 24 (d) 12

Q10 If $[x]^2 - 5[x] + 6 = 0$, where $[x]$ denote the greatest integer function, then

(a) $x \in [3, 4]$ (b) $x \in (2, 3]$ (c) $x \in [2, 3]$ (d) $x \in [2, 4)$

Q11 The domain of the function f defined by $f(x) = \frac{1}{\sqrt{x-|x|}}$ is

(a) $\mathbf{R}$ (b) $\mathbf{R}^+$ (c) $\mathbf{R}^-$ (d) None of these

Q12 The domain and range of the function f given by $f(x) = 2 - |x - 5|$ is
(A) Domain = **R+**, Range = $(-\infty, 1]$
(B) Domain = **R**, Range = $(-\infty, 2]$
(C) Domain = **R**, Range = $(-\infty, 2)$
(D) Domain = **R+**, Range = $(-\infty, 2]$

Q13 The number of relations on the set {a, b} are

(a) 2 (b) 4 (c) 8 (d) 16

Q14 If P × Q is an empty set then which of the following is a null set?

(a) only P (b) only Q (c) either P or Q (d) both P and Q

Q15 Let A = {1, 2} and B = {3,4}. Which of the following cannot be relation from set A to set B?

(a) {(1,1), (1,2), (1,3), (1,4)} (b) {(1,3), (1,4)}

(c) {(2,3), (2,4)} (d) {(1,3), (1,4), (2,3), (2,4)}

Q16 If $f(x) = x^3 - \frac{1}{x^3}$, then $f(x) + f\left(\frac{1}{x}\right)$ is equal to

(a) $2x^3$ (b) $2\frac{1}{x^3}$ (c) 0 (d) 1

Q17 Which of the following is not a function?

(a) {(1,2), (2,4), (3,6)} (b) {(-1,1), (-2,4), (2,4)}

(c) {(1,2), (1,4), (2,5), (3,8)} (d) {(1,1), (2,2), (3,3)}

Q18 If A × B = {(1, a), (1, b), (1, c), (2, a), (2, b), (2, c)} then find set B.

(a) {a, b, c} (b) {1, 2} (c) {1, a} (d) {1}

Q19 Let $f(x) = \sqrt{1 + x^2}$, then
(a) $f(xy) = f(x) \times f(y)$ (b) $f(xy) \geq f(x) \times f(y)$
(c) $f(xy) \leq f(x) \times f(y)$ (d) None of these

Q20 Let $f : R \to R$ be the function defined by $f(x) = \frac{1}{1-2\cos x}, x \in R$.
Then, the range of f.

(a) $\left[\frac{1}{3}, 1\right]$ (b) $\left[-1, \frac{1}{3}\right]$

(c) $[-\infty, -1] \cup \left[\frac{1}{3}, \infty\right)$ (d) $\left[-\frac{1}{3}, 1\right]$

Q21 The values of x for which the functions $f(x) = 3x^2 - 1$ and $g(x) = 3 + x$ are equal.

(a) 2, –1 (b) 1, $\frac{1}{3}$ (c) 1, $\frac{4}{3}$ (d) $-1, \frac{4}{3}$

Q22 If $f(x) = \frac{x-1}{x+1}$, then $f\left(\frac{1}{x}\right)$ is equal to

(a) $-f(x)$ (b) $\frac{-1}{f(x)}$

(c) $\frac{1}{f(-x)}$ (d) $f(-x)$

Q23 If R = $\{(x,\ x^3)$: x is a prime number < 10$\}$, then range (R) =

(a) {125, 27, 8, 341} (b) {27, 353, 125, 7}

(c) {125, 127, 18, 343} (d) {27, 343, 125, 8}

Q24 If $f(x) = |x| + [x]$, then $f\left(\frac{-3}{2}\right) + f\left(\frac{3}{2}\right)$ is equal to

(a) 1 (b) $\frac{-1}{2}$

(c) 2 (d) $\frac{1}{2}$

Q25 The domain of the function f given by $f(x) = \frac{x^2+2x+1}{x^2-x-6}$

(a) $R - \{3, -2\}$ (b) $R - \{-3, 2\}$ (c) $R - [3, -2]$ (d) $R - (3, -2)$

Q26 The value of x and y if (x – y, x + y) = (8, 10)

(a) 8, 2 (b) 2, 8 (c) 9, 1 (d) 1, 9

Q27 If X = {1, 2, 3, 4}, Y = {1, 2, 3,…., 20}, and f: X → Y be the correspondence which assigns each element in X the value equal to its square, then the domain, co-domain and range of f is

(a) Domain = {1, 2, ...20}, Range = {1, 2, 3, 4}, Co domain = {1, 2, 3, 4}

(b) Domain = {1, 2, 3, 4}, Range = {1, 4, 9, 16}, Co domain = {1, 2, 3, …, 20}

(c) Domain = {1, 4, 9, 16}, Range = {1, 2, 3, 4}, Co domain = {1, 2, 3, …, 16}

(d) Domain = {1, 2, 3, 4}, Range = {1, 4, 9, 16}, Co domain = {1, 2, 3, …, 16}

Q28 If Set A = {1, 2, 3, 4, 5} and Set B is {1, 4, 5} and Relation R is defined as less than, the R can be written in ordered pair as

(a) {(1,4),(1,5), (2,4), (2,5),(3,4),(3,5) ,(4,5)}

(b) {(1,4),(1,5), (2,4), (2,5),(3,4),(3,5) ,(4,5),(5,5)}

(c) {(1,4),(5,1), (2,4), (2,5),(3,4),(3,5) ,(4,5)}

(d) {(1,4), (2,4), (2,5),(3,4),(3,5) ,(4,5)}

Q29 Let R be the relation on the set N of natural numbers defined by

R = {(a, b): a + 3b = 12, a ∈ N, b ∈ N}

Which of the following is false

(a) R= {(9, 1}, (6, 2), (3, 3)}

(b) None of these

(c) Domain of R = {9, 6, 3}

(d) Range of R = {1, 2, 3}

Q30 If (1, 3), (2, 5) and (3, 3) are three elements of A × B and the total number of elements in A × B is 6, then the remaining elements of A × B are

(a) (1, 5); (2, 3); (3, 5)

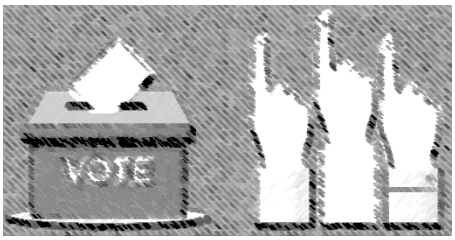
(b) (5, 1); (3, 2); (5, 3)

(c) (1, 5); (2, 3); (5, 3)

(d) None of these

CASE STUDY 1

A general election of Lok Sabha is a gigantic exercise. About 900 million people were eligible to vote and voter turnout was about 70%, the highest ever.



Let H be the set of all citizens of India who were eligible to exercise their voting right in general election held in 2014. A relation 'R' is defined on H as follows:
R = {(A, B) : A, B ∈ H and both use their voting right in general election – 2014}
Based on the information given above, answer the following questions:

Q1. Two neighbours X and Y∈ H. X exercised his voting right while Y did not cast her vote in general election – 2014. Which of the following is true?
(a) (X,Y) ∈R (b) (Y,X) ∈R (c) (X,X) ∉R (d) (X,Y) ∉R

Q2. Mr.'*X*' and his wife '*W*'both exercised their voting right in general election -2014, Which of the following is true?
(a) both (X,W) and (W,X) ∈ R (b) (X,W) ∈ R but (W,X) ∉ R
(c) both (X,W) and (W,X) ∉ R (d) (W,X) ∈ R but (X,W) ∉ R

Q3. Three friends X, Y and Z exercised their voting right in general election-2014, then which of the following is true?
(a) (X, Y) ∈ R, (Y, Z) ∈ R and (Z, X) ∈ R
(b) (X, Y) ∈ R, (Y, Z) ∈ R and (X, Z) ∉ R
(c) (X, Y) ∈ R, (Y, Y) ∈R but (Z, Z) ∉ R
(d) (X, Y) ∉ R, (Y, Z) ∉ R and (X, Z) ∉ R

Q4. Mr. Ram exercised his voting right in General Election – 2014, then Mr. Ram is related to which of the following?

(a) Family members of Mr. Ram

(b) All those eligible voters who cast their votes

(c) All citizens of India

(d) Eligible voters of India

Q5 The domain of relation R is
(a) All those eligible voters who cast their votes

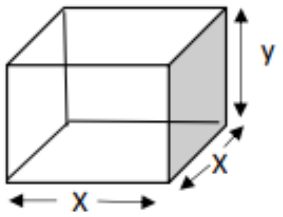
(b) Family members of voters

(c) All citizens of India

(d) Eligible voters of India

CASE STUDY 2

An open toy box with a square base is to be made out of a given quantity of metal sheet of area c^2.



Based on the above information answer following.

Q1 If *x* represents the side of square base and y represents the height of the toy box then the relation between the variables

$(a)\ 66xy = c^2$
$(b) x^3 = c^2$
$(c) x^2 + 4xy = c^2$
$(d)\ 2xy + 4x^2 = c^2$

Q2 The volume of the toy box V expressed as a function *x* is

$(a)\ V = xy^2$
$(b)\ V = \dfrac{c^2x - x^3}{4}$
$(c)\ V = \dfrac{x^3 - c^2x}{4}$
$(d)\ V = \dfrac{x^2(c^2x - x^2)}{4}$

Q3 If the box were to be closed then the relation between *x* and *y* would be

$(a)\ 2x^2 + 4xy = c^2$
$(b)\ 4x^2 + 2xy = c^2$
$(c)\ 6xy = c^2$
$(d)\ 6x^2 = c^2$

Q4 If the box were to be closed then the volume of the box expressed as a function of *x.*

$(a)\ V = \dfrac{x^2(c^2 - 2x^2)}{4}$
$(b)\ V = \dfrac{c^2x - 2x^3}{4}$
$(c)\ V = x^3$
$(d)\ V = \dfrac{2x^3 - c^2x}{4}$

Q5 The volume V of the open cuboidal toy box of edge *x*, in terms of c is

$(a)\ V = \dfrac{c^3}{125}$
$(b)\ V = \dfrac{c^3}{25}$
$(c)\ V = \dfrac{c^3}{5}$
$(d)\ V = \dfrac{c^3}{5\sqrt{5}}$

ASSERTION - REASONING

DIRECTION: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

Q1 **Assertion:** If $A = \{1, 2, 3\}$, $B = \{3, 4\}$ and $C = \{4, 5, 6\}$, then $(A \times B) \cup (A \times C)$ $= \{(1, 3), (1, 4), (1, 5), (1, 6), (2, 3), (2, 4), (2, 5), (2, 6), (3, 3), (3, 4), (3, 5), (3, 6)\}$.
Reason: $A \times A \times A = \{(a, b, c) : a, b, c \in A\}$. Here (a, b, c) is called an *ordered triplet*.

Q2 **Assertion:** The ordered pair (5, 2) belongs to the relation

$$R = \{(x, y) : y = x - 5, x, y \in Z\}$$

Reason: Given two non-empty sets P and Q. The cartesian product $P \times Q$ is the set of all ordered pairs of elements from P and Q, i.e.

$$P \times Q = \{(p, q) : p \in P, q \in Q\}$$

Q3 **Assertion:** If $(x - 2, y + 5) = \left(-2, \frac{1}{3}\right)$ are two equal ordered pairs, then $x = 4$, $y = \frac{-14}{3}$
Reason: Two ordered pairs are equal, if and only if the corresponding first elements are equal and the second elements are also equal.

Q4 **Assertion:** If $A \times B = \{(a, x), (a, y), (b, x), (b, y)\}$, then $A = \{a, b\}$ and $B = \{x, y\}$.
Reason: If there are p elements in A and q elements in B, then there will be pq elements in $A \times B$, i.e., if $n(A) = p$ and $n(B) = q$, then $n(A \times B) = pq$.

