Mathematics

Chapter#01 COMPLEX NUMBERS

1. If Z = -*i*, then $\sqrt{Z}$ equals to:

   a. $\pm\left(\frac{1-i}{\sqrt{2}}\right)$ b. ± 1 c. $\sqrt{2}$ d. $\pm i^{2}$.

2. If $Z = \frac{3}{772} + \frac{5}{876}i$ then $|Z|^2 - Z.\bar{Z} =$

   a. 0 b. 1 c. 1.5 d. 1/2

3. The multiplicative inverse of $\frac{\sqrt{3}}{2}i$ is

   a. $-\frac{\sqrt{3}}{4}i$ b. $-\frac{\sqrt{3}}{2}i$ c. $\frac{\sqrt{3}}{2}i$ d. $-\frac{2}{\sqrt{3}}i$

4. Which is the real and imaginary part of this term $\left(\frac{1-\sqrt{3}\,i}{1+\sqrt{3}\,i}\right)^5$

   a $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$. b. $\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ c. $\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ d. $\left(0, \frac{\sqrt{3}}{2}\right)$

5. If Z_1 = 100000+200000i and Z_2=500000 + 600000i then $\mathbf{Re}\left(\frac{Z_1}{Z_1+Z_2}\right) + \mathbf{Re}\left(\frac{Z_2}{Z_1+Z_2}\right) = ?$

   a.1 b. 0 c. 600000 d. None

6. If $n \in Z$ *than* $(\sin\varphi + i\cos\varphi)^n =$ _____

   a) $\sin\varphi + i\cos n\varphi$ b) $\cos n(\frac{\pi}{2} - \varphi) + i\sin n(\frac{\pi}{2} - \varphi)$ c) $\cos\varphi + i\sin\varphi$ d) none

7. $\frac{(\cos 2\varphi + i\sin 2\varphi)^5}{(\cos 3\varphi + i\sin 3\varphi)^2} =$

   a) $\cos 4\varphi + i\sin 4\varphi$ b) $\cos\varphi + i\sin\varphi$ c) $\cos 2\varphi + i\sin 2\varphi$ d) none

8. The minimum value of $|Z| + |Z - 1|$ is:

   a. 0 b.– 1 c.1 d.– 2

9. If modulus is 2 and argument is $\frac{2\pi}{3}$ then complex number is:

   a) $-\frac{1}{2} + \frac{\sqrt{3}}{2}i$ b. $-\frac{1}{2} - \frac{\sqrt{3}}{2}i$ c. $-1 + \sqrt{3}i$ d. $-1 - \sqrt{3}i$

10. If Z = a + b then $|Z| =$

    a) $\sqrt{a^2 - b^2}$ b. $-\sqrt{a^2 - b^2}$ c. $\sqrt{a^2 + b^2}$ d. $a + b$

11. The positive square root of *i* is:

    a) $\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}i$ b. $\frac{\sqrt{3}}{2} + \frac{1}{2}i$ c. $\frac{1}{\sqrt{3}} + \frac{2}{\sqrt{3}}i$ d. –1 + i

12. If $Z_1 = 1 - 3i$, $Z_2 = 3 - i$ Then $\left|\frac{Z_1}{Z_2}\right| =$ ___

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

13. $(1 - i)^8 =$ _____

    a) 0 b) $8i$ c) $\sqrt{2} - \sqrt{2}i$ d) 16

14. Complex numbers 1 + *i* and 1 - $\frac{1}{i}$ are

    a) Conjugate of each other b) Multiplicative inverse of each other
    c) Additive inverse of each other d) None of these

15. In trigonometric form the complex number $2-2\sqrt{3}\,i$ is equivalent to
a) $2(Cos60^o - i\ Sin60^o)$ b) $4(Cos60^o - i\ Sin60^o)$
c) $2(Cos30^o - i\ Sin30^o)$ d) $4(Cos30^o - i\ Sin30^o)$

16. It $x + 3iy + i\ (2x + iy) = 5$ Then x = ____ , y = _____
a) 3, -2 b) -3, -2 c) -3, 2 d) 3, 3

17. $4i^3 + 6i^{15} =$ _____
a) $-10i$ b) $6 - 4i$ c) $10i$ d) $-4 - 6i$

18. Polar form of $-i$ is
a) $Cos\,\pi/2 + iSin\,\pi/2$ b) $Cos\,\pi/2 - iSin\,\pi/2$ c) $Cos\,\pi + iSin\,\pi$ d) None of these

19. Real part of $\frac{i}{1+i}$ is _____
a) i b) 1 c) $\frac{1}{2}$ d) $-\frac{1}{2}$

20. If p – 4 = q Then which of the following is value of $|p-q|+|q-p|$.
a) 0 b) 8 c) 4 d) None of these

21. Real part of $(5 - 2i)^2$ is _____.
a) 5 b) 2 c) 21 d) None of these

22. Which of the following is correct?
a) $9 + 2i > 6 + 7i$ b) $3 - i > 1 + 3i$ c) $6 + 2i > 4 + 3i$ d) None of these

23. The result $\sqrt{x}\sqrt{y} = \sqrt{xy}$ is not true when
a) x > 0 , y > 0 b) x < 0 , y > 0
c) x < 0 , y < 0 d) x = 0, y = 0

24. If $Z_1 = 1 - 3i$, $Z_2 = 2 - i$, $= 2 + 4i$, Then $|Z_1 Z_2 Z_3| =$ _____
a) $\sqrt{10} + \sqrt{20} + \sqrt{5}$ b) $10\sqrt{10}$ c) 100 d) $\sqrt{35}$

25. Polar form of $-1 - i$ is _____
a) $\sqrt{2}\left[Cos\,\pi/4 + iSin\,\pi/4\right]$ b) $\sqrt{2}\left[Cos\,\pi/4 - iSin\,\pi/4\right]$
c) $\sqrt{2}\left[Cos\,3\pi/4 + iSin\,3\pi/4\right]$ d) $\sqrt{2}\left[Cos\,3\pi/4 + iSin\,3\pi/4\right]$

26. If $9x + 7yi = 3 + 2i^2$ Then y = _____
a) $\frac{2}{7}$ b) 2 c) 0 d) 1

27. Conjugate of $-8i - 1$ is _____
a) $-8i - 1$ b) $1 - 8i$ c) $8i - 1$ d) None of these

28. If $a + bi = \frac{2+i}{2-3i}$ Then $a^2 + b^2 =$ _____
a) $\frac{13}{5}$ b) $\frac{5}{13}$ c) $\frac{3}{19}$ d) $\frac{9}{13}$

