Mathematics

Number Systems

1. 0 (zero) is
   A. An irrational number
   B. A rational number
   C. A negative integer
   D. A positive number

2. 6 is
   A. A prime integer
   B. An irrational number
   C. A rational number
   D. An odd integer

3. $\sqrt{23}$ is
   A. A rational number
   B. A irrational number
   C. An even integer
   D. A factor of 36

4. $\frac{3}{2}$ is
   A. An irrational number
   B. Whole number
   C. A positive integer
   D. A rational number

5. Every prime number is also
   A. Rational number
   B. even number
   C. Irrational number
   D. multiple of two numbers

6. $\frac{\pi}{3}$ is
   A. A positive integer
   B. A negative integer
   C. A natural number
   D. An irrational number

7. The value of x, and y, when $(x + iy)^2 = 5 + 4i$
   A. X = 2, y = -1
   B. X = -2, y = 1
   C. X = 2, y = –i
   D. X = 2, y = 2

8. If Z = (1,2), then Z^{-1} = ?
   A. (0.2, 0.4)
   B. (-0.2, 0.4)
   C. (0.2 , -0.4)
   D. (-0.2 , -0.4)

9. If $Z_1 = 1+ i$, $Z_2 = 2+3i$, then $|Z_2 - Z_1| = ?$
   A. $\sqrt{3}$ I
   B. $\sqrt{7}$
   C. -2-I
   D. $\sqrt{5}$

10. If $z_1 = \sqrt{-36}$, $z_2 = \sqrt{-25}$, $z_3 = \sqrt{-16}$, then what is the sum of z_1, z_2 and z_3?

A. 15 B. 15i
C. −15i D. −15

11. What is the conjugate of −7 −2i?

A. −7 + 2i B. 7 + 2i
C. 7 -2i D. $\sqrt{53}$

12. For any set X, X∪ X′ is

A. X B. X′
C. φ D. Universal Set

13. Given X, Y are any two sets such that number of elements in X = 28, number of elements in set Y = 28, and number of elements in set X ∪ Y = 54, then number of elements in set X ∩ Y =

A. 4 B. 3
C. 2 D. 1

14. Let A, B, and C be any sets such that A∪B = A∪C and A ∩B = A∩C then

A. A ≠ C B. B = C
C. A = B D. A ≠ B

Sets, Functions and Groups

15. The complement of set A relative to universal set U is the set

A. {x / x ∈ A∧ x ∈ U} B. {x / x ∉ A ∧ x ∈ U}
C. {x / x ∈ A and x ∉ U} D. A - U

16. The multiplicative inverse of x such that x = 0 is

A. − x B. does not exist
C. 1/x D. 0
E. ±1

17. Multiplicative inverse of "1" is

A. 0 B. ±1
C. 1 D. {0, 1}

18. In a school, there are 150 students. Out of these 80 students enrolled for mathematics class, 50 enrolled for English class, and 60 enrolled for Physics class. The student enrolled for English cannot attend any other class, but the students of mathematics and Physics can take two courses at a time. Find the number of students who have taken both physics and mathematics.

A. 40 B. 30
C. 50 D. 20

19. Which of the following is the subset of all sets?
A. Φ B. {1,2,3}
C. {Φ} D. {0}

20. The set {{a,b}} is
A. Infinite set B. Singleton set
C. Two points set D. None

21. The set of the first elements of the ordered pairs forming a relation is called its
A. Function on B B. Range
C. Domain D. A into B

22. The graph of a quadratic function is
A. Circle B. Ellipse
C. Parabola D. Hexagon

23. The set of complex numbers forms a group under the binary operation of
A. Addition B. Multiplication
C. Division D. Subtraction

24. The multiplicative inverse of –1 in the set {1–,1} is
A. 1 B. –1
C. ±1 D. 0
E. Does not exist

25. The set {1, –1, i, –i}, form a group under
A. addition B. multiplication
C. subtraction D. None

26. The set of all positive even integers is
A. Not a group B. A group w.r.t. subtraction
C. A group w.r.t. division D. A group w.r.t. multiplication

27. The statement that a group can have more than one identity elements" is
A. True B. False
C. Fallacious D. Some times true

28. The set (Q, .)
A. Forms a group
B. Does not form a group
C. Contains no additive identity
D. Contains no additive inverse

29. The set (Z, +) forms a group
A. Forms a group w.r.t addition
B. Non commutative group w.r.t multiplication
C. Forms a group w.r.t multiplication
D. Doesn't form a group

Matrices and Determinants

1. If $A = [a_{ij}]$ and $B = [b_{ij}]$ are the matrices of the order 3×3 then $A - B =$
   A. $[a_{ij} - b_{ji}]$ B. $[a_{ij} - b_{ij}]$
   C. $[a_{ij} - b_{ij}]$ D. $[a_{ij}] - [b_{ij}]$

2. Two matrices A and B are conformable for multiplication (AB) if and only if
   A. Both A,B have the same number of columns
   B. Both A and B do not have the same order
   C. Number of col A is same as number of rows of B
   D. Number of rows of A is same as number of col of B

3. If $|A| \neq 0$ then A is called
   A. Nilpotent matrix B. Singular matrix
   C. Non singular matrix D. Diagonal matrix

4. If $X = \begin{bmatrix} k & 0 \\ 0 & k \end{bmatrix}$ then X is called
   A. Unit matrix B. Diagonal matrix
   C. Nilpotent matrix D. Zero matrix

5. If A and B are matrices of same order than $(A + B)(A + B) =$
   A. $A^2 + B^2$ B. $A^2 + B^2 + 2AB$
   C. $A + B$ D. $A^2 + B^2 + AB + BA$

6. In general matrices do not satisfy
   A. Commutative law w.r.t multiplication
   B. Associative law w.r.t addition
   C. Distributive law w.r.t addition
   D. Multiplication of a scalar with the matrix

7. If any two rows (or any two columns) of a square matrix are inter changed, the determinant of the resultant matrix is
   A. Same as the original determinant
   B. Additive inverse of the original determinant
   C. Both A and B
   D. Adj of the original matrix

8. If A and B are matrices such that AB=BA=I then
   A. A and B are multiplicative inverse of each other
   B. A and B are additive inverses of each other
   C. A and B are singular matrices
   D. A and B are equal

9. If $A = \begin{bmatrix} 3 & 6 \\ \lambda & -8 \end{bmatrix}$ is a singular matrix then
   A. $\lambda = 6$ B. $\lambda = -24$