Q5 **Assertion:** If $P = \{1, 2\}$, then $P \times P \times P = \{(1, 1, 1), (2, 2, 2), (1, 2, 2), (2, 1, 1)\}$
Reason: $A \times A \times A = \{(a, b, c) : a, b, c \in A\}$. Here (a, b, c) is called an *ordered triplet*.

ANSWER MCQ

1 (d)	**2 (b)**	**3 (d)**	**4 (b)**	**5 (c)**	**6 (b)**	**7 (d)**	**8 (c)**	**9 (a)**	**10 (c)**
11 (d)	**12 (b)**	**13 (d)**	**14 (c)**	**15 (a)**	**16 (c)**	**17 (c)**	**18 (a)**	**19 (c)**	**20 (b)**
21 (d)	**22 (a)**	**23 (d)**	**24 (c)**	**25 (a)**	**26 (c)**	**27 (b)**	**28 (a)**	**29 (b)**	**30 (a)**

ANSWER CASE STUDY 1

1 (d)	**2 (a)**	**3 (a)**	**4 (b)**	**5 (d)**

ANSWER CASE STUDY 2

1 (c)	**2 (b)**	**3 (a)**	**4 (b)**	**5 (d)**

ASSERTION - REASONING

1 (c)	**2 (d)**	**3 (d)**	**4 (b)**	**5 (d)**

Relations and Functions

Set-2

Objective Type Questions

1. Let A = {1, 2, 3}. The total number of distinct relations that can be defined over A is

(a) 29 (b) 6 (c) 8 (d) None of these

2. The range of the function f (x) = | x | is

(a) (0, infinity) (b) (–infinity,0)

(c) [0, infinity) (d) None of these

3. If A = {1, 2, 3, 4}, then which of the following are functions from A to itself?

(a) $f_1 = \{(x, y) : y = x + 1\}$ (b) $f_2 = \{(x, y) : x + y > 4\}$

(c) $f_3 = \{(x, y) : y < x\}$ (d) $f_4 = \{(x, y) : x + y = 5\}$

4. Let A = {1, 2, 3} and B ={a, b}. Which of the following subsets of A ×B is a mapping from A to B?

(a) {(1, a), (3, b), (2, a), (2, b)} (b) {(1, b), (2, a), (3, a)

(c) {(1, a), (2, b)} (d) None of the above

5. Let A = {1, 2, 3} and B = {2, 3, 4}, then which of the following relations is a function from A to B?

(a) {(1, 2), (2, 3), (3, 4), (2, 2)} (b) {(1, 2), (2, 3), (1, 3)}

(c) {(1, 3), (2, 3), (3, 3)} (d) {(1, 1), (2, 3), (3, 4)}

6. If number of elements in sets A and B are m and n respectively, then the number of relations from A to B is

(a) 2^{m+n} (b) 2^{mn} (c) m + n (d) mn

7. If R is a relation from a set P to set Q, then

(a) $R \subseteq P \times Q$ (b) $R \subseteq Q \times P$

(c) $R = P \times Q$ (d) $R = P \cup Q$

8. Let A be the set of first ten natural numbers and let R be a relation in A define by (x , y) € R if and only if x + 2y = 10. Which of the following is false?

(a) R = {2, 4}, (4, 3), (6, 2), (8, 1) (b) Domain of R = {2, 4, 6, 8}

(c) Range of R = {1, 2, 3, 4} (d) At least one is false

9. A relation is defined in the set Z of integers as follows (x, y) € R iff $x^2 + y^2 = 9$. Which of the following is false?

(a) R = {(0, 3), (0, – 3), (3, 0), (– 3, 0)} (b) Domain of R = {– 3, 0, 3}

(c) Range of R = {– 3, 0, 3} (d) At least one if false

10. Let R be a relation in N defined by R = {(1 + x, 1 + x^2) : x ≤ 5, x € N}. Which of the following is false?

(a) R = {(2, 2), (3, 5), (4, 10), (5, 17), (6, 25)

(b) Domain of R = {2, 3, 4, 5, 6}

(c) Range of R = {2, 5, 10, 17, 26}

(d) At least one if false

11. Let A= {1, 2, 3}, B = {1, 3, 5}. If relation R from A to B is given by {(1, 3), (2, 5), (3, 3)} then R^{-1} is

(a) {(3, 3), (3, 1), (5, 3)}

(b) {(1, 3), (2, 5), (3, 3)}

(c) {(1, 3), (5, 2)}

(d) None of these

12. Let R be a relation in N defined by R = {(x, y) : x + 2y = 8}. The range of R is

(a) {2, 4, 6}

(b) {1, 2, 3}

(c) {1, 2, 3, 4, 6}

(d) None of these

13. Let A = {a, b, c} and B = {1, 2}. Consider a relation R defined from set A to set B. Then, R is equal to a subset of

(a) A

(b) B

(c) A×B

(d) B×A

***14. A* = {1, 2, 3} and *B* = {3, 8}, then (*A U B*) × (*A*∩*B*) is**

(a) {(3, 1), (3, 2), (3, 3), (3, 8)}

(b) {(1, 3), (2, 3), (3, 3), (8, 3)}

(c) {(1, 2), (2, 2), (3, 3), (8, 8)}

(d) {(8, 3), (8, 2), (8, 1), (8, 8)}

15. The domain of log (x^2 - 9) is

(a) (∞, 3) U (3, ∞)

(b) (∞, 3] U (3, ∞)

(c) (∞, 3] U [3, ∞)

(d) None of these.

16. If f (x + 1) = x^2 – 3x + 2, then f (x) is equal to:

(a) x2 – 5x – 6

(b) x2 + 5x – 6

(c) x2 + 5x + 6

(d) x2 – 5x + 6

17. If A × B = { (5, 5), (5, 6), (5, 7), (8, 6), (8, 7), (8, 5)},then the value A.

(a) {5}

(b) {8}

(c) {5, 8}

(d) {5, 6, 7, 8}

18. The relation R defined on the set of natural numbers as {(a, b) : a differs from b by 3} is given

(a) {(1, 4), (2, 5), (3, 6),…..}

(b) {(4, 1), (5, 2), (6, 3),…..}

(c) {(1, 3), (2, 6), (3, 9),…..}

(d) None of these

19. A general election of Lok Sabha is a gigantic exercise. About 911 million people were eligible to vote and voter turnout was about 67%, the highest ever

Let I be the set of all citizens of India who were eligible to exercise their voting right in general election held in 2019. A relation 'R' is defined on I as follows:

R = {($V1, V2$) : $V1, V2 \in I$ and both use their voting right in general election – 2019}

19 (i) Two neighbors X and Y∈ I. X exercised his voting right while Y did not cast her vote in general election – 2019. Which of the following is true?

a. (X,Y) ∈R b. (Y,X) ∈R

c. (X,X) ∉R d. (X,Y) ∉R

19 (ii) Mr.'X' and his wife 'W'both exercised their voting right in general election -2019, Which of the following is true?

a. both (X,W) and (W,X) ∈ R b. (X,W) ∈ R but (W,X) ∉ R

c. both (X,W) and (W,X) ∉ R d. (W,X) ∈ R but (X,W) ∉ R

19 (iii) Three friends F1, F2 and F3 exercised their voting right in general election-2019, then which of the following is true?

a. (F1,F2) ∈R, (F2,F3) ∈ R and (F1,F3) ∈ R b. (F1,F2) ∈ R, (F2,F3) ∈ R and (F1,F3) ∉ R

c. (F1,F2) ∈ R, (F2,F2) ∈R but (F3,F3) ∉ R d. (F1,F2) ∉ R, (F2,F3) ∉ R and (F1,F3) ∉ R

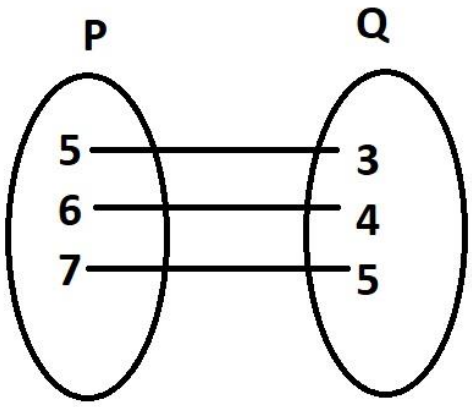
19 (iv) Mr. Shyam exercised his voting right in General Election – 2019, then Mr. Shyam is related to which of the following?

a. All those eligible voters who cast their votes b. Family members of Mr.Shyam

c. All citizens of India d. Eligible voters of India

20. Let A = {1, 2, 3, 4, 6}. Let R be the relation on A defined by

{(a, b): a , b ∈A, b is exactly divisible by a}.



(i) Write R in roster form

(ii) Find the domain of R

(iii) Find the range of R.

Answer Key :

1. (c) 2. (c) 3. (d) 4. (d) 5. (c)

6. (b) 7. (a) 8. (d) 9. (a) 10. (a)

11. (d) 12. (b) 13. (c) 14. (b) 15. (a)

16. (d) 17. (c) 18. (a)

19. (i). (d) (X,Y) ∉R

(ii). (a) both (X,W) and (W,X) ∈ R

(iii). (a) (F1,F2) ∈R, (F2,F3) ∈ R and (F1,F3) ∈ R

(iv). (a) All those eligible voters who cast their votes

20. (i) R = {(1, 1), (1,2), (1, 3), (1, 4), (1, 6), (2 4), (2, 6), (2, 2), (4, 4), (6, 6), (3, 3), (3, 6)}

(ii) Domain of R = {1, 2, 3, 4, 6}

(iii) Range of R = {1, 2, 3, 4, 6}

Complex number & Quadratic Equation

Objective Type Questions

1. $\left(i+\sqrt{3}\right)^{100}+\left(i-\sqrt{3}\right)^{100}+2^{100}=$
   (A) 1 (B) −1 (C) 0 (D) none

2. The smallest integer for which $\left(\frac{1-i}{1+i}\right)^{n}=1$is
   (A) n=8 (B) n=12 (C) n=16 (D) n=4

3. If Z=x+iy, $Z^{1/3}$=a –ib and $\frac{x}{a}-\frac{y}{b}=\lambda(a^2-b^2)$ then λ=
   (A) 3 (B) 4 (C) 2 (D) none

4. The locus of the point z satisfying the condition arg $\frac{z-1}{z+1}=\frac{\pi}{3}$ is
   (A) a straight line (B) a circle (C) a parabola (D) none

5. The conjugate of a complex number is $\frac{1}{i-1}$ Then, that complex number is
   (A) $-\frac{1}{1-i}$ (B)$\frac{1}{1+i}$(C) $-\frac{1}{1+i}$ (D)$\frac{1}{1-i}$

6. The value of the sum $\sum_{n=1}^{13}(i^n+i^{n+1})$, where i = $\sqrt{-1}$, is
   (A) i (B) i−1 (C) – i (D)0

7. The value of $(1+i)^3+(1-i)^6$ is
   (A) i (B) $2(-1+5i)$ (C) $1-5i$ (D) None

8. If $\frac{Z-1}{Z+1}=\frac{\pi}{3}$, then Z represents a point on
   (A) a straight line (B) a circle (C) a pair of lines (D) None

9. The smallest positive integer n, for which $(1+i)^{2n}=(1-i)^{2n}$ is
   (A) 2 (B) 3 (C) -2 (D) 4

10. $1+i^2+i^4+i^6+...+i^{2n}$ is
    (A) positive (B) negative (C) 0 (D) cannot be evaluated

11. If 1 – i, is a root of the equation $x^2+ax+b=0$, where a, b ∈ R, then find the values of a and b
    (A) a = -2 & b = 2 (B) a = 2 & b = 2 (C) a = 0 & b = 11 (D) cannot be evaluated