29. On the Argand plane the complex number $\frac{1+2i}{1-i}$ lies in the _____
a) First Quadrant b) 2nd quadrant c) 3rd quadrant d) 4th quadrant

30. The points $1 + i$, $1 - i$, $-1 + i$, $-1 - i$ are
a) With in a circle of radius 1 b) Collinear c) Concyclic d) Regular Polygone

31. If $p + q\ i = \begin{vmatrix} 6i & -3i & 1 \\ 4 & 3i & -1 \\ 20 & 3 & i \end{vmatrix}$ Then
a) P = 3 , q = 1 b) P = 1 , q = 3 c) P = 0 , q = 1 d) P = 0 , q = 0

32. Which of the following is not applicable for complex numbers?
a) Addition b) Division c) Inequality d) Square root

33. Reciprocal of 3 + 7i is _____

a) $3-7i$ b) $\frac{1}{3-7i}$ c) $\frac{16}{3-7i}$ d) $\frac{3-7i}{58}$

34. If n is any integer Then i^n is

a) $\pm i$ b) $\pm 1, \pm i$ c) ± 1 d) 1

35. If $Z = 1 + i$ Then the multiplicative inverse of Z^2 is _____

a) $8i$ b) $1 - i$ c) $\frac{i}{2}$ d) $\frac{-i}{2}$

36. The amplitude of 0 is _____

a) 0 b) $\pi/2$ c) $-\pi/2$ d) None of these

37. If $\left(\frac{1-i}{1+i}\right)^{100} = a + ib$ Then

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

38. $\frac{cis40^\circ\, cis(-110^\circ)}{cis(-80^\circ)\, cis10^\circ} =$ _____

a) 1 b)-1 c) i d) $-i$

39. There exist one-one correspondence b/w complex numbers and

a) R b)imaginary numbers c) $R \times R$ d) all of those

40. Components of complex numbers represent the coordinate of the points of

a) R b) C c) real plane d)complex plane

41. Both the roots of $x^2+4 = 0$ are at distance d from origin then d=_____

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

42. 0 is

a) a positive number b) an irrational number c) a negative integer d) a complex number

43. If $x,y \in R$ and $x<y \Rightarrow x^2>y^2$ then

a) x>0 b) x<0 c) y>0 d)y<0

44. Every real number is a

a) Rational number b) Natural number c) Prime number d) Complex number

45. $9a^2+4b^2=$_____

a) (3a+8b) (3a-8b) b) (9a+8b) (9a-8b) c) (3a+b) (3a-b) d) (3a+2bi) (3a-2bi)

46. The real part of $(x+iy)^n$ is

a) $r^n \cos n\varphi$ b) $r^n \sin n\varphi$ c) $\cos n\varphi$ d) $\sin n\varphi$

47. Number $2\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right)$ in Cartesian form is

a) $\sqrt{3} + i$ b) $1+\sqrt{3}\, i$ c) $\sqrt{3} - i$ d) $1-\sqrt{3}\, i$

48. i(iota) can be written as

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

49. The ordered pair (0,1) is denoted by i then i^2 is

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

50. If $i = \sqrt{-1}$ and n is positive integer then which of the following is false.

- a) $i^{4n} = 1$ b) $i^{4n+1} = -i$ c) $i^{n+4} = i^n$ d) $i^{4n+2} = -1$

51. Which one is meaning less

a) $Z_1\overline{Z_1} < Z_2\overline{Z_2}$ b) $Z_1\overline{Z_1} > Z_2\overline{Z_2}$ c) $Z_1\overline{Z_2} < Z_2\overline{Z_1}$ d) all of these

52. Which number is smaller?

a) (3,0) b) (-2,0) c) (1,0) d) (4,0)

Unit#02 **SETS"**

1. If the set, $G = \{\overline{0}, \overline{1}, \overline{2}, \overline{3}\}$ module form a group "+" then inverse of $\overline{3}$ is:

a) $\overline{1}$ b. $\overline{2}$ c. $\overline{3}$ d. $\overline{0}$

2. If A, B & C are any three sets then $A - (B \cup C) = ?$

a. $(A-B) \cap (A-C)$ b. $(B \cup C) - A$ c. $(A-B) \cup (A-C)$ d. None

3. Two finite sets have m & n elements then no. of total subsets of first set is 56 more than that of 2nd set the values of m & n are:
a) 7, 6 b. 6, 5 c. 6, 3 d.6, 4

4. If $A \subseteq B$, then which of the following is true:
a. $A \cap B = B$ b. $A \cup B = A$ c. $A^c \subseteq B^c$ d. $B^c \subseteq A^c$

5. If n(A) = 300, n(B) = 200, $n(A \cap B) = 100$, $n(u) = 700$ $n(A' \cap B') = ?$
a) 300 b. 400 c. 350 d. 325

6. If u is the universal set and n(u) = 50, n(A) = 30, n(B) = 28, then the least value of $n(A \cap B) = ?$
a) 25 b.5 c. 8 d. 18

7. The set R is a group w.r.t:
a.+ b. ÷ c.× d. –

8. The identity element in P(A) w.r.t binary operation $\cap$ (Intersection) is:
a) ϕ b. $\{\phi\}$ c. A d. Does not exists

9. If G ={1,-1,i,-i}is a group under multiplication then inverse of i is ;
a) 1 b) -1 c) i d) -i

10. If a,b are elements of group G then $(ab)^{-1}$=
a) $a^{-1}b^{-1}$ b) $b^{-1}a^{-1}$ c) $a^{-1}b$ d) $b^{-1}a$

11. If A={x|x∈ $Q \wedge 0 < X \leq 2$ } then No. of elements in A
a) 1 b) 2 c) 3 d) infinite

12. Which of the following is not function?
a) $x^2 + y^2 = a^2$ b. $x^2 - y^2 = a^2$ c. $y^2 = 4ax$ d. All of these

13. If $A \subseteq B$, $A \cap C = \phi$ and B & C are overlapping then $A \cap (B \cup C) =$
a) $B \cap (A \cup C)$ b. $B \cup C$ c. A d. Any of these possible