C. $\lambda = 3$ D. $\lambda = 2$

10. The value of $\begin{vmatrix} 4 & 2 & 1 \\ 0 & 0 & 0 \\ 5 & 8 & 2 \end{vmatrix} =$

A. 0 B. 12
C. 30 D. 14

11. The value of $\begin{vmatrix} a-b & b-c & c-a \\ b-c & c-a & a-b \\ c-a & a-b & b-c \end{vmatrix} =$

A. 0 B. A
C. B D. C

12. If the order of A is $n \times m$. Then order of kA is

A. $n \times m$ B. $m \times n$
C. $.km \times n$ D. $m \times kn$

13. An $m \times n$ matrix is said to be rectangular if

A. $m = n$ B. $.m \neq n$
C. $mn = 1$ D. $mn = 0$

14. The value of $\begin{vmatrix} b+c & a & 1 \\ c+a & b & 1 \\ a+b & c & 1 \end{vmatrix} =$

A. 0 B. abc
C. $a + b + c$ D. $\sqrt{a+b}$

15. The condition "x" for which the matrix $A = \begin{bmatrix} x & 8 \\ 8 & 16 \end{bmatrix}$ is singular

A. $X = 2$ B. $X = 4$
C. $X = 8$ D. $X = 16$

Quadratic Equations

1. If α and β be irrational roots of a quadratic equation, then

A. $\alpha = b/a$ and $\beta = ca$ B. $\alpha = a/b$ and $\beta = -c/a$
C. $\alpha^2 + \beta^2 = 1$ D. $\alpha = -b/a$ and $\beta = c/a$

2. The degree of the polynomial $2x^4 + 3x^2 + 16x + 28 = x^4 + 2x^2$ is

A. 1 B. 2
C. 3 D. 4

3. One of the roots of the equation $2x^2 + 3x + n = 0$ is the reciprocal of the other, then n = _____
   A. 1 B. 2
   C. 3 D. 4

4. If the sum of the roots of the equation $ax^2 - 2x + 2a = 0$ is equal to their product, then the value of a is
   A. 1 B. 2
   C. 3 D. 4

5. The cube roots of unity ω = _____
   A. $\frac{1-i\sqrt{-3}}{2}$ B. $\frac{-1+i\sqrt{-3}}{2i}$
   C. $\frac{-1+i\sqrt{3}}{2}$ D. $\frac{1+i\sqrt{3}}{2}$

6. Complex roots of real quadratic equation occur in
   A. Conjugate pair B. ordered pair
   C. reciprocal pair D. quadratic function

7. The value of the polynomial $3x^3 + 4x^2 - 5x + 4$ at x = -1 is
   A. 12 B. 1
   C. 10 D. -10

8. If the sum of the roots of $(a + 1)x^2 + (2a + 3)x + (3a + 4) = 0$ is -1, then product of the roots is
   A. 1 B. 2
   C. -2 D. -1

9. Two natural numbers whose sum is 25 and difference is 5, are
   A. 25, 20 B. 20, 10
   C. 20, 5 D. 15, 10

10. The length of rectangle is twice as much as its breadth. If the perimeter is 120 cm, the length of the rectangle is
    A. 10 cm B. 20 cm
    C. 30 cm D. 40 cm

11. $\omega^{88} = ?$
    A. 1 B. ω^2
    C. ω D. 0

12. $\omega^n = ?$, when $n = 3k$
    A. 0 B. ω
    C. 1 D. $\frac{1}{\omega}$

13. The number of real roots in cube roots of 8 is?
A. Zero B. One
C. Four D. Infinite

14. The sum of the ages of Nazish and his son is 56 years. Eight years ago, Nazish was 3 time as old as his son. How old is the son now?
A. 18 years B. 36 years
C. 8 years D. 16 years

15. The two consecutive positive integers whose product is 56 are
A. 7, 8 B. 14, 4
C. 28, 2 D. 56, 1

Partial Fractions

1. Which is a proper rational fraction
A. $\frac{3x-7}{x^2+4}$ B. $\frac{2x^2-5}{x^2+4}$
C. $\frac{3x^4}{2x^3-15}$ D. All are proper rational fractions

2. $\frac{2}{(x+1)(x-1)} = \frac{A}{x+1} + \frac{B}{x-1}$ corresponds to
A. A = x, B = 1 B. A = 0, B = 2
C. A = -1 , B = 1 D. A = x-1, B = x+1

3. $\frac{x-1}{(x+2)(x-2)} =$
A. $\frac{4}{3(x-4)} - \frac{1}{3(x-1)}$ B. $\frac{3}{4(x+2)} + \frac{1}{4(x-2)}$
C. $\frac{2}{3(x-2)} - \frac{4}{3(x+2)}$ D. $\frac{3}{x} - \frac{2}{x+1}$

4. $(x+2)^2 = x^2+4x+4$ is
A. A linear equation B. A cubic equation
C. A quadratic equation D. An equation for circle

5. $x^2 + 2x - 25 = 0$ is
A. A polynomial B. An inequality
C. An identity D. A linear function

6. $\frac{1}{x^2-1}$ = ? (in case of making partial fraction)
A. $\frac{Ax+B}{x^2-1}$ B. $\frac{A}{x} + \frac{B}{x-1}$

C. $\frac{A}{x+1}+\frac{B}{x-1}$ D. None

7. A fraction in which the degree of the numerator is less than the degree of the denominator is called
A. Polynomial B. Proper fraction
C. Rational fraction D. Mixed fraction

8. A relation in which the equality is true only for some values of the unknown variable is called
A. An identity B. An equation
C. A polynomial D. Inverse function

9. Partial fraction of $\frac{1}{x^2-1}$ will be of the form
A. $\frac{A}{x+1}+\frac{B}{x^2-x+1}$ B. $\frac{A}{x-1}+\frac{B}{x^2+x+1}$
C. $\frac{A}{x-1}+\frac{Bx+C}{x^2+x+1}$ D. None

10. The quotient of two polynomials $\frac{P(x)}{Q(x)}$ where $Q(x) \neq 0$ with no common factor is called
A. An equation B. Linear equation
C. Rational fraction D. Identity

Sequences and Series

1. The nth term of A.P: 1,5,9,15,..... is given by
A. $4n-3$ B. $4n+1$
C. $3n-4$ D. $4n+3$

2. If the 9^{th} term of A.P is 8 and the 4^{th} term is 20, then the first term is
A. 20.2 B. 25.5
C. 27.5 D. 37.5

3. The nth term in G.P 3, -6, 12, ... is
A. $3(-2)^{n-1}$ B. $2(-2)^{n+1}$
C. $3(-2)^n$ D. $4(-2)^{n-1}$

4. The sum of the series 1+5+9+13+17+21+25+29 is:
A. 140 B. 130
C. 120 D. 110

5. The series $1 - x + 2x^2 - 3x^3 + 4x^4 + \ldots$ may be written more briefly as
A. $\sum_{r=0}^{\infty}(-1)^r\, rx^r$ B. $1+\sum_{r=0}^{\infty}(-1)^r\, rx^r$
C. $\sum_{r=0}^{\infty} rx^r$ D. $\sum_{r=0}^{\infty}(-1)^{r+1}\, rx^r$

6. If a and b are any two distinct negative real numbers and $G = -\sqrt{ab}$ where A,G,H represent arithmetic, geometric, and harmonic means then
   A. $A < G < H$ B. $A > G > H$
   C. $A < G > H$ D. $A > G < H$

7. The sum of the interior angles for a 16 sided polygon is.
   A. 4π B. 14π
   C. 8π D. 2π

8. The difference of two consecutive terms of an A.P. is called
   A. Constant of series B. Common ratio
   C. Common difference D. General term