12. Let x, y ∈ R, then x + iy is a non- real complex number if
    (A) x = 0 (B) y = 0 (C) x ≠ 0 (D) y ≠ 0

13. If a + ib = c + id, then
    (A) $a^2+c^2=0$ (B) $b^2+c^2=0$ (C) $b^2+d^2=0$ (D) $a^2+b^2=c^2+d^2$

14. The value of arg (x) when x < 0 is:
(A) 0 (B) $\pi/2$ (C) π (D) none of these

15. The multiplicative inverse of 2 – 3i is
(A) $\frac{2}{13} + i.\frac{3}{13}$ (B) 2/13 (C) 3i/13 (D) none of these

16. Find real θ such that $\frac{3+2i\ sin\theta}{1-2i\ \sin\theta}$ is purely real.
(A) θ = 0 (B) θ = nπ, n ∈ Z (C) θ = π, n ∈ Z (D) none of these

17. Find the real numbers x and y if (x – iy) (3 + 5i) is the conjugate of –6 – 24i
(A) x = 3, y = – 3 (B) x = –3, y = 3 (C) x= 0, y=3 (D) none of these

18. Number of non-zero integral solutions of the equation $|1 - i|^x = 2^x$
(A) 0 (B) 1 (C) 2 (D) none of these

19. Solve $x^2 + 2 = 0$
(A) 0 (B) $\pm\sqrt{2}$ i (C) 1 (D) none of these

20. Express $(5 – 3i)^3$ in the form a + ib
(A) – 10 – 198i (B) $\pm\sqrt{3}$ i (C) 10 – 198i (D) none of these

21. Express the i^{-35} in the form a + ib
(A) 0 (B) 1 (C) i (D) –i

22. The conjugate of $\frac{(3-2i)(2+3i)}{(1+2i)(2-i)}$ is
(A) $\frac{2}{13} + i.\frac{24}{13}$ (B) $\frac{63}{25} + i.\frac{16}{25}$ (C) i (D) none of these

CCT Based Questions:

Solve the Q No. 23 to 26 using the information given bellow

1. If Z= x + iy where x & y are real, is a complex number & $\bar{Z}$ = x-iy is the complex conjugate of Z & $Modulus\ of\ Z\ or\ |Z| = \sqrt{x^2 + y^2}$
2. let Z_1= 2+ 3i & $\bar{Z}_2$=1+i

23. Modulus of Z_1+Z_2 will be

(A) 0 (B) $\sqrt{13}$ (C) 1 (D) none of these

24. Which is correct

(A) $|Z_1| = |Z_2|$ (B) $|Z_1| = |Z_1 + Z_2|$ (C) $|Z_1| = |Z_1 - Z_2|$ (D) none of these

25. $\bar{Z}_1 Z_2$ will be

(A) 0 (B) $(3 - 2i)$ (C) $(-1 - 5i)$ (D) none of these

26. Statement -I: let Z_1= -2+ i & $\bar{Z}_2$=1+2i

Statement -II: $(|Z_1 - Z_2|)^2 = 6.(|Z_1 + Z_2|)^2$

(A) Statement -I is correct (B) Statement-II is correct

(C) both statements are correct (D) none of the Statement are correct.

ANSWERS

1(C), 2(D), 3(B), 4(B), 5(C), 6(B), 7(B), 8(B), 9(A), 10(D),
11(A), 12(D), 13(D), 14(C), 15(A), 16(B), 17(A), 18(A), 19(B), 20(A),
21(C), 22(B), 23(B), 24(B), 25(C), 26(C)

SEQUENCES AND SERIES

Set - 1

MCQ TYPE QUESTIONS:

1. If 7^{th} and 13^{th} terms of an A.P.be 34 and 64 respectively, then its 18^{th} term is:
(a). 87 (b). 88 (c). 89 (d). 90

2. If the sum of p terms of an A.P.is q and the sum of q terms is p, then the sum of p+q terms will be
(a). 0 (b). p-q (c). p+q (d).-(p+q)

3. If the sum of n terms of an A.P. be $3n^2 - n$ and its common difference is 6, then its first term is
(a). 2 (b). 3 (c). 1 (d). 4

4. Sum of all two digit numbers which when divided by 4 yield unity as remainder is
(a). 1200 (b). 1210 (c). 1250 (d).1260

5. In A.M are introduced between 3 and 17 such that the ratio of the last mean to the first mean is 3:1, then the value of n is
(a). 6 (b). 8 (c). 4 (d). 10

6. If S_n denotes the sum of first n terms of an A.P.$< a_n >$Such that$\frac{S_m}{S_n} = \frac{m^2}{n^2}, then \frac{a_m}{a_n} =$
(a). $\frac{2m+1}{2n+1}$ (b). $\frac{2m-1}{2n-1}$ (c). $\frac{m-1}{n-1}$ (d). $\frac{m+1}{n+1}$

7. The first and last terms of an A.P.are 1 and 11.If the sum of its terms is 36,then the number of terms will be
(a). 5 (b). 6 (c). 7 (d). 8

8. If the sum of n terms of an A.P., is $3n^2 + 5n$, then which of its terms is 164?
(a). 26^{th} (b). 27^{th} (c). 28^{th} (d).29^{th}

9. In the A.P whose common difference is non-zero, the sum of first 3n terms is equal to the sum of next n terms. Then the ratio of the sum of the first 2n terms to the next 2n terms is
(a). $\frac{1}{5}$ (b). $\frac{2}{3}$ (c). $\frac{3}{4}$ (d). $\frac{1}{2}$

10. If the four numbers in A.P. are such that their sum is 50 and the greatest number is 4 times the least, then the numbers are
(a). 5,10,15,20 (b). 4,10,16,22 (c). 3,7,11,15 (d).2,3,7,11

11. If n arithmetic means are inserted between 1 and 31 such that the ratio of the first mean and nth mean is 3:29, then the value of n is
(a). 10 (b). 12 (c). 13 (d). 14

12. The first and last term of an A.P.are a and l respectively. If S is the sum of all the terms of the A.P and the common difference is given by $\frac{l^2-a^2}{k-(l+a)}$, then k=
(a). S (b). 2S (c). 3S (d).4S

13.If a, b, c, d, e are in A.P. then the value of a-4b+6c-4d+e is :
(a). 1 (b). 2 (c). 0 (d). 3

14.If the first, second and last term of an A.P. are a, b and2a respectively, then its sum is
$(a).\ \frac{ab}{2(b-a)}$ $(b).\ .\ \frac{ab}{b-a}$ $(c).\ .\ \frac{3ab}{2(b-a)}$ $(d)..\ \frac{2ab}{3(b-a)}$

15. If S_n denote the sum of n terms of an A.P. whose first term is a.If the common difference d is given by d=$S_n - kS_{n-1} + S_{n-2}$, then k=
$(a).$ 1 $(b).$ 2 $(c).$ 3 $(d).$ 4

16. If the sum of first n even natural numbers is equal to k times the sum of the first n odd natural numbers, then k=
$(a).\ \frac{1}{n}$ $(b).\ \frac{n-1}{n}$ $(c).\ \frac{n+1}{2n}$ $(d)\ .\ \frac{n+1}{n}$

17.If in an A.P.,$S_n = n^2p$ and $S_m = m^2p$, where S_r denotes the sum of r terms of the A.P.,then S_p =
$(a).\ \frac{1}{2}p^3$ $(b).$ m n p $(c).\ p^3$ $(d).(m+n)p^2$

18. Let S_n denote the sum of first n terms of an A.P. If $S_{2n} = 3S_n$,then $S_{3n}:S_n$ is equal to
$(a).$ 4 $(b).$ 6 $(c).$ 8 $(d).$ 10

19. If $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ is the A.M. of a and b, then n=
$(a).$ 1 $(b).$ 2 $(c).$ 3 $(d).0$

20. If log 2 ,log$(2^x - 1)$ and log$(2^x + 3)$ are n A.P. ,then the value of x=
$(a).\log_2 3$ $(b).\ \log_2 5$ $(c).\ \log_2 7$ $(d).\log_2 9$

21. The first three of four given numbers are in G.P. and their last three are in A.P. with common difference 6.If first and fourth numbers are equal, then the first number is:
(a) 2 (b) 4 (c) 6 (d) 8

22. If a,b,c are in G.P. and $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$,then xyz are in
(a) A.P (b) $G.P$ (c) H.P (d) AP.&G.P

23. If S be the sum,P the product and R be the sum of the reciprocals of n terms of a G.P.,then P^2 is equal to
(a) $\frac{S}{R}$ (b) $\frac{R}{S}(c)$ $\left(\frac{R}{S}\right)^n$ (d) $\left(\frac{S}{R}\right)^n$

24. If pth ,qth and rth terms of an A.P.are in G.P.,then the common ratio of this G.P. is
(a) $\frac{p-q}{q-r}$ (b) $\frac{q-r}{p-q}(c)$ pqr (d)pq

25. If nth term of a G.P. is 128 and the sum of its n terms is 225.If its common ratio is 2, then its first term is
(a) 1 (b) 3 (c) 8 (d) 0

26. The two geometric mean between the numbers 1 and 64 are
(a) 1 and 64 (b) 4 and 16(c) 2 and 16 (d) 8 and 16

27. In a G.P.if the $(m+n)^{th}$ term is p and $(m-n)^{th}$ term is q, then its m^{th} term is
(a) 0 (b) pq (c) $\sqrt{pq}$ $(d)\frac{(p+q)}{2}$

28. If a ,b,c are in G.P. and x,y are A.Ms between a,b, and b,c respectively, then
(a) $\frac{1}{x}+\frac{1}{y}=2$ (b) $\frac{1}{x}+\frac{1}{y}=\frac{1}{2}$ (c) $\frac{1}{x}+\frac{1}{y}=\frac{2}{a}$ (d) $\frac{1}{x}+\frac{1}{y}=\frac{2}{b}$

29. If x,2y, 3z are in A.P.,where the distinct numbers x,y,z are in G.P.then the common ratio of the G.P is
(a) 3 (b) $\frac{1}{3}$ (c) 2 (d) $\frac{1}{2}$

30. In a geometric progression consisting of positive terms, each term equals the sum of the next two terms. Then, the common ratio is
(a) $\frac{(1-\sqrt{5})}{2}$ (b) $\sqrt{5}(c)$ $\frac{\sqrt{5}}{2}$ (d) $\frac{(-1+\sqrt{5})}{2}$

31. **Case Study**

150 workers were engaged to finish a job in a certain number of daye.4 workers dropped out on second day, 4 more workers dropped out on third day and so on. It took 8 more days to finish the work. Write any four answers?