14. Let x and y are two subsets of universal set "u" give that n(x) = 100, n(y) = 200, n(u) = 500 and $n(X \cap Y) = 50$ then $(X' \cap Y') = 50 - ?$
a) 100 b. 200 c. 250 d. 150

15. If G is a group and e is the identity then e^n = _____.
a) 1 b) 0 c) e d) –ne

16. The truth value of the proposition 2 is positive number or 2 + 2 = 7 is
a) True b) False c) Both a & b d) None

17. The inverse of A → B is
a) B → A b) ~B → ~B c) ~B → ~A d) A → ~B

18. The contra positive of ~B → ~ A is
a) A → B b) B → A c) A → ~B d) ~A → B

19. ~ B → ~ A is converse of
a) A → B b) B → A c) ~A → B d) ~A → ~B

20. If x = 0 and y = 0 then x = y. The inverse of given statement is
a) If x = 0 & y = 0 then x ≠ y b) If x ≠ 0 & y ≠ 0 then x ≠ y c) If x ≠ 0 & y ≠ 0 then x = y d) None

21. If A and B are any two sets then A – (A – B) = _____
a) A∪B b) B c) A∩B d) Φ

22. In plane geometry the universal set consists of all the points in the ____
a) Universe b) Centre c) Circumference d) Plane

23. Empty set is
a) {x: x = x} b) {x: x = x^2} c) {x: x ≠ x} d) None of these

24. If A and B are two non-empty sets Then B – A is a subset of _____
a) A b) B c) A∩B d) None of these

25. If the sets A and B are defined as
A = {(x, y) / y = lnx, x ∈R}, B = {(x, y) / y = x, x∈R} Then A∩B = _____
a) A b) Φ c) B d) None of these

26. The solution set of $x^2 - 9 = 0$ when
a) x∈N is {3} b) x∈Z is {-3, 3} c) x∈S = { a + ib : a, b∈R} is Φ d) All of these

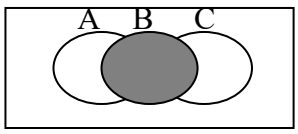
27. Which of the following is an empty set
a) {x / x∈R ∧ $x^2 - 4 = 0$} b) {x / x∈R ∧ $x^2 - 1 = 0$} c) {x / x∈R∧ x^2+5=0} d) All of these

28. In a class of 100 students 55 students have passed in maths and 67 students have passed in physics. Then the number of students who have passed in maths only is
a) 22 b) 45 c) 33 d) None of these

29. The set enumeration for $\{x: x \in Z \wedge x^2 \leq 4\}$ is _____.
a) {0,1,2} b) {1,2} c) {-1,-2} d) {-2,-1,0,1,2}

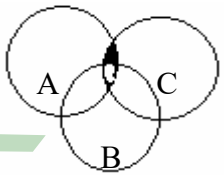
30. In a group of 120 pupils, 80 can play the guitar only and 25 can play the piano only. How many pupils can play both instruments? If there are 3 pupils who can play neither.
a) 10 b) 4
c) 12 d) None of these

30. In Figure shaded region represents



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

31. In figure shaded region represents



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

32. If $A \subseteq B$, n (A) = 10, n (B) = 20 Then n $(A \cup B)$
a) 10 b) 0 c) 20 d) None of these

33. If $A \cap B = A$ and $B \cap C = B$ Then $A \cap C$ = _____
a) A b) B c) C d) $B \cup C$

34. The number of elements of the set = $\{x: x \in W \wedge x^3 + 25x = 0\}$ is
a) 2 b) 3 c) 0 d) 1

35. For any subsets A and B, $A \cup (A \cap B)$ =_____
a) A b) B c) Φ d) $A \cap X$

36. If X = {1, 2, 3}, Y = {2, 3, 4} and Z = {1, 4, 5} Then_____
a) $(X - Y) \cap Z = \Phi$ b) $(Y - Z) \cap X = \Phi$
c) $(Z - X) \cap Y = \Phi$ d) $(Z - X) \cap Z = \Phi$

37. R – {0} is an Abelian group w.r.t.
a) Addition b) Subtraction c) Multiplication d) None of these

38. _____ is a link between set theory and logic.
a) Universal set b) Empty set c) Power set d) Truth set

39. If A and B are two sets then $(A - B) \cap B$ = _____
a) A b) Φ c) B d) None of these

40. The number of non-empty proper sub sets of the set {1, 2, 3, and 4} is
a) 16 b) 15 c) 14 d) 13

41. The relation "Less than" in the set of natural numbers is _____
a) Only symmetric b) Only transitive c) Only Reflexive d) None of these

42. Set A has 3 elements; set B has 6 elements, what can be the minimum number of elements in $A \cup B$.
a) 18 b) 9 c) 6 d) 3

43. The set A = $\{x: x \in R, x^2 = 16$ and $2x = 6\}$ equals _____
a) Φ b) {4} c) {8} d) {3,4,14}

44. A – B = _____
a) B - A b) $B^C - A^C$ c) $A^C - B^C$ d) None of these

45. If A and B are two sets then
a) $AUB \subset A \cap B$ b) $A \cap B \subset AUB$ c) $AUB = A \cap B$ d) none of these

46. Which of the following is not true?
a) (AUB)UC = AU(BUC) b) $A \cap (BUC) = (A \cap B) U (A \cap C)$
c) A-(BUC) = $(A-B) \cap (A-C)$ d) $A-(B \cap C) = (A-B) \cap (A-C)$

47. For any two sets A=B if and only if AUB=_____.
a) A′ b) B′ c) BUA d) $A \cap B$

48. If A and B are two sets then AU(A∩B)=_____.
a) B b) A c) φ d) A∩B

49. If A and B are two sets then A∩(A∩B)=_____.
a) B b) A c) φ d) AUB

50. A-B = _____.
a) A′∩B b) A∩B c) A′∩B′ d) A∩B′

51. If A∩B = A and B∩C = B then A∩C=_____.
a) A b) B c) C d) BUC

52. If S ={1,w,w^2} where w is a cube root of unity form an abelian group with respect to
a) multiplication b) division c) addition d) subtraction

53. If S = {1,-1,i,-i} where i = $\sqrt{-1}$ form an abelian group with respect to
a) multiplication b) division c) addition d) subtraction

54. The M of all square matrices of order 2 from an abelian group with respect to;
a) ordinary multiplication b) matrix division c) matrix addition d) none of these