9. Write the first four terms of the arithmetic sequence if $a_1 = 5$ and other three consecutive terms are 23, 26, 29
   A. 23, 26, 29, 32 B. 5, 8, 11, 14
   C. 8, 11, 14, 17 D. None of these

10. The common difference of the sequence 7, 4, 1, ...is
   A. 1 B. - 3
   C. 5 D. 0

11. Find the geometric mean between 4 and 16
   A. ±3 B. ±8
   C. ± 1 D. ± 16

12. A sequence of numbers whose reciprocals form an arithmetic sequence is called
   A. Harmonic series B. Arithmetic series
   C. Harmonic sequence D. Geometric sequence

13. The fifth term of the sequence $a_n = 3n - 2$ is
   A. 3 B. -3
   C. 13 D. -13

14. Sum of integers starting from ton is
   A. $\frac{n(n+1)}{4}$ B. $\frac{n(n+1)}{6}$
   C. $\frac{n(n+1)}{2}$ D. $\frac{n(n-1)}{2}$

15. The average of first 100 integers is =
   A. $50\frac{1}{2}$ B. $25\frac{1}{4}$
   C. 100 D. 5050

Permutation, Combination and Probability

1. The number of ways in which we can courier 5 packets to 10 cities is

A. 2×5^0 B. 5^{10}
C. 10^5 D. 2^{10}

2. Two dice are rolled. The number of possible out come in which at least one die shows 2 is?

A. 5 B. 12
C. 11 D. 7

3. If A and B are two events, then P(AUB) = ? (when A and B are disjoint)

A. P(A) – P(B) B. P(A) × P(B)
C. P(A)+P(B) D. P(A) + P(B) – P(A∩B)

4. A die is thrown. What is the probability that there is a prime number on the top?

A. 1/2 B. 1/3
C. 1/6 D. 2/3

5. If C_r^n $P_r^n = 24 : 1$ then r = ?

A. 1 B. 2
C. 3 D. 4

6. The number of diagonals of a six sided figure are

A. 9 B. 6
C. 12 D. 3

7. The number of ways in which 5 distinct toys can be distributed among 3 children is

A. 3^5 B. 5^3
C. C_3^5 D. P_3^5

8. If P(E) is the probability that can event will occur, then P(E) =

A. 1 B. 0.5
C. 2 D. 0

9. A standard deck of 52 cards is shuffled. What is the probability of choosing the queen of the diamonds

A. 1/5 B. 1/13
C. 5/52 D. 1/52

10. How many elements are in the sample space of two rolling dies

A. 6 B. 12
C. 18 D. 36

11. Corola available in 5 models, 8 colors, and 3 sizes. How many Corolas must a local dealer have on hand in order to have one of each kind available?

A. 24 B. 120
C. 16 D. 39

12. How many different arrangements of the letters in the word QABABA are possible?
A. 720 B. 40
C. 60 D. 30

13. Given eight points in a plane, no three of which are collinear. How many lines do the points determine?
A. 16 B. 64
C. 28 D. 36

14. There are 30 Red, 20 Green, and some Blue balls in a bag. If the probability of finding a Red ball is 1/3, how many are red balls in the bag
A. 120 B. 20
C. 40 D. 90

15. There are 30 Red balls and 25 Green balls in a bag. If a ball is drawn from the bag randomly, what is the probability that a Blue ball comes out?
A. 1 B. 0.5
C. 0 D. None

Mathematical Induction and Binomial Theorem

1. $1 + 2 + 3 + \ldots\ldots + n = ?$
A. $\frac{n(n+1)}{2}$ B. $\frac{n+1}{2}$
C. $\frac{n(n+1)(2n+1)}{6}$ D. n^2

2. In Binomial Expansion the coefficients of the terms equidistant from beginning and end of the expansion are
A. Zero B. Same
C. Equal to preceding term D. Equal to following term

3. In the expansion of $(a + b)^n$ in every term the sum of the exponents of a and b is
A. n B. n + 1
C. 2n − 1 D. 2n + 1

4. If $0 < n < 1$, n is a rational number, the number of terms in the expansion of $(1 + x)^n$ are
A. n + 1 B. 2n
C. Infinitely many D. $2n^2$

5. Total number of terms in the expansion of $(a + b)^5 + (a - b)^5$ after simplification are
A. 3 B. 1
C. 4 D. 7

6. The values of n such that, in the binomial expansion of $(1 - x)^n$, co-efficient of x^2 is 3, are
A. −2, −3 B. 2, −3

C. $-2, 3$ D. None of these

7. If n is a positive integer, then $3+6+9+\ldots\ldots+3n =$

A. $\frac{3n(n+1)}{2}$ B. $\frac{2n(n+1)}{3}$

C. $\frac{3n(n+1)}{4}$ D. $3n(n+1)$

8. If n is any positive integer, then $n! > 3^{n-1}$ is true for all

A. $n = 3$ only B. $n \geq 5$

C. $n \geq 3$ D. $n < 5$

9. If a statement S(n) is true for n = 1 and the truth of S(n) for n = K implies the truth of S(n) for S(n) = K + 1, then S(n) true for all