(i).The number of workers on the first day=
(a). 150 (b). 146 (c). 142 (d).138

(ii). The number of workers on the second day=
(a). 150 (b). 140 (c). 142 (d).146

(iii). The number of workers on the third day=
(a). 140 (b). 141 (c). 142 (d).143

(vi). The sequence of workers is=
(a). 143,140,138……. (b). 143,140,138……. (c). 146,142,150……. (d). 150,146,142…….
(v).The number of days in which the work was completed=
(a). 24 (b). 25 (c). 23 (d).22

ANSWERS:

1. c	2. d	3. a	4. b	5. a	6. b	7. b	8. b	9. a	10. a
11. d	12. b	13. c	14. c	15. b	16. d	17. c	18. b	19. d	20. b
21. d	22. a	23. d	24. b	25. a	26. b	27. c	28. d	29. b	30. d

31 (i). a (ii) d (iii) c (vi) d (v). b

SEQUENCE AND SERIES

Set 2

Multiple Choice Questions (MCQs)

1.The first term of a GP is 1. The sum of the third term and fifth term is 90. The common ratio of GP is

(a) 1 (b) 2 (c) 3 (d) 4

2.If the sum of the first 2n terms of the A.P. 2, 5, 8, …., is equal to the sum of the first n terms of the A.P. 57, 59, 61, …., then n equals

(a) 10 (b) 12 (c) 11 (d) 13

3. The third term of a geometric progression is 4. The product of the first five terms is

(a) 4^3 (b) 4^5 (c) 4^4 (d) none of these

4. pth term of an A.P. is q and qth term is p, its (p+ q)th term is

(a) - (p + q) (b) p + q (c) 0 (d) None of these

5. The sum of integers from 1 to 100 that are divisible by 2 or 5 is

(a) 2550 (b) 1050 (c) 3050 (d) None of these

6.The eleventh term of the sequence 1, 1, 2, 3, 5, 8, 13, 21, 34, …..is

(a) 89 (b) 66 (c) 72 (d) None of these

7. What is the 50th term of the sequence $\sqrt{3}$, 3, $3\sqrt{3}$, 9, ...

(a) $(\sqrt{3})^{49}$ (b) $(\sqrt{3})^{50}$ (c) 3^{49} (d) 3^{50}

8. A man saved Rs. 66000 in 20 years. In each succeeding year after the first year, he saved Rs. 200 more than what he saved in the previous year. How much did he save in the first year?

a)1000 b)1400 c)1500 d)2400

9. A carpenter was hired to build 192 window frames. The first day he made five frames and each day, thereafter he made two more frames than he made the day before. How many days did it take him to finish the job?

a) 10 b) 8 c) 25 d)12

10. The sum of interior angles of a triangle is 180° and the sum of the interior angles of polygons with 3, 4, 5, 6, … sides form an arithmetic progression. Find the sum of the interior angles for a 21-sided polygon.

a) 3420-degree b) 4200-degree c) 1520-degree d) 360 degree

11. The lengths of three unequal edges of a rectangular solid block are in G.P. If the volume of the block is 216 cm^3 and the total surface area is 252 cm^2, then the length of the longest edge is
(a) 12 cm (b) 6 cm (c) 18 cm (d) 3 cm

12. In a potato race 20 potatoes are placed in a line at intervals of 4 m with the first potato 24 m from the starting point. A contestant is required to bring the potatoes back to the starting place one at a time. How far would he run in bringing back all the potatoes?

a) 3500 m b) 3120 m c)2600 m d) 2480 m

13. In a cricket tournament 16 school teams participated. A sum of Rs. 8000 is to be awarded among themselves as prize money. If the last placed team is awarded Rs. 275 in prize money and the award increases by the same amount for successive finishing places, how much amount will the first-place team receive?

a) ₹ 500 b) ₹ 725 c) ₹ 1050 d) ₹ 750

14. If x, y and z are in A.P. then 1/yz ,1/zx and 1/xy are in :

a) A.P. b) G.P. c) None of these

15. The sum of terms equidistant from the beginning and end in an A.P. is equal to:

a) Last term b) First term c) Sum of first and last terms d) None of these

16.The sum of first 10terms of G.P. is equal to 244 times the sum of first five terms. Then the common ratio is:

a)7 b) 4 c) 3 d) 5

17. If a, b and c are in A.P as well as in G.P. then:

a) a=b≠ c b) a≠ $b \neq c$ c) a=b=c d) a≠ $b = c$

18. The 10th term of the sequence $\sqrt{3}, \sqrt{12}\ and\ \sqrt{27}$ …is:

a)$\sqrt{243}$ b)$\sqrt{363}$ c)$\sqrt{300}$ d)$\sqrt{432}$

19. If $\frac{a^n+b^n}{a^{n-1}+b^{n-1}}$ is the A.M. between a and b then the value of n is:

a) 0 b) -1 c) 2 d) 1

20. If 9 times the 9th term of an A.P. is equal to 13 times the 13th term then the 22nd term of A.P. is:

a) 0 b) 22 c) 220 d) 198

State whether following statements (21-23) are true or false:

21. Two sequences cannot be both in A.P. and G.P. together.

a) True b) False

22. Any term of an A.P. (except first) is equal to half the sum of terms which are equidistant from it:

a) True b) False

23. The sum or difference of two G.P. s, is again a G.P.:

a) True b) False

24. The A.M. of two numbers is 34 and G.M. is 16, the numbers are:

a) 2 and 64 b) 64 and 4 c) 64 and 3 d) None of these.

25. The nth term of the G.P. $3, \sqrt{3}, 1 \ldots\ldots\ldots$ is $\frac{1}{243}$, then value of n is:

a) 14 b) 13 c) 20 d) 18

Answer key

1. c	2. c	3. b	4. c	5. c
6. a	7. b	8. b	9. d	10. a
11. a	12. d	13. b	14. a	15. c
16. c	17. c	18. c	19. d	20. a
21. False	22. True	23. False	24. b	25. b

STRAIGHT LINES
Set - 1

SHORT NOTES ON THE TOPIC:-

SLOPE OF A LINE :

$m = \tan\theta$ if θ is the angle of inclination.

$m = \frac{y_2 - y_1}{x_2 - x_1}$

if (x_1, y_1) and (x_2, y_2) are two points on the line.

SLOPE of a horizontal line is 0 and vertical line is not defined.

ANGLE BETWEEN LINES:

If m_1 and m_2 are slopes of lines L_1 and L_2 respectively.

Acute angle between L_1 and L_2

$\tan\theta = \left| \frac{m_2 - m_1}{1 - m_1 m_2} \right|$ as $1 + m_1 m_2 \neq 0$ and the obtuse angle = $180 - \theta$.

CONDITION OF PARALLELISM & PERPENDICULARITY:

$L_1 \parallel L_2 \rightarrow m_1 = m_2$

$L_1 \perp L_2 \rightarrow m_1 \times m_2 = -1$

EQUATION OF STRAIGHT LINE:

Equation of x-axis $\rightarrow y = 0$

Equation of y-axis $\rightarrow x = 0$

Equation of line $\parallel$ to x-axis $\rightarrow y = b$

Equation of line $\parallel$ to y-axis $\rightarrow x = a$

Eq^n of line having slope m and making an intercept c on y-axis $\rightarrow y = mx + c$

Eq^n of line making intercepts a and b on the x-axis and y-axis $\rightarrow \frac{x}{a} - \frac{y}{b} = 1$

Eq^n of line passing through (x_1, y_1) and (x_2, y_2) $\rightarrow y - y_1 = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1)$

Eq^n of line having normal distance from orgin P and angle between the normal and positive x-axis $\omega \rightarrow x\cos\omega + y\sin\omega = P$.

General form of Eq^n of line $\rightarrow Ax + By + C = 0$

DISTANCE OF A POINT FROM A LINE:

Distance of a point (x_1, y_1) from a line $ax + by + c = 0$ is $\left| \frac{a x_1 + b y_1 + c}{\sqrt{a^2 + b^2}} \right|$

MCQ

1 The general equation of line is ……

a) $y = mx + c$ b) $Ax + By + C = 0$ c) $x \cos \alpha + y \sin \alpha = p$ d) $y - y_1 = m(x - x_1)$

2 Two opposite vertices of a rectangle are (1, 3) and (5, 1). If the equation of a diagonal of this rectangle is $y = 2x + c$ then the value of c is …….

a) 1 b) 2 c) - 4 d) – 9

3 The distance between the lines $3x + 4y = 9$ and $6x + 8y = 15$ is …….

a) 6 b) 3 c) 1/3 d) 3/10

4 The inclination of the line $x - y + 3 = 0$ with the positive direction of x-axis is ……

a) 45^0 b) 135^0 c) -135^0 d) -45^0

5 The two lines $ax + by = c$ and $a'x + b'y = c'$ are perpendicular if

a) $aa' + bb' = 0$ b) $ab' = ba'$ c) $ab + a'b' = 0$ d) $ab' + ba' = 0$

6 The equation of the line passing through (1, 2) and perpendicular to $x + y + 7 = 0$ is …….

a) $y - x + 1 = 0$ b) $y - x - 1 = 0$ c) $y - x + 2 = 0$ d) $y - x - 2 = 0$

7 If the line $\frac{x}{a} + \frac{y}{b} = 1$ passes through the points (2, -3) and (4, -5) then (a, b) is ……

a) (1, 1) b) (1, -1) c) (-1, 1) d) (-1, -1)

8 The equations of the lines which pass through the point (3, –2) and are inclined at 60° to the line $\sqrt{3}x + y = 1$ are …….

a) $y + 2 = 0, \sqrt{3}x - y - 2 - 3\sqrt{3} = 0$
b) $x - 2 = 0, \sqrt{3}x - y + 2 + 3\sqrt{3} = 0$
c) $\sqrt{3}x - y - 2 - 3\sqrt{3} = 0$
d) None of these
e)

9 Equation of the line passing through (1, 2) and parallel to the line $y = 3x - 1$ is

a) $y - 2 = x - 1$ b) $y + 2 = x + 1$ c) $y - 2 = 3(x - 1)$ d) $y + 2 = 3(x + 1)$

10 Slope of a line which cuts off intercepts of equal lengths on the axes is

a) - 1 b) 2 c) 0 d) $\sqrt{3}$

11 A point equidistant from the lines $4x + 3y + 10 = 0$, $5x - 12y + 26 = 0$ and $7x + 24y - 50 = 0$ is

a) (1, 1) b) (1, - 1) c) (0, 1) d) (0, 0)

12 One vertex of the equilateral triangle with centroid at the origin and one side as $x + y - 2 = 0$ is

a) (-1, - 1) b) (2, 2) c) (-2, -2) d) (2, -2)

13 Line through the points (–2, 6) and (4, 8) is perpendicular to the line through the points (8, 12) and (x, 24). The value of x is

a) 4 b) 3 c) 2 d) 1

14 A point on the x-axis, which is equidistant from the points (7, 6) and (3, 4) is …….

a) (1/2, 0) b) (15/2, 0) c) (1, 7) d) (15, 2)

15 The distance of the point P (1, – 3) from the line 2y – 3x = 4 is …….

a) 13 b) √13 c) 1/ √13 d) √3

16 The value of x for which the points (x, – 1), (2,1) and (4, 5) are collinear is ……..

a) 0 b) -1 c) 1 d) none of these

17 The equations of the lines parallel to axes and passing through (– 2, 3) are ……..

a) x = -2, y = 3 b) x = 2, y = -3 c) x = 3, y = -2 d) x = -3, y = 2

18 The equation of the line through the points (1, –1) and (3, 5) is

a) 3x + y + 4 = 0 b) – 3x + y + 4 = 0 c) 3x – y + 4 =0 d) none of these

19 The equation of the line, which makes intercepts –3 and 2 on the x- and y-axes respectively is…

a) 2x + 3y + 6 = 0 b) 2x + 3y - 6 = 0 c) 2x + 3y - 6 = 0 d) 2x - 3y + 6 = 0

20 Equations of diagonals of the square formed by the lines x = 0, y = 0, x = 1 and y = 1 are…

a) y = x, y + x = 1 b) y = x, x + y = 2 c) 2y = x, y + x = 1/3 d) y = 2x, y + 2x = 1

21 The angle between the lines x + 2y = 3 and y - 2x = 5 is ….

a) 45^0 b) 60^0 c) 90^0 d) 0^0

22 The equation of the line whose perpendicular distance from the origin is 4 units and the angle which the normal makes with positive direction of x-axis is 15°, is ……

a) (√3+1) x + (√3-1) y =√2
b) (√3+1) x - (√3-1) y =√2
c) (√3+1) x + (√3-1) y =8√2
d) (√3+1) x - (√3-1) y = 8√2
e)

23 The locus of a point whose abscissa and ordinate are always equal is …….

a) x + y + 1 = 0 b) x – y = 0 c) x + y = 1 d) None of these

24 Which of the following equation of line is not passing through origin (0, 0)?

a) x + 7 y = 23 b) 13 x – 4 y = 2x c) (x + 6) = 2(y + 3) d) (x – 1) – (y – 1) = 0

25 The slope of the line ax + by + c = 0 is

a) a/ b b) – a/ b c) – c/ b d) c/ b

26 If the line joining two points A(2, 0) and B(3, 1) is rotated about A in anti-clock wise direction through an angle of 15°. Then the equation of the line in new position.

a) y – √3x + 23√3 = 0 b) y – √3x + 3√3 = 0 c) y + √3x + 2√3 = 0 d) y – √3x + 2√3 = 0

CASE STUDY

A girl standing at the junction (crossing) of two straight paths represented by the equations $2x - 3y + 4 = 0$ and $3x + 4y - 5 = 0$ wants to reach the path whose equation is $6x - 7y + 8 = 0$ in the least time.