55. The identity element in a group is
a) unique b) infinite c) matrix addition d) none of these

56. Inverse of an element in a group is
a) infinite b) finite c) unique d) not possible

57. (p→ q) ^ (q→p) is logically equivalent to
a) p↔q b) q→p c) p→q d) p→ ~q

58. When P→q is true which related conditional is true.
a) q→p b) ~ p→ ~q c) ~ q→ ~p d) p→ ~q

59. Which is always false?
a) pv ~ p b) q ^ ~ q c) pv ~ q d) q ^ ~ p

60. The over lapping sets are
a) A={1,2,3}, B={1,2,3,4} b) A ={1,2}, B={3 4} c) A={1,2,3}, B={1,2,5} d) none of these

Unit#03 MATRICES AND DETERMINANTS

1. If AB = I and AC = I then what about B and C:
a. B = C^{-1} b. C^{-1} = B c. B = C d. None

2. If AB = A and BA = B then B^2 = ?
a. A b. B c. I d. 0 (Null Matrix)

3. If A is symmetric matrix then A^t is.
a. A b. –A c. A^2 d. A^{-1}

4. If $X + 2I = \begin{bmatrix} 5 & 7 & 8 \\ 9 & 2 & 1 \\ 0 & 2 & 3 \end{bmatrix}$ then X = ?

a. $\begin{bmatrix} 3 & 5 & 6 \\ 7 & 0 & 1 \\ 0 & 2 & 1 \end{bmatrix}$ b. $\begin{bmatrix} 3 & 7 & 8 \\ 7 & 0 & 1 \\ 0 & 2 & 1 \end{bmatrix}$ c. $\begin{bmatrix} 5 & 7 & 8 \\ 9 & 0 & 1 \\ 0 & 2 & 1 \end{bmatrix}$ d. $\begin{bmatrix} 3 & 7 & 8 \\ 9 & 0 & 1 \\ 0 & 2 & 1 \end{bmatrix}$

5. If $A = [a_{ij}]_{3\times4}$ $B = [b_{ij}]_{4\times3}$ then which of the following is true?
a. $\lambda A + \lambda B = \lambda (A + B)$ b. $(\lambda + 1) A = \lambda A + A$ c. $\lambda A - \lambda B = \lambda (A - B)$ d. All of these

6. $\begin{vmatrix} 1 & 2 & 4 \\ 8 & 16 & 32 \\ 64 & 128 & 256 \end{vmatrix}$ = ?
a.1028 b. 2801 c. 0 d. – 2801

7. If $A = \begin{bmatrix} \alpha & 2 \\ 2 & \alpha \end{bmatrix}$ and $|A|^3 = 125$ then α = ?
a) $\alpha = \pm 5$ b. $\alpha = \pm 4$ c. $\alpha = 3$ d. $\alpha = 0$

8. If system $\begin{cases} a_{11}x_1 + a_{12}x_2 + a_{13}x_3 = b_1 \\ a_{21}x_1 + a_{22}x_2 + a_{23}x_3 = b_2 \\ a_{31}x_1 + a_{32}x_2 + a_{33}x_3 = b_3 \end{cases}$, be a non-homogenous system and $|A| \neq 0$,
then which is true?
a. $x_1 = \frac{b_1A_{11} + b_2A_{12} + b_3A_{13}}{|A|}$ b. $x_2 = \frac{b_1A_{12} + b_2A_{22} + b_3A_{32}}{|A|}$ c. $x_1 = \frac{b_1A_{12} + b_2A_{22} + b_3A_{32}}{|A|}$ d. All of these

9. $\begin{vmatrix} 2003 & 2002 & 2001 \\ 2006 & 2005 & 2004 \\ 2009 & 2008 & 2007 \end{vmatrix} = ?$

a) 2000 b.1 c. 0 d. – 1

10. If $\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = 3 Then \begin{vmatrix} 2a & 2b & 2c \\ 2d & 2e & 2f \\ 2g & 2h & 2i \end{vmatrix}$

a) 3 b) 6 c) 12 d) 24

11. $\begin{bmatrix} p & o & o \\ o & p & o \end{bmatrix}$ is called _____ matrix

a) Scalar b) Diagonal c) Non - Singular d) None of these

12. The order of $\begin{bmatrix} p & q & r \end{bmatrix} \begin{bmatrix} a & b & c \\ d & e & t \\ g & h & i \end{bmatrix} \begin{bmatrix} l & o \\ m & p \\ n & q \end{bmatrix}$ is_____

a) 2×2 b) 1×2 c) 3×2 d) 2×2

13. If $= \begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = 7 Then \begin{vmatrix} a+d & b+e & c+f \\ d & e & f \\ g & h & i \end{vmatrix} =$ _____

a) 7 b) 14 c) 21 d) Cannot be determined.

14. The matrix $\begin{bmatrix} 0 & 8 & 9 \\ -8 & 0 & 15 \\ -9 & -15 & 0 \end{bmatrix}$ is known as

a) Symmetric b) Diagonal c) Skew symmetric d) Upper Triangular

15. The equations x + 4y – 2z = 3, 3x + y + 5z = 7 and 2x + 3y + 2z = 5 have

a) Unique or infinite solution b) No solution

c) x = 1, y = 2, z = 3 d) None of these

16. $\begin{vmatrix} 1 & 0 & 0 & 0 \\ 5 & 7 & 0 & 0 \\ 3 & 0 & 5 & 0 \\ 9 & 0 & 0 & 2 \end{vmatrix}$ _____

a) 70 b) 35 c) 10 d) None of these

17. If A is 3×4 matrix, B is a matrix such that AB and BA both are define Then order of matrix B is = _____

a) 3×4 b) 4×4 c) 3×3 d) 4×3

18. The equations x + 2y + 3Z = 0, x – y + 4Z = 0 and 2x + y + 7Z = 0 have

A)only one solution b) Only two solutions

c) No solution d) Infinite Solutions

19. The transpose operation on matrices satisfies the following properties except.

a) $(A + B)^t = A^t + B^t$ b) $(A^t)^t = A$ c) $(KA)^t = KA^t$ d) $(AB)^t = A^t B^t$

20. If A and B are square matrices of same order such that $(A + B)^2 = A^2 + 2AB + B^2$ Then

a) A = -B b) AB = BA c) $A = B^C$ d) None of these

21. If $\begin{bmatrix} 1 & a \end{bmatrix} \begin{bmatrix} 1 & 3 \\ 0 & 5 \end{bmatrix} \begin{bmatrix} a \\ 1 \end{bmatrix} = 0$ Then a is