A. All Real numbers B. All Integers

C. Positive integers D. All complex numbers

10. .a + x is

A. A trinomial B. A binomial

C. A monomial D. An equation

11. The first three terms in the expansion of $(1 + x)^{-1}$ are

A. $1 + x + x^2$ B. $1 - x - x^2$

C. $-1 - x + x^2$ D. $1 - x + x^2$

12. If n is odd then the middle terms in the expansion of $(a + x)^n$ are

A. $[\frac{n+1}{2}]$ th and $[\frac{n+2}{2}]$th B. $[\frac{n+1}{2}]$ th and $[\frac{n+3}{2}]$ th

C. $[\frac{n}{2}]$ th and $[\frac{n+2}{2}]$ th D. None of these

13. If n is any positive integer then $4^n > 3^n + 4$ is true for all

A. $N \leq 2$ B. $N < 3$

C. $N > 2$ D. $N \geq 2$

14. If n is not natural number, then the expansion $(1 + x)^n$ is valid for

A. $-1 < x < 1$ B. $-2 < x < 2$

C. $-2 \leq x \leq 2$ D. $-1 \leq x \leq 1$

15. The expansion of $(1 - 3x)^{-1}$ is valid if

A. $|x| < 1$ B. $|x| < 3$

C. $|x| < \frac{1}{3}$ D. None of these

Fundamentals of Trigonometry

1. An angle of one radian is equivalent to

A. 90^0 B. 60^0

C. 67^0 D. $57^0 18'$

2. An arcPQ is subtends an angle 60^0 at the center of a circle of radius 1m. The length PQ is

A. 30m B. 10m

C. $\frac{\pi}{6}$ m D. $\frac{\pi}{3}$ m

3. The associative angle of 280^0 is

A. 100^0 B. 10^0

C. 80^0 D. -80^0

4. If $\text{Sin}\,0 = \frac{3}{5}$ then $\text{Cos}0 =$

A. $\frac{1}{2}$ B. $\frac{3}{5}$

C. $\frac{4}{5}$ D. 1

5. An angle 0 is such that $\tan 0 = 1$ and cos0 is negative, then

A. sin0 is positive B. $\text{Cos}\,0 = -\sqrt{2}/4$

C. cot0 = –1 D. sec0 is negative

6. If in isosceles right angled triangle, one side is a then hypotenuse is

A. $a\sqrt{2}$ B. $\frac{a}{2}$

C. a

D. cannot be determined by given information

7. If 0 is not an integral multiple of $\frac{\pi}{2}$, then $\text{Cot}^4 0 + \text{Cot}^2 0 = ?$

A. $\text{Cosec}^4 0 - \text{Cosec}^2 0$ B. $\text{Tan}\,0 - \text{Tan}^2 0$

C. $\text{Cosec}^2 0 + \text{Cosec}0$ D. $\text{Sin}0\text{Cos}0$

8. Domain of Cosec0 is

A. is R but $0 = n\pi$ B. is R but $0 \neq n\pi$

C. is R but $0 \neq 2n\pi$ D. is R but $0 \neq \frac{n\pi}{2}$

9. In 30,60,90 triangle, if the smallest side is 6 then the side opposite to the angle of 60 is

A. 12 B. 3

C. $6\sqrt{3}$ D. 6

10. $\text{Csc}\,\frac{\pi}{3}$

A. 2 B. 1

C. 0 D. $\frac{2}{\sqrt{3}}$

11. If a rectangle has an area $81x^2$ and length of 27x, then what is its width?

A. 3x B. 9x
C. $3x^2$ D. $9x^2$

12. If Sin 0 = 1, then θ =

A. $2n\pi + \pi/2$ B. $2n\pi$
C. $2\pi + n$ D. $N\pi + \pi/2$

13. Sin 720° = _____

A. 1 B. 0
C. 2 D. $\frac{1}{2}$

14. Cot 360° = _____

A. undefined B. 0.707
C. -0.5 D. 0

15. Sin $(2\pi - 0)$ = _____

A. Cos 0 B. -Sin 0
C. – sin 0 D. – cos 0

Trigonometric Identities

1. In the triangle Δ ABC, where C is the right angle, Tan A + Tan B =

A. A + B B. C^2/AB
C. A^2/BC D. B^2/AC

2. If $\cos\alpha = 3/5$, $\cos\beta = 5/13$, then

A. $\cos(\alpha + \beta) = 33/65$ B. $\sin(\alpha + \beta) = 56/65$
C. $\sin^2(\alpha + \beta/2) = 1/65$ D. $\cos(\alpha + \beta) = 63/65$

3. If 2 Sin x Cos 2 x = Sin x then?

A. $X = n\pi + \pi/6$ B. $X = n\pi + \pi/3$
C. $X = n\pi + 1$ D. $X = n\pi + \pi/2$

4. The value of $\cos(\frac{1}{2}\cos^{-1}\frac{1}{2})$ is equal to?

A. $\frac{\sqrt{3}}{2}$ B. -3/4
C. 1/16 D. ¼

5. Sin(a + b) + Sin (a – b) =

A. Sin a Cos b B. Sin a Sin b
C. Sin a + Cos b D. Sin a – 2 Cos b

6. Period of Tan $\frac{x}{5}$ is

A. 5π B. 4π

C. 2π D. $\frac{\pi}{5}$

7. Cos 315° =

A. 0.707 B. 0.5

C. 1 D. 0

8. If Sin θ = Cos θ then θ =

A. 30 B. 45°

C. 60° D. 90°

9. Sin x + Cos x = 1 x =

A. π B. $\pi/2$

C. $\pi/3$ D. $\pi/4$

10. If A = (3,8) and B = (5,6), then the distance between A and B is

A. $2\sqrt{2}$ B. 2

C. 1 D. 6

Fundamentals of Trigometry

1. What is the domain of $y = Sin^{-1} x$?

A. $-1 \le x \le 1$ B. $1 \le x \le 1$

C. $0 \le x \le \pi$ D. $-\frac{\pi}{2} \le x \le \frac{\pi}{2}$

2. What is the domain of $y = Cot^{-1} x$?

A. Set of irrational numbers only

B. Set of all real numbers.

C. Set of Integers only

D. Set of complex numbers only

3. What is the period of Cot x?

A. 2π B. π

C. $\pi/2$ D. 4π

4. Period of Sin 2x =

A. π B. 4π

C. $2n\pi$ D. 2π

5. $Sin^{-1}(-x) = ?$

A. $Sin^{-1} x$ B. $-Sin^{-1} x$

C. $Cos^{-1} x$ D. $-Cos^{-1} x$

6. $\text{Sin}^{-1}x = ?$

A. $\frac{\pi}{2} - \text{Sin}^{-1}x$ B. $\frac{\pi}{2} - \text{Cos}^{-1}x$

C. $-\text{Sin}^{-1}x$ D. $-\text{Cos}^{-1}x$

7. $\text{Tan}(\pi + \text{Tan}^{-1}x) = ?$

A. Tan x B. X

C. $-x$ D. $\text{Cot}^{-1}x$

8. $\text{Cos}^{-1}x = ?$

A. $\sqrt{1-x^2}$ B. $\text{Sin}^{-1}\sqrt{1-x^2}$

C. $\text{Sin}^{-1}\sqrt{1+x^2}$ D. $\text{Cos}^{-1}\sqrt{1-x^2}$

9. $\text{Sin}^{-1}\frac{\sqrt{3}}{2} = ?$

A. $\frac{2\pi}{3}$ B. $\frac{\pi}{2}$

C. $\frac{\pi}{3}$ D. $\frac{\pi}{5}$

10. $\text{Sin}^{-1}(\frac{\sqrt{2}}{2}) = ?$

A. $\frac{\pi}{2}$ B. $\frac{\pi}{3}$

C. $\frac{3\pi}{4}$ D. 2π

11. ArcCot $\sqrt{3} = ?$

A. $\frac{\pi}{2}$ B. π

C. 2π D. $\frac{\pi}{6}$

12. Which of the following is not defined?

A. Arcsin $\frac{1}{9}$ B. ArcCos $(-\frac{4}{3})$

C. Arctan $\frac{11}{12}$ D. Arccot (-4)

13. $\text{Cos}^{-1}(-x) =$ _____

A. $\pi + \text{cos}^{-1}x$ B. $\pi - \text{Sin}^{-1}x$

C. $\pi + \text{Sin}^{-1}x$ D. $\pi - \text{Cos}^{-1}x$

14. If $\text{Sin}^{-1}x + \text{cos}^{-1}y = \pi$, then x and y are

A. Associative angles B. Complementary angles

C. Reflex angles D. Supplementary angles

15. The principal value of $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$ is

A. $\frac{\pi}{3}$ B. $-\frac{\pi}{3}$

C. $\frac{2\pi}{3}$ D. $\frac{5\pi}{3}$

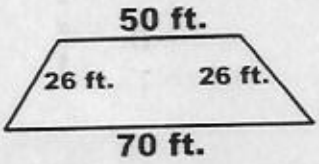
Application of Trigonometry

1. 120^0 degrees are equal to how many radians?