(i) Equation of path that she should follow is

a) $119x + 102y = 125$ b) $109x + 102y = 125$ c) $119x + 112y = 125$ d) $109x + 102y = 105$

(ii) The angle between the cross roads is

a) $\tan^{-1}(6/17)$ b) $\tan^{-1}(1/17)$ c) $\tan^{-1}(17/6)$ d) $\tan^{-1}(6)$

(iii) The y- intercept of the path used to reach in least time at $6x - 7y + 8 = 0$ is

a) 125 / 119 b) 119 / 125 c) 102 / 125 d) 125/ 102

(iv) The x – intercept of the path used to reach in least time at $6x - 7y + 8 = 0$ is

a) 125 / 119 b) 119 / 125 c) 102 / 125 d) 125/ 102

ANSWER KEYS:

1-	**b**	**6-**	**b**	**11-**	**d**	**16-**	**c**	**21-**	**c**
2-	**c**	**7-**	**d**	**12-**	**b**	**17-**	**a**	**22-**	**c**
3-	**d**	**8-**	**a**	**13-**	**a**	**18-**	**b**	**23-**	**b**
4-	**a**	**9-**	**c**	**14-**	**b**	**19-**	**d**	**24-**	**a**
5-	**a**	**10-**	**a**	**15-**	**b**	**20-**	**a**	**25-**	**b**
								26-	**d**

CASE STUDY

(i) A (ii) C (iii) D (iv) A

STRAIGHT LINES)

Set 2

Choose the correct answer from the given four options in questions

1. The point on the y-axis which is equidistant from the points (3, 2) and (-5, -2) is

   a) (-2, 0) b) (0, -2) c) (0, -1) d) (-1, 0)

2. If point C(-4, 1) divides the line segment joining the points A(2, -2) and B in the ratio 3:5, then the coordinates of B are

   a) (-14, 6) b) (6, -14)c) (-14, -6) d) (-6, -14)

3. If the points A(-2, -1), B(1, 0), C(a, 3) and D(1, b) form a parallelogram ABCD, then the value of a and b are

   a) a = -4, b = -2 b) a = -4, b = 2 c) a = 4, b = 2 d) a = 2, b = -4

4. If the middle points of a triangle are (1,1), (2,-3) and (3,2), then the centroid of a triangle is

   a) (-2,0) b) (0,2) c) (3,2) d) (2,0)

5. The vertices of a triangle are A(-5,3), B(p,-1) and C(6,q). If the centroid of the triangle ABC is (1,-1), then value of p and q are

   a) P= -2, q= 5 b) p = 2 , q = -5 c) p =3, q = 5 d) p = -5, q = 2

6. The tangent of the angle between lines joining the points (-1,2), (3,-5) and (-2,3), (5,0) is

   a) 37/49 b) 49/37 c) 23/47 d) 47/23

7. If a line joining the points (-2,6) and (4,8) is perpendicular to the line joining the points (8,12) and (x,24), then the value of x is

   a) 3 b) 4 c) -4 d) 2

8. If the points A(0,6), B(2,1) and C(7,3) are three corners of a square ABCD, then the slope of the diagonal BD is

   a) 2/7 b) 7/2 c) 7/3 d) -3/7

9. If the line through (3,Y) and (2,7) is parallel to the line through (-1,4) and (0,6), then the value of Y is

   a) -9 b) -8 c) 8 d) 9

10. The equation of line passing through (2,-3) and making an angle of 120° with +ve direction of x-axis is

   a) $\sqrt{3}x - y + 3 - 2\sqrt{3} = 0$ c) $\sqrt{3}x + y + 3 - 2\sqrt{3} = 0$

   b) $\sqrt{3}x + y - 3 - 2\sqrt{3} = 0$ d) $\sqrt{3}x + y + 3 + 2\sqrt{3} = 0$

11. The inclination of the line x – y – 3 = 0 with +ve direction of x-axis is

   a) 45° b) 135° c) 60° d) 150°

12. The equation of line whose inclination is 150° and which cuts off an intercept of 4 units on –ve direction of y-axis is

   a) $x + \sqrt{3}y + 4\sqrt{3} = 0$ c) $x + \sqrt{3}y - 4\sqrt{3} = 0$

   b) $x - \sqrt{3}y + 4\sqrt{3} = 0$ d) $x - \sqrt{3}y - 4\sqrt{3} = 0$

13. The equation of the line through (-1,5) making an intercept of -2 on y-axis is

   a) x + 7y + 2 = 0 b) 7x + y + 2 = 0 c) x – 7y + 2 = 0 d) 7x – y + 2 = 0

14. The equation of line which cuts off intercept 4 on x-axis and makes an angle of 60° with +ve direction of x-axis is

   a) $y = \sqrt{3}(x + 4)$ b) $y = -\sqrt{3}(x - 4)$ c) $y = \sqrt{3}(x - 4)$ d) $y = -\sqrt{3}(x + 4)$

15. If the straight line y = mx + c passes through the points (2,4) and (-3,6), then the value of m and c are

a. m = -2/5, c = 24/5 b) m=2/5, c=24/5 c) m=-2/5, c=-24/5 d) m=2/5, c=-24/5

16. A line passes through P(1,2) such that the portion of the line intercepted between the axes is bi-sected at P . The equation of the line is

a) x + 2y = 5 b) x – y = -1 c) x + y = 3 d) 2x + y = 4

17. The two lines ax + by + c = 0 and a′x + b′y + c′ = 0 are $\perp$ if

a) ab′ = a′b b) ab + a′b′ = 0 c) ab′ + a′b = 0d) aa′ + bb′ = 0

18. The angle between the lines y = (2 - $\sqrt{3}$)(x + 5) and y = (2 + $\sqrt{3}$)(x – 7) is

a) 30° b) 45° c) 60° d) 90°

19. The ratio in which the line segment joining (-1, 1) and (5, 7) is divided by the lines x + y = 4 is

a) 1:2 internally b) 1:2 externally c) 2:1 internally d) 2:1 externally

20. If the image of the point (-3,k) in the line 2x + y – 2 = 0 is the point (1,5), then the value of k is

a) 2 b) 3 c) -3 d) 1

21. If the lines x/3 + y/4 = 5 and 3x + ky = 9 are perpendicular to each other, then the value of k is

a) -4 b) -3 c) -1/2 d) 2

22. If the lines 2x + y – 3 = 0, 5x + ky – 3 = 0 and 3x – y – 2 = 0 are concurrent, then the value of k is

a) -3 b) -2 c) -1 d) 2

23. The equation of the line passing through (1, 2) and perpendicular to x + y + 7 = 0 is

a) y – x + 1 = 0 b) y – x – 1 = 0 c) y – x + 2 = 0 d) y – x – 2 = 0

24. If p is the length of perpendicular from the origin on the line x/a + y/b = 1, and a^2, p^2, b^2 are in A.P., then

a) $a^2 + b^2 = 0$ b) $a^4 - b^4 = 0$ c) $a^2 + b^2 = 0$ d) $a^2 - b^2 = 0$

25. The distance of the point P(1, -3) from the line 2y - 3x = 4 is

a) 13 b) $\frac{7}{13}\sqrt{3}$ c) $\sqrt{13}$ d) 7/13

26. The coordinates of the foot of the perpendicular from the point (2, 3) on the line x + y – 11 = 0 are

a) (-6, 5) b) (5, 6) c) (-5, 6) d) (6, 5)

27. If a vertex of a square is at the point (1, -1) and one of its sides lie along the line 3x – 4y – 17 = 0, then area of the square is

a) 4 sq units b) 3 sq units c) ¼ sq units d) 2 sq units

28. If the line x/a + y/b = 1 passes through the points (2, -3) and (4, -5), then (a, b) is

a) (1, 1) b) (-1, 1) c) (1, -1) d) (-1, -1)

29. The equations of lines passing through the point (1, 0) and at a distance of $\frac{\sqrt{3}}{2}$ units from the origin are

a) $\sqrt{3}\,x + y - \sqrt{3} = 0, \sqrt{3}x - y - \sqrt{3} = 0$

b) $\sqrt{3}\,x + y + \sqrt{3} = 0, \sqrt{3}x - y + \sqrt{3} = 0$

c) $x + \sqrt{3}y - \sqrt{3} = 0, x - \sqrt{3}y - \sqrt{3} = 0$

d) None of these

30. The distance between the lines y = mx + c_1 and y = mx + c_2 is

a) $\frac{c_1 - c_2}{\sqrt{m^2+1}}$ b) $\frac{|c_1 - c_2|}{\sqrt{m^2+1}}$ c) $\frac{c_2 - c_1}{\sqrt{m^2+1}}$ d) 0

31. Equations of diagonals of square formed by the lines x = 0, y = 0, x = 1 and y = 1 are

a) Y = x, x + y = 2 b) 2y = x, y + x = 1/3 c) y = x, y + x = 1 d) y = 2x, y + 2x = 1

32. The equation ax + by + c = 0 represent a straight line

a) For all real numbers a, b, and c

b) Only when $a \neq 0$

c) Only when $b \neq 0$

d) Only when at least one a and b is non-zero

33. The ratio in which the line 3x + 4y + 2 = 0, divides the distance between the lines 3x + 4y + 5 = 0 and 3x + 4y – 5 = 0 is

a) 1:2 b) 3:7 c) 2:3 d) 2:5

34. The no of straight lines through origin which are equally inclined to both the axes is

a) 4 b) 3 c) 2 d) 1

35. The equation of line with slope -3/2 and which is concurrent with the lines 4x + 3y – 7 = 0 and 8x + 5y – 1 = 0 is

a) 3x + 2y – 63 = 0 b) 3x+2y-2=0 c) 2y-3x-2=0 d) none of these

36. The equation of the straight line which passes through the point(-4, 3) such that the portion of the line between the axes is divided internally by the point in the ratio 5:3 is

a) 9x-20y+96=0 b) 9x+20y=24 c) 20x+9y+53=0 d) none of these

b)

37. The points which divides the join of (1,2) and (3,4) externally in the ratio 1:1 lies in the

a) III quadrant b) II quadrant c) I quadrant d) cannot be found

38. If p_1 and p_2 are the lengths of the perpendicular from the origin upon the lines $x \sec\theta + y \operatorname{cosec}\theta = a$ and $x \cos\theta - y \sin\theta = a \cos 2\theta$ respectively, then

a) $4p_1^2 + p_2^2 = a^2$ b) $p_1^2 + 4p_2^2 = a^2$ c) $p_1^2 + p_2^2 = a^2$ d) none of these

39. If p be the length of the perpendicular from the origin on the line x/a + y/b = 1, then

a) $P^2 = a^2 + b^2$ b) $p^2 = \frac{1}{a^2} + \frac{1}{b^2}$ c) $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$ d) none of these

40. Three vertices of a parallelogram taken in order are (-1,-6), (2,-5) and (7,2). The fourth vertex is

a) (1,4) b) (4,1) c) (1,1) d) (4,4)

Answers:

1.(b)	2. (a)	3. (c)	4. (d)	5. (b)	6. (a)	7. (b)	8. (c)	9. (d)	10.(c)
11. (a)	12.(a)	13. (b)	14. (c)	15. (a)	16. (d)	17.(d)	18. (c)	19. (a)	20. (b)
21.(a)	22. (b)	23. (b)	24. (a)	25. (c)	26.(b)	27. (a)	28. (d)	29. (a)	30. (b)
31. (c)	32. (d)	33. (b)	34. (c)	35.(b)	36. (a)	37. (d)	38. (a)	39. (c)	40. (b)

PART-1 (CCT QUESTIONS)

1. A triangular park has two of its vertices as B(-4, 1) and C(2, 11). The third vertex A is a point dividing the line joining the points (3, 1) and

(6, 4) in the ratio 2 : 1.