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

22. If $A=\begin{pmatrix}2 & 3\\ 1 & 1\\ 5 & 6\end{pmatrix}, B=\begin{pmatrix}3 & 2\\ 5 & 7\\ 2 & 1\end{pmatrix}$ and A + B – C = 0 Then C = _____

a) $\begin{pmatrix}5 & 5\\ 6 & 8\\ 7 & 7\end{pmatrix}$ b) $\begin{pmatrix}1 & 1\\ -4 & -4\\ 3 & 5\end{pmatrix}$ c) $\begin{pmatrix}5 & 5\\ 8 & 6\\ 7 & 7\end{pmatrix}$ d) $\begin{pmatrix}5 & 6\\ 8 & 7\\ 7 & 5\end{pmatrix}$

23. If A and B are two matrices such that A + B and AB are defined Then.
a) A and B are two matrices not necessarily of same order
b) A and B are square matrices of same order
c) Number of columns of A = Number of rows of B
d) None of these

24. If $\begin{pmatrix}4 & 3\\ 2 & 1\end{pmatrix}\begin{pmatrix}1 & y\\ x & -1\end{pmatrix}=\begin{pmatrix}4 & 5\\ 2 & 3\end{pmatrix}$ Then x + y = _____

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

25. If the matrix AB is Zero Then
a) A = 0 or B = 0 b) A = 0 and B = 0
c) It is not necessary that either A = 0 or B = 0
d) All the above statements are wrong.

26. What is called a matrix of order mx1
a) Row matrix b) Column matrices c) Identity matrix d) Scalar matrix

27. If A and B are two square matrices of same order Then $(A+B)^2$ =
(a) $A^2+2AB+B^2$ (b) $A^2+2BA+B^2$ (c) $A^2+AB+BA+B^2$ (d) A^2+B^2

28. If A,B,C are three matrices such that
AB = AC ⇒ B = C Then A is
(a) singular matrix (b) null matrix (c) non singular matrix (d) none of these

29. If A and B are non-singular matrices Then $(AB)^{-1}$ = _____
(a) $A^{-1}B^{-1}$ (b) $B^{-1}A^{-1}$ (c) $(BA)^{-1}$ (d) AB

30. Minors and co–factors of the elements in a determinant are in equal magnitude but they may differ in
a) order b) position c) sign d) symmetry

31. If each element of a 3×3 matrix A is multiplied by 3 then the determinant of the resulting matrix is
a) $|A|^3$ b) $2|A|$ c) $3|A|$ d) $9|A|$

32. The system of equation x+2y=5 and -3x-6y=15 has
a) only one solution b) no solution c) finite solutions d) infinite many solutions

33. For homogenous linear equations, system AX=0 has non- trivial solution if $|A|$ =_____
a) non-zero b) zero c) negative d) positive

34. If a matrix A with real entries then $\overline{A}$ = _____
a) A b) –A c) A^{-1} d) A^t

35. Which matrix can be rectangular matrix?
a) diagonal b) identity c) scalar d) null

36. If $A=\begin{bmatrix}1 & 0 & -1 & 2\\ 3 & 1 & 2 & 5\\ 0 & -2 & 1 & 6\end{bmatrix}$, $B=\begin{bmatrix}2 & -1 & 3 & 1\\ 1 & 3 & -1 & 4\\ 3 & 1 & 2 & -1\end{bmatrix}$
Then(2,3)rd element of $(A+B)^t$ is
a) -1 b) 1 c) 4 d) 3

37. If $A=[a_{ij}]_{m\times n}$, $B=[b_{ij}]_{n\times r}$ then order of $(AB)^t$ is
a) m×r b) n×m c) m×n d) m×m

38. Which one is not symmetric?
a) AA^t b) A^tA c) A^t+A d) A^t

39. AB is symmetric if

a) $A^t=A$ b) $B^t=B$ c) $AB=BA$ d) all of these

40. The co-factor of an element a_{ij} denoted by Aij is

a) $(-1)^{ij}M_{ij}$ b) $(-1)^{i+j}Mij$ c) $(-1)^{i-j}Mij$ d) $(1)^{i+j}Mij$

41. If $B=\begin{bmatrix}0 & -4 & 1\\ 4 & 0 & -3\\ -1 & 3 & 0\end{bmatrix}$ then

a) $|B| = 0$ b) $B^t=B$ c) $B^t+B=0$ d) $|B| = 1$

42. If $\Delta=\begin{vmatrix}c & a & x\\ m & m & m\\ b & x & b\end{vmatrix}$ then the roots of $\Delta = 0$ are given by

a) x = l, x = m b) x = a, x = b c) x = a, x = m d) None of these

43. If x = -9 is a root of $\begin{vmatrix}x & 3 & 7\\ 2 & x & 2\\ 7 & 6 & x\end{vmatrix}=0$ then the other two roots ar

a) 2 & 7 b) 4 & 4 c) 7 & 7 d) 2 & 2

44. If $A\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}=\begin{pmatrix}5 & 3\\ 2 & -3\end{pmatrix}$ Then matrix A is _____

a) $\begin{pmatrix}1 & 2\\ 3 & -4\end{pmatrix}$ b) $\begin{pmatrix}5 & 3\\ -2 & 3\end{pmatrix}$ c) $\begin{pmatrix}-3 & -\\ 2 & 5\end{pmatrix}$ d) $\begin{pmatrix}5 & 3\\ 2 & -3\end{pmatrix}$