A. $\frac{\pi}{3}$ radians B. $\frac{2\pi}{3}$ radians

C. $\frac{\pi}{4}$ radians D. $\frac{\pi}{2}$ radians

2. A grassy plot has the dimension indicated in the figure. The area of this isosceles trapezoid is



A. 3500 B. 1200

C. 1440 D. 2500

3. If the angle of a triangle are in the ratio 2:3:7, the triangle is

A. Obtuse B. Acute

C. Right angle D. Isosceles

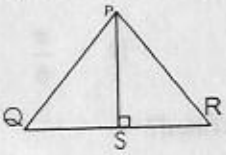
4. In the figure. PS is perpendicular to QR. If PQ = PR =26 and PS = 24, then QR =

A. 10

B. 20

C. 40

D. 26



5. $Sin\frac{\alpha}{2} =$

A. $\sqrt{\frac{(s-b)(s-c)}{bc}}$ B. $\sqrt{\frac{(s-b)(s-c)}{bc}}$

C. $\sqrt{\frac{bc}{(s-c)(s-b)}}$ D. $\sqrt{\frac{s(s-a)}{bc}}$

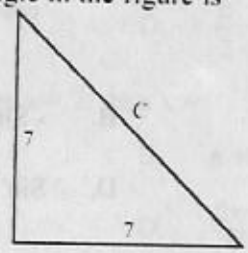
6. Area of $\Delta ABC =$

A. $ab\,Sin\alpha$ B. $\frac{1}{2}ab\,Sin\alpha$

C. $\frac{1}{2}ac\,Sin\gamma$ D. $\frac{1}{2}ac\,Sin\beta$

7. If you are looking a high point from the ground, then the angle formed is
A. Angle of elevation
B. Angle of depression
C. Right angle
D. Horizon

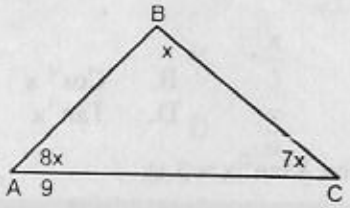
8. The value of c in the triangle in the figure is



A. 7
B. $7\sqrt{2}$
C. $\sqrt{7}$
D. 49

9. If $\theta = 60^0$ then
A. $\sin\theta = ½$
B. $\tan\theta = \cot 30^0$
C. $\theta = \pi/4$
D. $\text{Sec}\theta = 4$

10. In the figure angle A is =



A. 15
B. 60
C. 90
D. 20

11. If Cos θ = 0. Then θ =
A. $n\pi/2$
B. $(2n + 1)\pi/2$
C. $(2n - 1)\pi/2$
D. $(n \pm 1)\pi/2$

12. If five triangles are constructed having sides of the lengths indicated below, the triangle that will NOT be a right triangle is:
A. 8, 15, 17
B. 3, 4, 5
C. 12, 15, 18
D. 5, 12, 13

Inverse Trigonometric Functions

1. $\text{Sin}^{-1}\left[-\frac{1}{2}\right] =$ ____

A. $\frac{\Pi}{3}$
B. $-\frac{\Pi}{6}$
C. $-\frac{\Pi}{3}$
D. $\frac{\Pi}{6}$

2. $\text{Tan}^{-1}\frac{1}{x} =$ ____

A. Sin x B. Sec^{-1} X

C. Cot^{-1} X D. $\frac{\sin -1x}{\cos -1x}$

3. $\text{Sin}^{-1}(-x) =$

A. $\text{Cos}^{-1}\frac{1}{x}$ B. $-\text{Sin}^{-1}$ X

C. $\frac{1}{\sin -1x}$ D. $\text{Sin}^{-1}\frac{1}{x}$

4. Sec^{-1} x =

A. $\text{Cos}^{-1}\frac{1}{x}$ B. $\text{Cosec}^{-1}\frac{1}{x}$

C. $\text{Cos}^{-1}(-x)$ D. Tan^{-1} x

5. Cos^{-1} x =

A. $\Pi - \sin^{-1}x$ B. $\Pi + \sin^{-1}x$

C. $\frac{\Pi}{2} - \sin^{-1}$ x D. $\frac{\Pi}{2} + \sin^{-1}$ x

6. $\frac{\Pi}{2} - \text{cosec}^{-1}$ x =

A. Sin^{-1} x B. Cos^{-1} x

C. Sec^{-1} x D. Tan^{-1}x

7. The solution of the equation $3\tan^2 x = 3$ is ____

A. $\left\{\frac{\Pi}{6}+n\Pi\right\} U \left\{\frac{5\Pi}{6}+n\Pi\right\}, n \in Z$ B. $\left\{\frac{\Pi}{3}+2n\Pi\right\}\left\{\frac{2\Pi}{3}+2n\Pi\right\}, n \in Z$