Based on the above information, answer the following questions:

a) The coordinates of third vertex A are

i) (5, 3)

ii) (3, 5)

iii) (-5, 3)

iv) (5, -3)

b) The equation of passing through B and C is

i) 5x – 3y – 23 = 0

ii) 5x – 3y + 23 = 0

iii) 3x + 5y – 23 = 0

iv) 5x + 3y – 23 = 0

c) The equation of line passing through A and parallel to BC is

i) $5x - 3y + 16 = 0$

ii) $5x - 3y + 34 = 0$

iii) $5x - 3y - 16 = 0$

iv) $5x + 3y - 16 = 0$

d) The equation of line passing through A and perpendicular to BC is

i) $3x + 5y - 30 = 0$

ii) $3x + 5y + 30 = 0$

iii) $3x - 5y + 30 = 0$

iv) $3x + 5y = 0$

e) The area of triangular field ABC is

i) 78 sq units

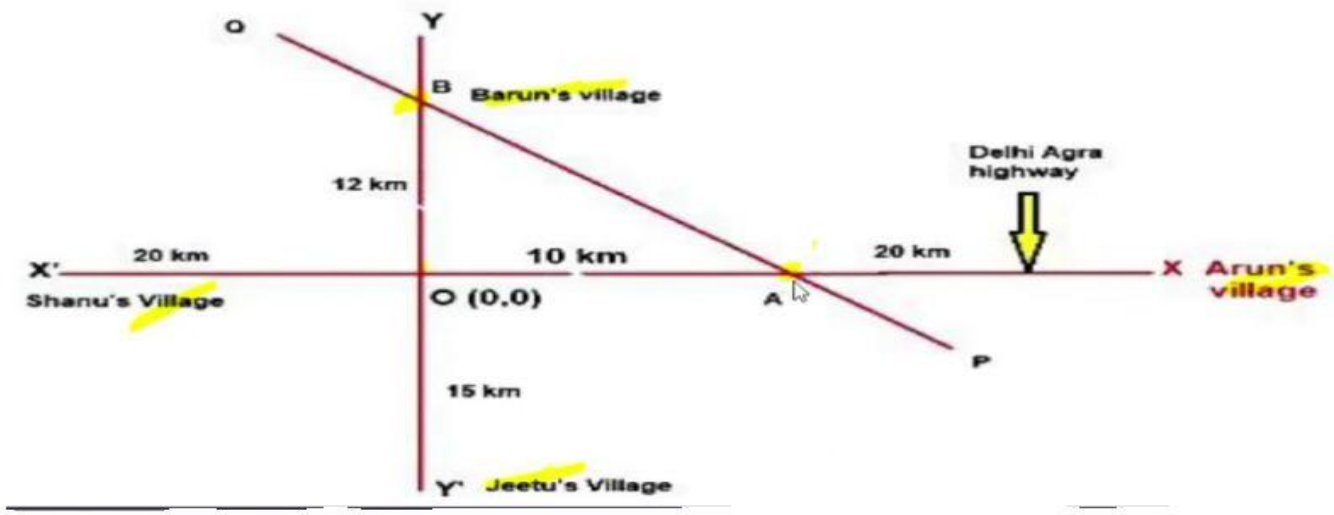
ii) 43 sq units

iii) 86 sq units

iv) 39 sq units

2. Read the paragraph given below and answer the following queations:

Villages of Shanu and Arun's are 50 km apart and are situated on Delhi Agra highway as shown in figure . Another highway yy′ crosses Agra Delhi highway at O (0,0). A small local road PQ crosses both the highways at points A and B s.t. OA = 10 km and OB = 12 km. Also, the villages of Barun and Jeetu is 15km from O.



Now answer the following questions:

a) What are the coordinates of A?

i) (10, 0)

ii) (10, 12)

iii) (0, 10)

iv) (0, 15)

b) What is the equation of line AB?

i) 5x + 6y = 60

ii) 6x + 5y = 60

iii) x = 10

iv) y = 12

c) What is the distance of AB from O (0,0)?

i) 60 km

ii) $60/\sqrt{61}$ km

iii) $\sqrt{61}$ km

iv) 60 km

d) What is the slope of line AB?

i) 6/5

ii) 5/6

iii) -6/5

iv) 10/12

e) What is the length of line AB?

i) $\sqrt{61}$ km

ii) 12 km

iii) 10 km

iv) $2\sqrt{61}$ km

3. Assuming that straight line $x - 3y + 4 = 0$ works as a plane mirror and point P (1,2) not on the line based on this information answer the following questions:

   a) What is the slope of the line?

      i) 3

      ii) 1/3

      iii) -1/3

      iv) -3

   b) What is the equation of a line passing through 'P' and parallel to $x - 3y + 4 = 0$

      i) $x - 3y = 5$

      ii) $x + 3y = -5$

      iii) $x - 3y + 5 = 0$

      iv) $3x + y = 5$

   c) If 'Q' is the image of 'P' in the line $x - 3y + 4 = 0$, then slope of line PQ is

      i) 3

      ii) 1/3

      iii) -1/3

      iv) -3

   d) If 'Q' is the image of 'P' in line $x - 3y + 4 = 0$, then coordinates of 'Q' are

      i) (1/5, 2/5)

      ii) (6/5, 7/5)

      iii) (7/5, 6/5)

      iv) (-6/5, 7/5)

   e) Coordinates of mid point of PQ are

      i) (1/10, 3/10)

      ii) (11/10, 7/10)

      iii) (11/10, 3/10)

      iv) None of these.

4. Equation of a straight- line path is $2x + y - 12 = 0$. A man is standing at a point (2, 3). He wants to reach the straight -line path in least possible time

Based on above information, answer the following questions:

a) The slope of path followed by man is

i) ½ ii) -1/2 iii) 2 iv) -2

b) Equation of path followed by man is

i) $2x + y - 4 = 0$

ii) $2x - y + 4 = 0$

iii) $x - 2y + 4 = 0$

iv) $x + 2y + 4 = 0$

c) Coordinates of point where path followed by man and given straight line path meet is

i) (2, 5) ii) 4, 4) iii) -2, 4) iv) 4, -4)

d) The distance covered by man in reaching the straight -line path is

i) $\sqrt{5}$ units

ii) $\sqrt{6}$ units

iii) 2 units

iv) 3 units

e) The image of the point (2, 3) with respect to the given straight -line path, assuming the given path to be a plane mirror is

i) (5, 6) ii) (-5, 6) iii) (6, -5) iv) (6, 5)

5. A parking lot in a company is triangular shaped. Its sides are given by the equations

AB : $3y = 5x + 2$, BC : $x + y - 6 = 0$, and AC : $3y - x + 2 = 0$

Based on above information, answer the following questions:

a) The coordinates of vertex A are

i) (-1, -1)

ii) (-1, 2)

iii) (1, 2)

iv) (-1, 1)

b) The coordinates of vertex B are

i) (-2, 2)

ii) (2, -2)

iii) (2, 4)

iv) (2, -4)

c) The equation of line passing through A and perpendicular to BC is

i) $x + y = 0$

ii) $x – y = 0$

iii) $x + 2y = 0$

iv) $x – 2y = 0$

d) The equation of line passing through A and perpendicular to BC is

i) $x + 3y + 10 = 0$

ii) $x – 3y + 10 = 0$

iii) $3x - y – 10 = 0$

iv) $3x + y – 10 = 0$

e) The coordinates of orthocenter of triangle ABC are

i) (-5/2, -5/2) ii) (-5/2, 5/2) iii) (5/2, 5/2) iv) (5/2, -5/2)

ANSWER KEY (CCT QUESTIONS)

1. a) i) (5, 3)

b) ii) $5x – 3y + 23 = 0$

c) iii) $5x – 3y – 16 = 0$

d) i) $3x + 5y – 30 = 0$

e) iv) 39 sq units

2. a) i) (10, 0)

b) ii) $6x + 5y = 60$

c) ii) $60/\sqrt{61}$ km

d) iii) -6/5

e) iv) $2\sqrt{61}\ km$

3. a) ii) 1/3

b) iii) $x - 3y + 5 = 0$

c) iv) -3

d) ii) (6/5, 7/5)

e) iv) None of these

4. a) i) ½

b) iii) $x - 2y + 4 = 0$

c) ii) (4, 4)

d) i) $\sqrt{5}$ units

e) iv) (6, 5)

5. a) i) (-1, -1)

b) iii) (2, 4)

c) ii) $x - y = 0$

d) iv) $3x + y - 10 = 0$

e) iii) (5/2, 5/2)

UNIT : IV

TOPIC : LIMITS

Set 1

Multiple Choice Questions (MCQs)

Q. 1. $\lim_{x\to 0}(\pi - \frac{22}{7})$ is

(a) 3

(b) 2

(c) 1

(d) 0

Q. 2. $\lim_{x\to 0}(\frac{1-(\cos x)^3}{xSinx\ Cosx})$ is

(a) 3/5

(b) 3/2

(c) ¾

(d) 2/5

Q. 3. $\lim_{x\to 0}(\frac{Sinax}{bx})$ is

(a) 1

(b) 0

(c) a/b

(d) b/a

Q. 4. $\lim_{x\to 1}(\frac{(1+x)^6-1}{(1+x)^2-1})$ is

(a) 6

(b) 2

(c) 21

(d) 12

Q.5. $\lim_{x\to 1}(\frac{x^7-2x^5+1}{x^3-3x^2+2})$ is

(a) 7/3

(b) 3/7

(c) 1

(d) 0

Q6. $\lim_{x\to\sqrt{2}}\left(\frac{x^4-4}{x^2-3\sqrt{2}x\ -8}\right)$ is

(a) 2

(b) 4

(c) 5/8

(d) 8/5

Q7. Find n if $\lim_{x\to 2}\left(\frac{x^n-2^n}{x-2}\right)=80, n\epsilon N$

(a) 2

(b) 160

(c) 40

(d) 5

Q 8. $\lim_{x\to\frac{1}{2}}\left[\frac{8x-3}{2x-1}-\frac{4x^{\ 2}+1}{4x^{\ 2}-1}\right]$ *is*

(a) 4

(b) 7/2

(c) 5/2

(d) ½

Q9. $\lim_{x\to 0}\frac{Sin^2\ 2x}{Sin^2\ 4x}$ is

(a) ½

(b) ¼

(c) 1/8

(d) 1/16

Q10. $\lim_{x\to 0}\frac{1-Cos2x}{x^2}$ is

(a) 0

(b) 1

(c) 2

(d) None of the above

Q11. $\lim_{x\to\pi} \frac{Sinx}{x-\pi}$ is

(a) 0

(b) 1

(c) -1

(d) None of the above

Q12. $\lim_{x\to 0} \frac{2Sinx - Sin2x}{x^3}$ is

(a) 0

(b) 1

(c) 2

(d) 3

Q13. $\lim_{x\to a} \frac{Sinx - Sina}{\sqrt{x}-\sqrt{a}}$ is

(a) $\sqrt{a}$ Cos a

(b) $\sqrt{a}$ 2Cos a

(c) $\sqrt{a}$ Sin a

(d) $\sqrt{a}$ 2 Sin a

Q14. $\lim_{x\to 0} \frac{x^2\, Cos\, x}{1-Cosx}$ is

(a) 0

(b) 1

(c) 2

(d) ∞

Q15. $\lim_{x\to 0} \frac{(1+x)^3-1}{x}$ is

(a) 0

(b) 1

(c) 2

(d) 3

Q 16. $\lim_{x\to 1} \frac{x^m - 1}{x^n - 1}$ is

(a) m

(b) n

(c) m/n

(d) n/m

Q17. $\lim_{\theta \to 0} \frac{1-Cos\ 4\theta}{1-Cos\ 6\theta}$ is

(a) 2/3

(b) 4/9

(c) 1

(d) 0

Q18. $\lim_{x \to 0} \frac{Cosec\ x - Cotx}{x}$

(a) 0

(b) 1

(c) ½

(d) -1

Q19. if $Y = \frac{Sinx+Cosx}{Sinx-Cosx}$ then $\frac{dy}{dx}\ at\ x = 0\ is$

(a) 1

(b) -1

(c) 2

(d) -2

Q20. If f(x) =$1 + \frac{x^1}{1} + \frac{x^2}{2} + \cdots \ldots \ldots \ldots + \frac{x^{100}}{100}\ then\ f'(1) =$

(a) 0

(b) 1

(c) 10

(d) 100

Q21. $\lim_{x \to 0} \frac{Sinx}{\sqrt{1+x}-\sqrt{1-x}}$ is

(a) 2

(b) 0

(c) 1

(d) -1

Q22. $\lim_{x \to 1} \frac{(\sqrt{x}-1)(2x-3)}{2x^2+x-3}$ is

(a) 1/10

(b) -1/10

(c) 1

(d) None of these

Q23. $\lim_{x\to 0} \frac{|Sinx|}{x}$ is

(a) 1

(b) -1

(c) Limit does not exist.