45. If $P=\begin{bmatrix}3 & 0 & 0\\ 0 & 3 & 0\\ 0 & 0 & 3\end{bmatrix}$ $Then\ P^4$ = _____

a) 81P b) P c) 3P d) None of these

46. The system 3a + 5b = 6, 9a + 15 = 12 _____ Solution

a) Unique b) On c) No d) None of these

47. If $A=\begin{pmatrix}4 & 2\\ 0 & 3\end{pmatrix}, B=\begin{pmatrix}\frac{1}{4} & s\\ 0 & 1\end{pmatrix}$ Then value of s such that AB = I is

a) 3 b) 4 c) -6 d) $-\frac{1}{6}$

48. If $a_1x + b_1y + c_1z = d_1$, $a_2x + b_2y + c_2z = d_2$, $a_3x + b_3y + c_3z = d_3$ Then z = ___

a) $\dfrac{\begin{vmatrix}b_1 & a_1 & d_1\\ b_2 & a_2 & d_2\\ b_3 & a_3 & d_3\end{vmatrix}}{\begin{vmatrix}a_1 & b_1 & c_1\\ a_2 & b_2 & c_2\\ a_3 & b_3 & c_3\end{vmatrix}}$ b) $\dfrac{\begin{vmatrix}a_1 & b_1 & c_1\\ a_2 & b_2 & d_2\\ a_3 & b_3 & d_3\end{vmatrix}}{\begin{vmatrix}a_1 & b_1 & c_1\\ a_2 & b_2 & c_2\\ a_3 & b_3 & c_3\end{vmatrix}}$ c) $\dfrac{\begin{vmatrix}a_1 & b_1 & d_1\\ a_2 & b_2 & d_2\\ a_3 & b_3 & d_3\end{vmatrix}}{\begin{vmatrix}a_1 & b_1 & c_1\\ a_2 & b_2 & c_2\\ a_3 & b_3 & c_3\end{vmatrix}}$ d) None

49. If $\begin{vmatrix}l & m & n\\ o & p & q\\ r & s & t\end{vmatrix}=30$ $Then$ $\begin{vmatrix}l & o & r\\ m & p & s\\ n & q & t\end{vmatrix}$ = _____

a) 30 b) 15 c) 10 d) 5

50. If a, b, c are positive real numbers other than one and a = b = c Then

$$\begin{vmatrix} \log_a^b & \log_a^c & 1 \\ \log_b^c & \log_b^a & 1 \\ 1 & \log_c^a & \log_C^b \end{vmatrix} = \_\_\_\_\_$$

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

Unit#04 **Solution of Equations**

1. Let α, β be the roots of $ax^2 + bx + c = 0$ then the equation whose roots are $\frac{1}{4\alpha}, \frac{1}{4\beta}$ is:

   a. $ax^2 + bx + c = 0$ b. $16cx^2 + 4bx + a^2 = 0$ c. $4cx^2 + 16x + c = 0$ d. None of these

2. If $\frac{\alpha^2}{\beta}$ and $\frac{\beta^2}{\alpha}$ be the roots of $3x^2 - 5x + 15 = 0$ then $\alpha\ \beta$ =?

   a. $5/3$ b. – 5 c. 5 d.None of these

3. If $x + 1$ and $x - 2$ are the factors of $x^3 + px^2 + qx + 2$ th[illegible]:

   a. p = 1, q = 2 b. q = – 1, p = – 2 c.[illegible] = 0, [illegible] = 1 d.p = 1, q = 0

4. $\sum_{n=1}^{50} W^n = ?$ (where ω is cube root of unity)

   a) 0 b. W c. W^2 d. – 1

5. The degree of the equation $3x^2 - 4xy^2 + [illegible] + \frac{2y}{x} = 0$ is:

   a. 3 b. 4 c. 5 d. None

6. The difference b/w the roots of $x + \frac{1}{[illegible]x} = 1$ is

   a. 4 b. 1/[illegible] c. 8 d. Zero

7. If $25^x . 5^x = 1$ and $\frac{3^{2y+1}}{3^{1+2x}} = [illegible]$, then x = ? , y = ?

   a) $x = 1/3$, $y = -2/3$ b. $x = 1,\ y = -2$ c. $x = 0,\ y = 0$ d. None

8. If a number is multiplied by 3 [illegible]d the result is added to 5times the reciprocal of the number the result is – 8, then the number is:

   a. – 1 b. 2 c. – 3/5 d. – 1/2

9. Find the equation [illegible]ho[illegible]e two roots are 3, –4i

   a. $x^2 + (4i - 3)x - 12i$ b. $x^2 + ix - 12i$ c. $x^3 + 3x^2 + 16 - 48$ d. None

10. If the quadratic equation $ax^2 + bx + c = 0$ touches the x-axis, then there are:

    a) 2 different real roots b. 2 complex roots c. 2 real equal roots d. None

11. If x is greater than y by 2, then:

    a) $x - y = 2$ b. $\frac{1}{y} - \frac{1}{x} = \frac{2}{xy}$ c. $y - x = 2$ d. Both (a) & (b)

12. The value of x satisfying $x = \sqrt{6 + \sqrt{6 + \sqrt{6 + ...\infty}}}$ is

    a) 2 b) 3 c) -2 d) None of these

13. If $x^2 - 5x < 0$ Then x is a member of

    a) $(-\infty, 0] \cup [5, \infty)$ b) $(\infty, 5) \cup [6, \infty)$

    c) $(-\infty, \infty)$ d) None of these

14. If $\frac{3x}{x-4} > 0$ Then x is a member of

    a) $(-\infty, \infty)$ b) $(-\infty, 0) \cup (4, \infty)$ c) [-2, 2] d) None of these

15. If $\frac{x+3}{x} < 5$ Then

a) $x > \frac{3}{4}$ b) $x \neq \frac{3}{4}$ c) $x < 0$ or $x > \frac{3}{4}$ d) None of these

51. If $x^2 - 5x + 6 > 0$ Then $x \in$,
a) $(-\infty, 2) \cup (3, \infty)$ b) $[2, 3]$ c) (2,3) d) None of these

17. If $|3x + 7| = -5$ Then x is equal to
a) -4 b) 4 c) 3 d) None of these

18. If $|x - 3| > 7$ then
a) $x > 0$ b) $x < 0$
c) $x > 10$ and $x < -4$ d) Cannot be determined

19. If $\log_y x = 2$ and $xy = 8$ Then x = _____, y = _____
a) 1, 2 b) 2, 3 c)3, 4 d) 4, 2

20. If $\log_2 (\log_3 x) = \log_5 5$ then x = _____
a) $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ b) 7 c) 8 d) 9

21. If $\log_5 125 = x$ and $\log_3 y = 2$ Then x + y = _____
a) 10 b) 12 c) 15 d) 18

22. If $\log(\sin\theta) = r$ then $\log(\operatorname{Cosec}\theta)$ = _____
a) $\frac{1}{r}$ b) r^2 c) 1 – r d) -r

23. The exact value of $\frac{\log_{10} 256}{\log_{10} 8}$ is _____
a) $4\frac{1}{2}$ b) $2\frac{1}{2}$ c) $2\frac{2}{3}$ d) None of these