C. $\left\{\frac{\Pi}{4}+n\Pi\right\} U \left\{\frac{5\Pi}{4}+n\Pi\right\}, n \in Z$ D. None of these

8. Find the solution of Sin Ø = 1 in [0,2 Π]

A. $\frac{\Pi}{6}, \frac{5\Pi}{6}$ B. $\frac{\Pi}{3}, \frac{4\Pi}{3}$

C. $\frac{\Pi}{4}, \frac{5\Pi}{4}$ D. $\frac{\pi}{2}$

9. In which quadrant is the solution of the equation sin x - 1 = 0

A. II quadrants B. II and III quadrants

C. III and IV quadrants D. I quadrant

10. If $\theta = 60^0$ then

A. $\sin\theta = ½$ B. $\tan\theta = \cot 30^0$

C. $\theta = \pi/4$ D. $\text{Sec}\theta = 4$

Solutions of Trigonometric Equations

1. If $1 + \cos x = 0$, then $x =$

   A. $\pi + 2n\pi$ B. $\pi + n\pi$

   C. $\pi - n\pi$ D. $\frac{\pi}{2}$

2. If x lies in $\{0, 2\pi\}$ and $\operatorname{Cosec} x = 2$, then $x =$

   A. $\frac{\pi}{6}$ and $\frac{5\pi}{6}$ B. $\pi + 2n\pi$

   C. $n\pi$ D. $\frac{2\pi}{3}$ and $\frac{\pi}{3}$

3. Which of the following is solution of $\tan^2 x = \frac{1}{3}$

   A. $\frac{7\pi}{6}$ B. $\frac{5\pi}{6}$

   C. $\frac{\pi}{6}$ D. All

4. Which of the following is the solution of $\cot^2 x = \frac{1}{\sqrt{3}}$

   A. $\frac{\pi}{5}$ B. $\frac{\pi}{3}$

   C. $\frac{\pi}{7}$ D. $\frac{\pi}{9}$

Functions and Limits

1. If $f(x) = x^3 - 2x^2 + 4x - 1$, then $f(-2) = ?$

   A. 0 B. -25

   C. 5 D. 45

2. If $f(x) = \frac{x}{x^2 - 4}$ then which is not included in the domain of $f(x)$

   A. 0 B. -2

   C. 1 D. 4

3. $P(x) = 2x^4 - 3x^3 + 2x - 1$ is polynomial of degree

   A. 1 B. 2

   C. 3 D. 4

4. Which is not included in the domain of $\cos^{-1} x$

   A. 0 B. 1

   C. -1 D. 2

5. Which is an explicit function

A. $y = x^2 + 2x - 1$ B. $x^2 + xy + y^2 = 2$

C. $\frac{x^2 - x + 9}{x} = 1$ D. All are

6. If f(x) : A → B and g(x) : A → B then Dom [f(x) + g(x)] is

A. Dom f(x) ∩ Dom g(x) B. Dom f(x) ∪ Dom g(x)

C. [Dom f(x)]^2 - [Dom g(x)]^2 D. [Dom g(x)]^2 - [Dom f(x)]^2

7. The Domain of f(x) = log x is

A. [0, ∞] B. (0, ∞)

C. [0, ∞[D. [∞, ∞]

8. A function F(x) is called even if

A. F(x) = F(−x) B. F(x) = F(-x)

C. F(x) = -F(x) D. 2F(x) = 0

9. The range of inequality x + 2 > 4 is

A. (−1, 2) B. (−2, 2)

C. (1, ∞) D. None

10. $\lim_{x \to \infty} \frac{x - 2}{x}$ is

A. 1 B. 0

C. -2 D. 3

11. Graph of the equation $x^2 + y^2 = 4$ is

A. a circle B. an ellipse

C. a parabola D. a square

12. Domain of y = csc x is

A. R - nπ, n ε I B. R

C. $R - \frac{n\pi}{2}, n \hat{I} I$ D. All negative Integers

13. The area of circle of unit radius =

A. 0 B. 1

C. 4 D. π

14. $\lim_{x \to \infty} (e^x) =$

A. 0 B. 1

C. 8 D. ∞

15. In the function $v = \frac{4}{3}\pi r^3$, V is a function of

A. $\frac{3}{4}$ B. r

C. v D. π

Differentiation

1. $F(x) = x^x$ decreases in the interval

A. $(0, e)$ B. $(0, 1)$
C. $(-\infty, 0)$ D. None

2. The parametric equation of a curve are $x = t^2$, $y = t^3$ then

A. $\frac{dy}{dx} = \frac{3t}{2}$ B. $\frac{dy}{dx} = t^5$
C. $\frac{dy}{dx} = 5t^4$ D. None

3. If $x^2 + y^2 = 4$. Then $\frac{dy}{dx}$ =

A. $2x + 2y$ B. $4 - x^2$
C. $\frac{-x}{y}$ D. $\frac{y}{x}$

4. $\frac{d}{dx} a^x$ is

A. $.xa^{x-1}$ B. $.a^x$
C. $x \ln a$ D. $a^x \ln a$

5. $\frac{d}{dx}(\sqrt{x}) =$

A. $2\sqrt{x}$ B. $\frac{1}{\sqrt{x}}$
C. $\frac{1}{2\sqrt{x}}$ D. None of these

6. $\frac{d}{dx}(3y^4) =$

A. $12y^3 \frac{dy}{dx}$ B. $8y^3$
C. $8y^3 \frac{dy}{dx}$ D. $12y^3$

7. If $y = (ax)^m + b^m$, then $\frac{dy}{dx}$ equals

A. $m(ax)^m x^{m-1}$ B. $ma^m x^{m-1}$
C. $m a^m x^{m-1}$ D. $m a^m x^{m-2}$

8. If c is a constant number and if f is the function defined by the equation $f(x) = c$ for all values of x, then f is differentiable at every x and f' is defined by the equation $f'(x) =$ ____

A. f B. 1
C. C D. 0

9. $\frac{d}{dx}[\cos x^2] =$ _____

A. $-2x \cos x^2$ B. $-2x^2 \sin x^2$

C. $-x^2 \sin x$ D. $-2x^2 \sin x^2$

10. Second derivative of $y = x^9 + 10x^2 + 2x - 1$ at $x = 0$ is

A. 10 B. 20

C. 12 D. 1

11. Derivative of strictly increasing function is always

A. Zero B. Positive

C. Negative D. Both (A) and (B)

12. Any point, where f is neither increasing nor decreasing and $f'(x) = 0$ at that point, is called a

A. Minimum B. Maximum

C. Stationary point D. Constant point

13. If $y = \sin(ax + b)$, then fourth derivative of y with respect to x =

A. $a^4 \cos(ax + b)$ B. $a^4 \sin(ax + b)$

C. $-a^4 \sin(ax + b)$ D. $a^4 \tan(ax + b)$

Integration

1. The value of $\int_0^{\frac{1}{2}} \frac{dx}{\sqrt{1 - x^2}}$ is

A. π B. $\frac{\pi}{6}$

C. $\frac{-\pi}{2}$ D. 2π

2. e^{x^2} could be the integral w.r.t x of

A. $.e^{2x}$ B. $2xe^{2x}$

C. $\frac{e^{x^2}}{2x}$ D. None of these

3. Which of the following integrals can be evaluated

A. $\int_0^1 \frac{1}{x - 1} dx$ B. $\int_0^{\frac{\pi}{2}} \sin x \, dx$

C. $\int_1^2 \sqrt{1 - x^2} \, dx$ D. $\int_{-2}^{1} \ln x dx$

4. $\int \frac{1}{ax+b}\,dx =$

A. $\frac{1}{a}\log|ax+b| + c$ B. $\text{Log}|ax+b| + c$

C. $\frac{1}{b}\log|ax+b| + c$ D. $\frac{1}{x}\log|ax+b| + c$

5. $\frac{d}{dx}\int x^3\,dx =$ _____

A. $\frac{1}{4}x^4$ B. X^3

C. $3x^2$ D. $\frac{x^4}{4}$

6. If $f_1(x)$ and $f_2(x)$ are any two anti derivatives of a function F (x), then the value of $f_1(x) - f_2(x) =$

A. A variable B. A constant

C. undefined D. infinity

7. To integrate $\int_9^{99} \frac{\sqrt{100-x^2}}{x}\,dx$ we will make substitution

A. $X = 100 \sin\theta$ B. $X = 10 \sin\theta$

C. $X = 10 \sec\theta$ D. None of these

8. $\int \cot(ax+b)\,dx =$

A. $\frac{1}{a}\log|\sin(ax+b)| + c$ B. $\frac{1}{a}\log|\cos(ax+b)$

C. $\frac{1}{b}\log|\sin(ax+b)|$ D. $\frac{1}{a}\log|\sin(bx+a)|$

9. $\int \sec(ax+b)\tan(ax+b)\,dx =$ _____

A. $\frac{\sec(ax+b)}{a}$ B. $\frac{\sec^2(ax+b)}{2}$

C. $\frac{\sec(ax+b)}{x}$ D. $\frac{1}{2}$

10. The general solution of the differential equation $\frac{dy}{dx} = \log x$ is

A. $Y = -x\log x - x + c$ B. $Y = x\log x + x^2$

C. $Y = x\log x - x + c$ D. $Y = 2x\log x + 2x + c$

Introduction to Analytic Geometry

1. The point (-5 ,3) is the center of a circle and P(7, -2) lies on the circle. The radius of the circle is

A. 2 B. 13

C. 7 D. 8

2. The mid point of the line joining (−1, −3) to (3, −5) is
   A. (1, 1) B. (1,-1)
   C. (2, −8) D. (1, −4)

3. The gradient of the line joining (1, 4) and (−2, 5) is
   A. $\frac{3}{8}$ B. $-2\frac{2}{3}$
   C. $-\frac{1}{3}$ D. 2