(d) None of the above

Q24. $\lim_{x\to 0} \frac{Tan2x-x}{3x-Sinx}$ is

(a) 2

(b) ½

(c) -1/2

(d) ¼

Q25. If y = $\sqrt{x} + \frac{1}{\sqrt{x}}$, then $\frac{dy}{dx}$ $at\ x = 1\ is$

(a) 1

(b) -1

(c) $\frac{1}{\sqrt{2}}$

(d) 0

ANSWER KEY				
Q No.1 (b) 2	**Q No.2 (b) 3/2**	**Q No.3 (c) a/b**	**Q No.4 (c) 21**	**Q No.5 (c) 1**
Q No.6 (d) 8/5	**Q No.7 (d) 5**	**Q No.8 (b) 7/2**	**Q No.9 (b) 1/4**	**Q No.10 (c) 2**
Q No.11 (c) -1	**Q No.12 (b) 1**	**Q No.13 (b)**	**Q No.14 (c) 2**	**Q No.15 (d) 3**
Q No.16 (c) m/n	**Q No.17 (b) 4/9**	**Q No.18 (c) 1/2**	**Q No.19 (a) 1**	**Q No.20 (d) 100**
Q No.21 (c) 1	**Q No.22 (b)-1/10**	**Q No.23 (c) limit not exist**	**Q No.24 (b) 1/2**	**Q No.25 (d) 0**

LIMITS

Set 2

Multiple Choice Questions (MCQs)

Q.1 The value of $\lim_{x\to 0}\frac{\sqrt{x^2+1}-1}{\sqrt{x^2+9}-3}$ is

a) 3 b) 4 c) 1 d) 2

Q.2 $\lim_{x\to 1}\frac{x+x^2+.....+x^n-n}{x-1}$ =

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

Q.3 $\lim_{x\to 0}\frac{|x|}{x}$

a) 1 b) -1 c) 0 d) none of these

Q.4 $\lim_{x\to 0}\frac{(1-\cos 2x)\sin 5x}{x^2\sin 3x}$ =

a) $\frac{10}{3}$ b) $\frac{3}{10}$ c) $\frac{6}{5}$ d) $\frac{5}{6}$

Q.5 $\lim_{x\to 0}\frac{\sin 4x}{1-\sqrt{1-x}}$

a) 4 b) 8 c) 10 d) none of these

Q.6 $\lim_{x\to 0}\frac{\tan x - x}{x^2\tan x}$ =

a) 1 b) $\frac{1}{2}$ c) $\frac{1}{3}$ d) none of these

Q.7 The value of constants a and b so that $\lim_{x\to\infty}\left(\frac{x^2+1}{x+1}-ax-b\right)=0$ *is*

a) a = 0 ,b = 0 b) a = 1 ,b = -1 c) a = -1 ,b = 1 d) a = 2 ,b = -1

Q.8 $\lim_{x\to\infty}\left(\frac{x+6}{x+1}\right)^{x+4}$

a) e b) e^2 c) e^4 d) e^5

Q.9 $\lim_{x\to 0} \dfrac{\sqrt{\dfrac{(1-\cos 2x)}{2}}}{x}$

a) 1 b) -1 c) 0 d) none of these

Q.10 $\lim_{x\to a} \dfrac{\cos\sqrt{x}-\cos\sqrt{a}}{x-a}$

a) $\dfrac{-\cos\sqrt{a}}{2\sqrt{a}}$ b) $\dfrac{\cos\sqrt{a}}{2\sqrt{a}}$ c) $\dfrac{\sin\sqrt{a}}{2\sqrt{a}}$ d) $\dfrac{-\sin\sqrt{a}}{2\sqrt{a}}$

Q.11 $\lim_{x\to\infty} \sqrt{x^2+x+1} - \sqrt{x^2+1}$

a) $\dfrac{-1}{2}$ b) $\dfrac{-1}{3}$ c) $\dfrac{-1}{4}$ d) $\dfrac{1}{2}$

Q.12 $\lim_{x\to 3} \dfrac{x^3-7x^2+15x-9}{x^4-5x^3+27x-27}$

a) $\dfrac{9}{2}$ b) $\dfrac{9}{4}$ c) $\dfrac{2}{9}$ d) $\dfrac{4}{9}$

Q.13 $\lim_{x\to 0} \dfrac{1-\cos^3 x}{x\sin x\cos x}$

a) $\dfrac{2}{5}$ b) $\dfrac{3}{5}$ c) $\dfrac{3}{2}$ d) $\dfrac{3}{4}$

Q.14 $\lim_{x\to 0} \dfrac{x(5^x-1)}{1-\cos x}$

a) 5 log2 b) 2 log5 c) $\dfrac{1}{2}\log 5$ d) $\dfrac{1}{5}\log 2$

Q.15 $\lim_{x\to 5} \dfrac{3^x-5^5}{x-5}$

a) $3^5 \log 5$ b) $3^5 \log 3$ c) $5^3 \log 3$ d) $5^2 \log 3$

Q.16 $\lim_{x\to 0} \dfrac{10^x-2^x-5^x+1}{x\tan x}$

a) (log3) (log2) b) (log5) (log2) c) (log4) (log2) d) (log6) (log2)

Q.17 $\lim_{x\to\pi} \dfrac{1-\sin\frac{x}{2}}{\cos\frac{x}{2}\left(\cos\frac{x}{4}-\sin\frac{x}{4}\right)}$

a) $\dfrac{-1}{\sqrt{2}}$ b) $\dfrac{-1}{\sqrt{3}}$ c) $\dfrac{1}{\sqrt{3}}$ d) $\dfrac{1}{\sqrt{2}}$

Q.18 $\lim_{x\to 0} \dfrac{\cos x-\cos 3x}{x(\sin 3x-\sin x)}$

a) - 2 b) 2 c) - 3 d) 3

Q.19 $\lim_{x\to 0} \dfrac{\sin ax+bx}{ax+\sin bx}$

a) $\dfrac{b}{a+1}$ b) $\dfrac{a+1}{b}$ c) $\dfrac{b+1}{a}$ d) $\dfrac{a}{b+1}$

Q.20 $\lim_{x\to\pi} \dfrac{1+\cos x}{\tan^2 x}$

a) $\dfrac{1}{3}$ b) $\dfrac{-1}{3}$ c) $\dfrac{1}{2}$ d) $\dfrac{-1}{2}$

Q.21 $\lim_{x\to 0} \dfrac{\sqrt{1+2x}-\sqrt{1-2x}}{\sin x}$

a) 3 b) 2 c) 4 d) 5

Q.22 $\lim_{x\to 0} \dfrac{\sin x-2\sin 3x+\sin 5x}{x}$

a) 0 b) -1 c) - 2 d) 1

Q.23 $\lim_{x\to 0} \dfrac{(1+x)^6-1}{(1+x)^2-1}$

a) 4 b) 5 c) 6 d) 3

Q.24 $\lim_{x\to -3} \dfrac{x^2-9}{\sqrt{x^2+16}-5}$

a) 12 b) 14 c) 10 d) 11

Q.25 $\lim_{x\to 3} \dfrac{x^4-81}{2x^2-5x-3}$

a) $\dfrac{-108}{7}$ b) $\dfrac{7}{108}$ c) $\dfrac{108}{7}$ d) $\dfrac{107}{8}$

Q.26 $\lim_{x \to \sqrt{2}} \frac{x^4 - 4}{x^2 + 3\sqrt{2}\,x - 8}$

a) $\frac{5}{8}$ b) $\frac{8}{5}$ c) $\frac{4}{5}$ d) $\frac{5}{4}$

Q.27 $\lim_{x \to 7} \frac{4 - \sqrt{9 + x}}{1 - \sqrt{8 - x}}$

a) $\frac{-1}{4}$ b) $\frac{1}{4}$ c) $\frac{1}{3}$ d) $\frac{-1}{3}$

Q.28 $\lim_{x \to 0} \frac{e^{\sin x} - 1}{x}$

a) - 1 b) 2 c) - 2 d) 1

Q.29 $\lim_{x \to 0} \frac{e^{ax} - e^{bx}}{x}$

a) a - b b) a + b c) ab d) $\frac{a}{b}$

Q.30 $\lim_{x \to 0} \frac{1 - \cos 2x}{3 \tan^2 x}$

a) $\frac{3}{2}$ b) $\frac{5}{2}$ c) $\frac{7}{2}$ d) $\frac{2}{3}$

ANSWER KEY

Question No.	Answer	Question No.	Answer	Question No.	Answer
1	**A**	**11.**	**D**	**21.**	**B**
2	**C**	**12.**	**C**	**22.**	**A**
3	**D**	**13.**	**C**	**23.**	**D**
4	**A**	**14.**	**B**	**24.**	**C**
5	**B**	**15.**	**B**	**25.**	**C**
6	**C**	**16.**	**B**	**26.**	**B**
7	**B**	**17.**	**D**	**27.**	**A**
8	**D**	**18.**	**B**	**28.**	**D**
9	**D**	**19.**	**B**	**29.**	**A**
10	**D**	**20.**	**C**	**30.**	**D**

Statistics

1.The sum of 10 items is 12 and the sum of their squares is 18. The standard deviation is
(a) 1/5 (b) 2/5 (c) 3/5 (d) 4/5

2.The algebraic sum of the deviation of 20 observations measured from 30 is 2. So, the mean of observations is
(a) 30.0 (b) 30.1 (c) 30.2 (d) 30.3

3.The coefficient of variation is computed by
(a) S.D/.Mean×100 (b) S.D./Mean (c) Mean./S.D×100 (d) Mean/S.D.