24. $\log_{27} \sqrt{54} - \log_{27} \sqrt{6}$ = _____
a) $\frac{1}{2}$ b) $\frac{1}{3}$ c) $\frac{1}{4}$ d) $\frac{4}{3}$

25. The sum of roots of $12x^3 - 5x^2 + \ldots$
a) $\frac{5}{12}$ b) $\frac{7}{12}$ c) 0 d) None of these

26. $3x^2 + x + 5 = 0$ has
a) Two equal roots b) Two rational roots
c) Two real roots d) Two complex roots

27. If α, β are the roots of the equation $3x^2 - 2x + 4 = 0$ then the value of $\frac{1}{\alpha} + \frac{1}{\beta}$ is
a) 2/3 b) ½ c) -½ d) None of these

28. If equation $3x^2 + Kx + \frac{1}{3} = 0$ has equal roots Then K = _____
a) ± 3 b) ± 4 c) ± 2 d) None of these

29. If the roots of the equation $4x^2 - 5x + 3 = 0$ are α and β Then value of $\frac{1}{\alpha} + \frac{1}{\beta}$ = _____
a) $\frac{1}{3}$ b) $\frac{4}{3}$ c) $\frac{7}{3}$ d) $\frac{5}{3}$

30. A man is 3 times as old as his son, 2years ago the sum of their ages was 48years. Find their present ages.
a) 10, 30 b) 12, 36 c) 13, 39 d) 14, 42

31. Which one is not reciprocal equation.
a) x=1 b) $x + \frac{1}{x} = 1$ c) x=0 d) $x^2 + \frac{1}{x^2} + x + \frac{1}{x} = 1$

32. Equation $\sqrt{x+8} + \sqrt{x+3} = \sqrt{12x+13}$ has the root

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

33. Which one is not the square root of unity.
a) 1 b) -1 c) 0 d) a & c

34. $1 + w + w^2 + w^3 + w^4 + \ldots..w^{100} =$ _____.
a) $-w^2$ b) w c) 0 d) $-w$

35. Solution set of the system $x+y=7$ and $x^2-xy+y^2=13$ is
a) {(1,2), (2,1)} b) {(3,4),(4,3)} c) {(1,1),(2,2)} d) none of these

36. If product as well as quotient of two numbers is 1, then difference is
a) 1 b)0 c)2 d) -1

37. If $4c<b^2/a$ then roots of $ax^2-bx+c=0$ are
a) rational b) irrational c) complex d) equal

38. If $f(x)=\cos x$ is divided by $x-\pi/2$ then remainder is
a) 1 b) 0 c) 2 d) f(0)

39. Which equation is not a quadratic equation?
a) $x(x+2)=2x-1$ b) $\frac{1}{x}+\frac{1}{x-1}=5$ c) $\frac{x}{2}+\frac{1}{x-1}=5$ d) $x^2+2x = 5(\frac{x^2}{5}+1)$

40. An equation which remains unchanged when x is replace b[illegible] $\frac{1}{x}$ is
a) exponential equation b) reciprocal equati[illegible]
c) linear equation d) none of these

41. The fourth roots of unity are
a) 1, -1 b) 0, 1, w, w^2 c) 2, -2 d) $\pm 1, \pm i$

42. The equations $x + y = 2$ and $2x + 2y = 3$ have
a) A unique solution b) Finite many soluti[illegible] c) No. solution d) None

43. The sum of squares of the roots of the equation $x^2 + 6x + 7 = 0$
a) 22 b) -7 c) 1 d) -22

44. The square of a number is added to thrice of number result is 28. The number is
a) -7 b) 7 c) 4 d) -4

45. If $5x^2 - 2x + p = 0$ has complex roo[illegible] Then value of P is
a) $P > 5$ b) $P = 5$ c) $P < \frac{1}{5}$ d) $P > \frac{1}{5}$

46. Two consecutive odd number suc[illegible] that sum of their squares is 290 are.
a) 11, -13 b) -11, 13 c) 13, 15 d) -11, -13

47. The sum of the roots of the equation $(x^2 - \sqrt{5})(x - 7)(x + 5) = 0$ is _____
a) $2\sqrt{5}$ b) 0 c) 2 d) Can not be determined

48. If $|x - 2| = x^2$ where x [illegible] R Then x = _____
a) -1, 2 b) 1, 2 c) -1, -2 d) 1, -2

49. If the equation $5x^2 + 13x + K = 0$ has roots α and $\frac{1}{\alpha}$ Then K = _____
a) 1 b) 13 c) -5 d) 5

50. If one root of quadratic equation is $2 + i$ Then quadratic equation is
a) $x^2 + 4x + 5 = 0$ b) $x^2 - 4x + 5 = 0$
c) $x^2 - 4x - 5 = 0$ d) None of these

Unit#05 Partial Fraction

1. A rational fraction $\frac{S(x)}{T(x)}$ is called an improper fraction if:
a. Degree of S(x) < Degree of T(x) b. Degree of S(x) > Degree of T(x)
c. Degree of S(x) = Degree of T(x) d. None

2. $(x-4)^2 = x^2 - 8x + 16$ is:
a) A transcendental equation b) Cubic equation
c) An identity d) An equation

3. If $\frac{x+p}{(x-1)(x-3)} = \frac{q}{x-1} + \frac{2}{x-3}$ then values of p and q are:

a) p =2, q =1 b) p =-2, q =1 c) p =1, q =1 d) p =1, q =-1

4. $\frac{x+3}{x(x+1)} =$ _____

a) $\frac{4}{3(x-4)} - \frac{1}{3(x-1)}$ b) $\frac{3}{x} - \frac{2}{x+1}$ c) $\frac{2}{3(x-2)} - \frac{4}{3(x+2)}$ d) None of these

5. Partial fractions of $\frac{1}{x^3-1}$ 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) $\frac{Ax+B}{x-1} + \frac{C}{x^2+x+1}$

6. Partial fractions of $\frac{2x^2-3x+4}{(x-1)^3}$ will be of the form:

a) $\frac{Ax+B}{x-1} + \frac{C}{(x-1)^2} + \frac{D}{(x-1)^3}$ b) $\frac{A}{x-1} + \frac{B}{(x-1)^2} + \frac{C}{(x-1)}$

c) $\frac{A}{x-1} + \frac{Bx+C}{(x-1)^2} + \frac{D}{(x-1)^3}$ d) $\frac{A}{x-1} + \frac{B}{(x-1)^2} + \frac{Cx+D}{(x-1)^3}$