4. The line joining (1, 3) to (a, b) has unit gradient then
   A. a-b = -2 B. .a+b =0
   C. .a- b = 5 D. 2a+3b=1

5. The equation of the line with gradient 1 passing through the point (h, k) is
   A. Y = x + k − h B. $Y = \frac{k}{h}x + 1$
   C. Y = x + h − k D. Ky = hx − 1

6. The curves $y = x^2$, y = x intersect at
   A. (0,0) , (1,1) B. (2,4)
   C. (0, ∞),(2, 4) D. (0,3), (−1,1)

7. Which of the following is the equation of a line with slope 0 and passing through the point (4,3)
   A. X = 4 B. X = −4
   C. Y = 3 D. Y = −6

8. If the diagonal of a square has coordinates (1,2) and (5,6) . the length of a side is
   A. 3 B. 4
   C. 1 D. 5

9. If $k_1 : k_2 = 1:1$ then the point P dividing the line is
   A. Midpoint B. Extreme left point
   C. Extreme Right Point D. P lies out side k_1 and k_2

10. The center of a circle of radius 10 is on the origin. Which of the following points lies with in the circle
    A. (10,0) B. (8,8)
    C. (8,4) D. (0,10)

11. The angle α ($0° < α < 180°$) measured counterclockwise from positive x-axis to a non-horizontal straight line *l* is called the
    A. Rotation B. Inclination
    C. Radian D. None

12. If a line passes through origin, then the equation of the line is
    A. $y = \frac{m}{x}$ B. $y = mx$

C. $x = my$ D. None

Linear Inequalities and Linear Programming

1. If $x < y$, $2x = A$, and $2y = B$, then
   A. $A = B$ B. $A < B$
   C. $A < x$ D. $B < y$

2. If $ab > 0$ and $a < 0$, which of the following is negative?
   A. b B. -b
   C. $-a$ D. $(a - b)^2$

3. If $4 - x > 5$, then
   A. $x > 1$ B. $x > -1$
   C. $x < 1$ D. $x < -1$

4. Which is not a half plane
   A. $ax + by < c$ B. $ax + by > c$
   C. Both A and B D. None

5. A point of a solution region where two of its boundary lines intersect, is called
   A. Boundary B. Inequality
   C. Half Plane D. Vertex

6. A farmer possesses 100 hectometers of land and wants to grow corn and wheat. Cultivation of corn requires 3 hours per hectometer while cultivation of wheat requires 2 hours per hectometer. Working hours cannot exceed 240. If he gets a profit of Rs. 20 per hectometer for corn and Rs. 15 per hectometer for wheat. The profit function for the farmer is
   A. $P(x,y) = 20x + 15y$ B. $P(x,y) = 2x + 3y$
   C. $P(x,y) = x + y$ D. $P(x,y) = 3x + 2y$

7. Which is in the solution set of $4x - 3y < 2$
   A. (3,0) B. (4,1)
   C. (1,3) D. None

8. For which of the following ordered pairs (s, t) is $s + t > 2$ and $s - t < -3$?
   A. (3, 2) B. (2, 3)
   C. (1, 8) D. (0, 3)

9. If $-1 < x < 0$, which of the following statements must be true?
   A. $x < x^2 < x^3$ B. $x < x^3 < x^2$
   C. $x^2 < x^3 < x$ D. $x^2 < x < x^3$

10. If p and r are integers, $p \neq 0$, and $p = -r$, which of the following must be true?
    A. $p < r$ B. $p > r$
    C. $p + r < 0$ D. $p - r < 0$

11. The total cost of 2 apples and 3 oranges is $1.70, which of the following is true
A. The cost of one apple
B. The cost of one orange
C. Both have equal cost per item
D. cost of each single item can not be determined.

12. x is a member of the set {-1, 0, 3, 5} y is a member of the set {-2, 1, 2, 4} which is possible?
A. $x - y = -6$ B. $x - y < -6$
C. $x - y > -6$ D. None

13. $r + 3 > 5$ then which is true
A. $r + 2 > 4$ B. $r + 2 < 4$
C. $r + 2 = 4$ D. None

14. $ab > 0$ and $a > 0$ then
A. $a > b$ B. $a < b$
C. $a = b$ D. None

15. $s > t$ then
A. $(s-t)^2 > (t-s)^2$ B. $(s-t)^2 < (t-s)^2$
C. $(s-t)^2 = (t-s)^2$ D. None

Conic Section

1. If a cone is cut by a plane perpendicular to the axis of the cone, then the section is a
A. Parabola B. Circle
C. Hyperbola D. Ellipse

2. The constant distance of all points of the circle from its centre is called the
A. Radius of the circle B. Secant of the circle
C. Chord of the circle D. Diameter of the circle

3. The equation of the circle with centre origin and radius $2\sqrt{2}$ is
A. $X^2 + y^2 = 2\sqrt{2}$ B. $X^2 + y^2 = 8$
C. $X^2 - y^2 = 2\sqrt{2}$ D. $X^2 - y^2 = 8$

4. The radius of the circle $(x-1)^2 + (y+3)^2 = 64$ is
A. 8 B. $2\sqrt{2}$
C. 4 D. 64

5. The circle $(x-2)^2 + (y+3)^2 = 4$ is not concentric with the circle
A. $(x-2)^2 + (y+3)^2 = 9$ B. $(x+2)^2 + (y-3)^2 = 4$
C. $(x-2)^2 + (y+3)^2 = 8$ D. $(x-2)^2 + (y+3)^2 = 5$

6. The point (x_1, y_1) lies outside the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ if
A. $X_1^2 + y_1^2 + 2gx_1 + 2fy_1 + c < 0$
B. $X_1^2 + y_1^2 + 2gx_1 + 2fy_1 + c = 0$
C. $X_1^2 + y_1^2 + 2gx_1 + 2fy_1 + c > 0$

D. None of these

7. The equation of the normal to the circle $x^2 + y^2 = 25$ at(4, 3) is
   A. $3x - 4y = 0$ B. $3x - 4y = 5$
   C. $4x + 3y = 5$ D. $4x + 3y = 25$

8. A line segment whose end points lie on a circle is called
   A. The secant of the circle B. The arc of the circle
   C. The chord of the circle D. The circumference of the circle

9. The perpendicular bisector of any chord of a circle
   A. Passes through the centre of the circle
   B. Does not pass through the centre of the circle
   C. May or may not pass through the centre of the circle
   D. None of these