4.When tested the lives (in hours) of 5 bulbs were noted as follows: 1357, 1090, 1666, 1494, 1623. The mean of the lives of 5 bulbs is
(a) 1445 (b) 1446 (c) 1447 (d) 1448

5.If mode of a series exceeds its mean by 12, then mode exceeds the median by
(a) 4 (b) 8 (c) 6 (d) 12

6.Range of the data 4, 7, 8, 9, 10, 12, 13 and 17 is
(a) 4 (b) 17 (c) 13 (d) 21

7.If Mean = Median = Mode, then it is
(a) Symmetric distribution (b) Asymmetric distribution
(c) Both symmetric and asymmetric distribution (d) None of these

8.If the difference of mode and median of a data is 24, then the difference of median and mean is
(a) 12 (b) 24 (c) 8 (d) 36

9.If the varience of the data is 121 then the standard deviation of the data is
(a) 121 (b) 11 (c) 12 (d) 21

10.If the mean of first n natural numbers is 5n/9, then n =
(a) 5 (b) 4 (c) 9 (d) 10

11.If one of the observation is zero then geometric mean is
(a) (Sum of observation)/n (b) $(\text{Multiplication of all observations})^{n}$
(c) $(\text{Multiplication of all observations})^{1/n}$ (d) 0

12.Which one is measure of dispersion method
(a) Range (b) Quartile deviation (c) Mean deviation (d) all of the above

13.If a variable takes discrete values x + 4, x – 7/2, x – 5/2, x – 3, x – 2, x + 1/2, x – 1/2, x + 5 (x > 0), then the median is
(a) x – 5/4 (b) x – ½ (c) x – 2 (d) x + 5/4

14.Let $x_1, x_2, x_3, \ldots\ldots, x_n$, be n observations and X be the arithmetic mean. Then formula for the standard deviation is given by
(a) $\sum(x_i - \text{mean})^2$ (b) $\sum(x_i - \text{mean})2 /n$ (c) $\sqrt{\{\sum(x_i - \text{mean})^2/n\}}$ (d) None of these

15. The mean weight of a group of 10 items is 28 and that of another group of n items is 35.The mean of combined group of 10 + n items is found to be 30. The value of n is

(a) 12 (b) 10 (c) 4 (d) 2

16. The mean of 5 observations is 4.4 and their variance is 8.24. If three observations are 1,2 and 6, the other two observations are

(a) 4 and 8 (b) 5 and 7 (c) 5 and 9 (d) 4 and 9

17. The mean deviation about the mean for the following data 3, 7, 8, 9, 4, 6, 8, 13, 12, 10 is:

(a) 5 (b) 3 (c) 2 (d) 2.4

18. The mean deviation of the following data 14, 15, 16, 17, 13 is:

(a) 4 (b) 2.3 (c) 3 (d) 1.2

19. The variance of data: 0,10,20,30,40,50

(a) 291.67 (b) 290 (c) 230 (d) 12

20. The arithmetic mean of the numerical values of the deviations of items from some average value is called the

(a) Standard deviation (b) Range (c) Quartile deviation (d) Mean deviation

21. For a given data, the variance is 15. If each observation is multiplied by 2, what is the new variance of the resulting observations?

(a) 15 (b) 60 (c) 30 (d) 7.5

22. A batsman scores runs in 10 innings as 38,70,48,34,42,55,63,46,54 and 44 , then the mean score is

(a) 4.94 (b) 49.4 (c) 494 (d) 0.494

23. If the mean of the first n odd natural numbers be n itself, then n is equal to

(a) 3 (b) any natural number (c) 2 (d) 1

24. Which one of the following average is most affected of extreme observations ?

(a) Median (b) Mode (c) G.M. (d) A. M.

25. If the mean of numbers 27,31,89,107,156 is 82, then the mean of 130,126,68,50,1 is :

(a) 75 (b) 82 (c) 80 (d) 157

26. If mean = (3 median – mode) x , then the value of x is

(a) 1 (b) ½ (c) 3/2 (d) 2

27.The mean deviation from the median is
a) Equal to that measured from another value
b) Maximum if all observations are positive
c) Greater than that measured from any other value
d) less than that measured from any other value.

28. A batsman scores runs in 10 innings as 38,70,48,34,42,55,63,46,54 and 44. The mean deviation about mean is:
a) 8.6 b) 6.4 c)10.6 d)7.6

29. The mean deviation of the data 3, 10, 10, 4, 7, 10, 5 from the mean is
(A) 2 (B) 2.57 (C) 3 (D) 3.75

30.When tested, the lives (in hours) of 5 bulbs were noted as follows: 1357, 1090, 1666, 1494, 1623 The mean deviations (in hours) from their mean is
(A) 178 (B) 179 (C) 220 (D) 356

31. Following are the marks obtained by 9 students in a mathematics test: 50, 69, 20, 33, 53, 39, 40, 65, 59 The mean deviation from the median is:
(A) 9 (B) 10.5 (C) 12.67 (D) 14.76

32. The standard deviation of the data 6, 5, 9, 13, 12, 8, 10 is

(A) $\sqrt{\frac{52}{7}}$ (B) $\frac{52}{7}$ (C) $\sqrt{6}$ (D) 6

33. The mean of 100 observations is 50 and their standard deviation is 5. The sum of all squares of all the observations is
(A) 50000 (B) 250000 (C) 252500 (D) 255000

34. Let a, b, c, d, e be the observations with mean m and standard deviation s. The standard deviation of the observations a + k, b + k, c + k, d + k, e + k is
(A) s (B) k s (C) s + k (D) s /k

35. Let x_1, x_2, x_3, x_4, x_5 be the observations with mean m and standard deviation s. The standard deviation of the observations $kx_1, kx_2, kx_3, kx_4, kx_5$ is
(A) k + s (B) s/ k (C) k s (D) s

36. Let $x_1, x_2, \ldots x_n$ be n observations. Let $w_i = lx_i + k$ for i = 1, 2, ...n, where l and k are constants. If the mean of x_i's is 48 and their standard deviation is 12, the mean of w_i's is 55 and standard deviation of w_i's is 15, the values of l and k should be
(A) l = 1.25, k = – 5 (B) l = – 1.25, k = 5 (C) l = 2.5, k = – 5 (D) l = 2.5, k = 5

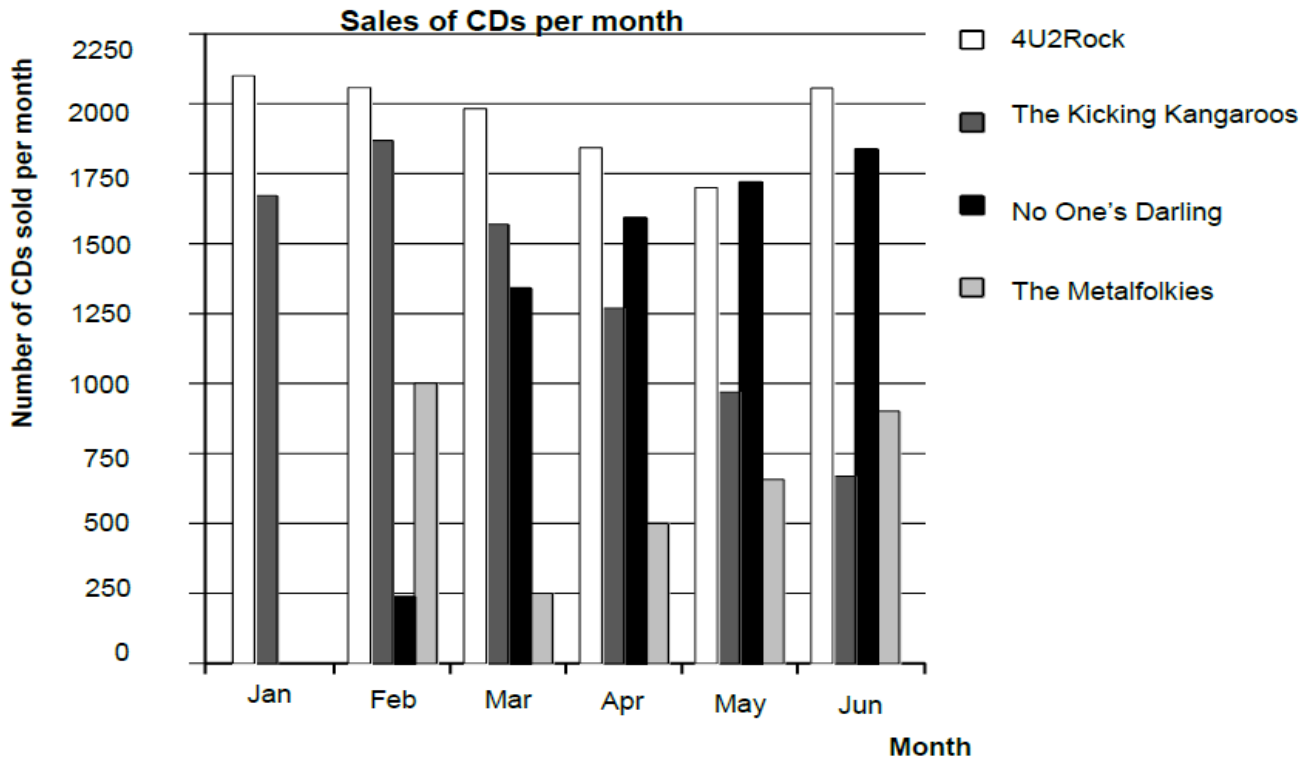
37. Standard deviations for first 10 natural numbers is
(A) 5.5 (B) 3.87 (C) 2.97 (D) 2.87

38. Consider the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. If 1 is added to each number, the variance of the numbers so obtained is
(A) 6.5 (B) 2.87 (C) 3.87 (D) 8.25

39. Consider the first 10 positive integers. If we multiply each number by –1 and then add 1 to each number, the variance of the numbers so obtained is
(A) 8.25 (B) 6.5 (C) 3.87 (D) 2.87

40. The following information relates to a sample of size 60: $x^2 = 18000$, x = 960 The variance is
(A) 6.63 (B) 16 (C) 22 (D) 44

Q. No- 41-50
In January, the new CDs of the bands *4U2Rock* and *The Kicking Kangaroos* were released. In February, the CDs of the bands *No One's Darling* and *The Metalfolkies* followed. The following graph shows the sales of the bands' CDs from January to June.



The Sale of each band is given below and some questions based on them are given
Sale of 4U2Rock:-

JAN	FEB	MARCH	APRIL	MAY	JUNE
2100	2050	1950	1800	1700	2050

Sale of The Kicking Kangaroos :-

JAN	FEB	MARCH	APRIL	MAY	JUNE
1600	1800	1550	1250	900	600

Sale of No One"s Darling:-

JAN	FEB	MARCH	APRIL	MAY	JUNE
	250	1300	1250	1600	1800

Sale of The Metalfolkies :-

JAN	FEB	MARCH	APRIL	MAY	JUNE
	1000	250	500	700	900

MEAN=670

41. What is the mean of sales of 4U2Rock?
a) 1940.2 b)1941.67 c)1942.23 d)1943.43

42. What is the mean deviation of sales of The Kicking Kangaroos?
a) 367.54 b) 365.34 c) 367.34 d) 366.67

43. What is the mean deviation of sales of No one's Darling?
a) 399 b) 398 c) 396 d) 397

44. What is the standard deviation of sales of The Metalfolkies?
a) 274.5 b) 272.1 c) 271.39 d) 271.29

45. What is the standard deviation of sales of 4U2Rock?
a) 145.54 b) 146.54 c) 147.34 d) 144.54

46. What is the standard deviation of sales of No one's Darling?
a) 524.23 b) 534.23 c) 535.34 d) 536.67

47. What is the variance of sales of The Metal folkies?
a) 73500 b) 72300 c) 73600 d) 73700

48. What is the variance of sales of 4U2Rock?
a) 21180.55 b) 21190.56 c) 21195.45 d) 22195.34

49. What is the mean of sales of The Metal folkies?
a) 680 b) 670 c) 690 d) 675

50. What is the mean of sales of The Kicking Kangaroos?
a) 1265.67 b) 1243.66 c) 1283.33 d) 1287.33

ANSWER KEY:-

1. C	2. B	3. B	4. B	5. B	6. C	7. A	8. A	9.B	10. C
11. D	12.D	13.A	14. C	15. C	16.D	17. D	18.D	19.A	20. D
21.B	22.B	23.B	24. D	25. A	26. B	27. D	28. A	29. B	30. B
31. C	32. A	33. C	34. A	35. C	36. A	37. D	38. D	39. A	40. D
41.B	42.D	43. C	44.D	45.A	46.B	47.C	48.A	49. B	50.C

To Get More material for Maths IX - X Click below

CBSE MATHS IX-X

To Get More Material for XI-XII Click below

CBSE MATHS XI-XII