10. The conic is a parabola if
   A. $e < 1$ B. $e > 1$
   C. $e = 1$ D. $e = 0$

11. The axis of the parabola $y^2 = 4ax$ is
   A. $X = 0$ B. $Y = 0$
   C. $X = y$ D. $X = -y$

12. The end points of the major axis of the ellipse are called its
   A. foci B. Vertices
   C. Co - vertices D. eccentricity

13. The vertices of the ellipse $x^2 + 4y^2 = 16$ are
   A. $(\pm, 4, 0)$ B. $(0, \pm 4)$
   C. $(\pm 2, 0)$ D. $(0, \pm 2)$

14. The line through the centre and perpendicular to the transverse axis is called the
   A. Major axis B. Minor axis
   C. Focal axis D. Conjugate axis

15. The two different parts of the hyperbola are called its
   A. Vertices B. Directrices
   C. Nappes D. Branches

Vectors

1. If $|\vec{a}| = 1$, then $\vec{a}$ is a
   A. Free vector B. Null vector
   C. Unit vector D. None of these

2. Unit vector in the positive direction of x-axis is
   A. $\hat{i}$ B. $\hat{j}$
   C. $\hat{k}$ D. All

3. A vector of magnitude zero is called
   A. Position vector B. Null vector
   C. Free vector D. None of these

4. The magnitude of a vector can never be
   A. Zero B. Negative
   C. Positive D. Absolute

5. The scalar or dot product of two vectors $\vec{a}$ and $\vec{b}$ is defined as
   A. $\vec{a} \cdot \vec{b} = |\vec{a}|\,|\vec{b}| \sin\theta$ B. $\vec{a} \cdot \vec{b} = |\vec{a}|\,|\vec{b}|$
   C. $\vec{a} \cdot \vec{b} = |\vec{a}|\,|\vec{b}| \cos\theta$ D. $\vec{a} \times \vec{b} = |\vec{a}|\,|\vec{b}| \cos\theta$

6. Which of the vectors have opposite direction?
   A. $\hat{i} - \hat{j} + 2\hat{k}, 3\hat{i} - 3\hat{j} + 6\hat{k}$
   B. $2\hat{i} - \hat{j} + 2\hat{k}, -4\hat{i} + 2\hat{j} - 4\hat{k}$
   C. $\hat{i} - \hat{j} + 2\hat{k}, -4\hat{i} + 2\hat{j} - 4\hat{k}$
   D. Both (A) and (B)

7. If l, m, n are the direction cosines of a vector $\overrightarrow{OP}$, then
   A. $l^2 + m^2 + n^2 = 0$ B. $l^2 - m^2 + n^2 = 1$
   C. $l^2 + m^2 + n^2 = 1$ D. $l^2 + m^2 - n^2 = 0$

8. The direction cosines of y-axis are
   A. 1, 0, 0 B. 0, 1, 0
   C. 0, 0, 1 D. 1, 1, 1

9. If $\vec{a}$ and $\vec{b}$ are the position vectors of A and B respectively, then the position vector of a point P in AB such that $\overrightarrow{AC} = 4\overrightarrow{AB}$ is given by
   A. $4\vec{b} - 3\vec{a}$ B. $4\vec{a} - 3\vec{b}$
   C. $3\vec{b} - 2\vec{a}$ D. $\vec{b} - \vec{a}$

10. The angle between the vector $\vec{A} = 5i$ and $\vec{B} = 15j$ is
    A. 30° B. 90^0
    C. 60° D. 180°

11. If the angle between two vectors with magnitude 8 and 2 is 60^0 then their scalar product is
    A. 12 B. 8
    C. 16 D. 1

12. If the vector $2i + 4j - 2k$ and $2i + 6j + xk$ are perpendicular then $x = ?$
    A. 4 B. 8
    C. 14 D. 7

13. If $\vec{A}$ is a vector along x- axis, its component along y-axis is

A. $\vec{A}$ B. 0

C. Unit vector D. $2\vec{A}$

Answers

Number Systems

1	B	4	D	7	A	10	B	13	C
2	C	5	A	8	C	11	A	14	B
3	B	6	D	9	A	12	D		

Sets, Functions and Groups

1	B	4	A	7	C	10	B	13	B
2	B	5	A	8	C	11	B	14	B
3	C	6	B	9	A	12	A	15	A

Matrices and Determinants

1	B	4	B	7	B	10	A	13	B
2	C	5	D	8	A	11	A	14	A
3	C	6	A	9	C	12	A	15	B

Quadratic Equations

1	D	4	A	7	C	10	D	13	B
2	D	5	C	8	C	11	B	14	A
3	B	6	A	9	D	12	C	15	A

Partial Fractions

1	A	3	B	5	A	7	B	9	C
2	C	4	C	6	C	8	B	10	C

Sequences and Series

1	A	4	C	7	B	10	B	13	C
2	C	5	B	8	C	11	B	14	C
3	A	6	A	9	B	12	C	15	A

Permutation, Combination and Probability

1	C	4	D	7	C	10	D	13	C
2	C	5	D	8	A	11	B	14	C
3	C	6	A	9	D	12	C	15	C

Mathematical Induction and Binomial Theorem

1	A	4	C	7	A	10	B	13	D
2	B	5	A	8	B	11	D	14	A
3	A	6	C	9	C	12	B	15	C

Fundamentals of Trigonometry

1	D	4	C	7	A	10	D	13	B
2		5	D	8	B	11	A	14	A
3	C	6	A	9	C	12	A	15	B

Trigonometric Identities

1	B	3	A	5	A	7	A	9	B
2	B	4	A	6	A	8	B	10	A

Fundamentals of Trigonometry

1	A	4	A	7	B	10	C	13	D
2	B	5	B	8	B	11	D	14	D
3	B	6	B	9	C	12	B	15	A

Application of Trigonometry

1	B	4	B	7	A	10	B
2	C	5	B	8	B	11	B
3	A	6	A	9	B	12	C

Inverse Trigonometric Functions

1	B	3	B	5	C	7	C	9	D
2	C	4	A	6	C	8		10	B

Solutions of Trigonometric Equations

1	A	2	A	3	D	4	B

Book - 2

Functions and Limits

1	B	4	D	7	C	10	A	13	D
2	B	5	A	8	B	11	A	14	D
3	D	6	A	9	D	12	A	15	B

Differentiation

1	D	4	D	7	B	10	B	13	B
2	A	5	C	8	D	11	B		
3	C	6	A	9	B	12	C		

Integration

1	B	3	B	5	B	7	B	9	A
2	D	4	A	6	B	8	A	10	C

Introduction to Analytic Geometry

1	B	4	A	7	C	10	C
2	D	5	A	8	B	11	B
3	C	6	A	9	A	12	B

Linear Inequalities and Linear Programming

1	B	4	C	7	C	10	A	13	A
2	A	5	D	8	C	11	D	14	D
3	D	6	A	9	B	12	C	15	D

Conic Section

1	B	4	A	7	A	10	C	13	A
2	A	5	B	8	C	11	B	14	D
3	B	6	C	9	A	12	B	15	D

Vectors

1	C	4	B	7	C	10	B	13	B
2	A	5	C	8	B	11	B		
3	B	6	B	9	A	12	C		

END OF THE SECTION