7. Partial fraction of $\frac{x^3+2x+2}{(x^2+x+1)^2}$ will be of the form:

a) $\frac{A}{x^2+x+1} + \frac{B}{(x^2+x+1)^2}$ b) $\frac{A}{x^2+x+1} + \frac{Bx+C}{(x^2+x+1)^2}$

c) $\frac{Ax+B}{x^2+x+1} + \frac{C}{(x^2+x+1)^2}$ d) $\frac{Ax+B}{x^2+x+1} + \frac{Cx+D}{(x^2+x+1)^2}$

8. Partial fractions of $\frac{x^2+1}{x^3+1}$ will be 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) $\frac{Ax+B}{x+1} - \frac{C}{x^2-x+1}$

9. $x + \frac{3}{x} = 4$ is

a) An identity b) A linear equation c) An equation d) None of thes

10. The rational function $\frac{(x-1)(x-3)(x-5)}{(x-2)(x-4)(x-6)}$ is

a) Proper b) Improper c) Both d) None of these

11. A rational function is of _____ types.

a) One type b) Two types c) Three types d) None of these

12. If $ax^2 + bx + c = 2x + 3 + x^2$ then:

a) a =2, b =3, c = 1 b) a =2, b =1, c = 3 c) a =3, b =2, c = 1 d) a =1, b =2, c = 3

13. Which one is not a conditional equation?

a) $2x=3$ b) $x^2+x-6=0$ c) $x^3 + \frac{1}{x^3} + x + \frac{1}{x} = 0$ d) $x = \frac{1}{2}(2x) - \frac{x}{2}$

14. For an identity $ax^3=2x^2+1$

a) a=1 b) a=2 c) a=3 d) none of these

15. Which one is not an identity

a) $x^2+7x+12= (x+3)(x+4)$ b) $x-\frac{1}{3}(2x+x)=0$ c) x =1 d) $\frac{x}{5} = (\frac{5}{x})^{-1}$

16. Which fraction is not improper rational fraction?

a) $\frac{x^3+a}{x+3}$ b) $\frac{x^2+16}{x-4}$ c) $\frac{x}{x+1}$ d) $\frac{x^3+1}{x^4+1}$

17. Identity $\frac{7x+a}{(x+3)(x+4)}=\frac{b}{x+3}+\frac{3}{x+4}$ implies that a,b=_____

a) 1,1 b) 25,4 c) 4,25 d) 2,4

18. Equation $(x+2)^2-4x=x^2+4$ is an

a) expression b) conditional equation c) algebraic equation d) identity

19. $\frac{x+1}{2(x^2+1)^2}-\frac{x+1}{4(x^2+1)}+\frac{1}{4(x-1)}$ is partial fraction of

a) $\frac{x^2}{(x^2+1)^2(x-1)}$ b) $\frac{1}{(x^2+1)^2(x-1)}$ c) $\frac{x^2+1}{(x^2+1)^2(x-1)}$ d) none of these

20. When a rational fraction is separated into partial fractions, the result is;

a) Conditional equation b) an equation c) identity d) improper fraction

21. $\frac{1}{(x^2+5)(x^2+4)}=$_____

a) $\frac{1}{x^2-4}-\frac{1}{x^2+5}$ b) $\frac{1}{x^2+4}-\frac{1}{x^2+5}$ c) $\frac{1}{x+4}-\frac{1}{x^2-5}$ d) $\frac{1}{x+4}-\frac{1}{x+5}$

Unit#06 SEQUENCE AND SERIES

1. $\sum_{k=1}^{5}\left[k^2-(k-1)^2\right]=$

a. 5 b. 25 c. 125 d. 625

2. If a, b, c are in H.P, then b = ?

a. $\frac{2ac}{a+c}$ b. $\frac{a-c}{2ac}$ c. $\frac{a+c}{2}$ d.Zero

3. The sum of 1000 A.M's b/w 4 and 8 is:

a. 2,000 b. 12,000 c. 32,000 d.6,000

4. If $\frac{a^n+b^n}{a^{n-1}+b^{n-1}}$ is H.M between a and b. Then n = _____

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

5. For what value of n, $\frac{a^{n+1}+b^{n+1}}{a^{n-1}+b^{n-1}}$ is the harmonic mean between two distinct numbers a & b:

a. $n=\frac{1}{2}$ b. $n=-\frac{1}{2}$ c. $n=0$ d. $n=-1$

6. The n^{th} term of $\frac{1^2}{1}+\frac{1^2+2^2}{2}+\frac{1^2+2^2+3^2}{3}+\ldots\ldots is$

a. $\frac{n+1}{2}$ b. $\frac{(n+1)(2n+1)}{6}$ c. $\frac{n(n+1)^2}{4}$ d. $\frac{n(n+1)(2n+1)}{6}$

7. $0.\overline{159}=?$

a.159/99 b. 159/100 c. 159/999 d. 159/990

8. In $a+ar+ar^2+ar^3+\ldots\ldots$ to n terms if r = – 1 and n is odd then S_n = ?

a. r b. a b. 0 c. $\frac{a^n(r+1)}{r-1}$

9. If n is positive integer, then 3 + 6 + 9 +….. + 3n =

a) $\frac{3n(n+1)}{2}$ b. $\frac{3n(3n+1)}{2}$ c. $\frac{3n(n-1)}{2}$ d. $\frac{3n+1}{2}$

10. The middle term in the following A.P 20, 16, 12, ….176 is :

a. – 46 b.– 76 c. – 80 d. None

a) 11. A student reading 342 page book, find that he read faster as he gets into the subject. He read 12 pages on first day and his rate of reading then goes up by 3 pages each day. How long does he take to finish the book?

12. If x, y, z are in A.P As well as in G.P Then
a) $x \neq y \neq Z$ b) $x = y \neq Z$ c) $x \neq y = Z$ d) $x = y = Z$

13. Which of the following is divergent series.

b) 10Days b.12days c. 14days d. Nonea) $6 + 3 + \frac{3}{2} + \frac{3}{4} + \frac{3}{8} + \ldots\ldots\ldots$ b) $18 - 6 + 2 - \frac{2}{3} + \ldots\ldots\ldots$

c) $12 + 4 + \frac{4}{3} + \frac{4}{9} + \ldots\ldots\ldots\ldots$ d) $1 + 4 + 16 + 64 + \ldots\ldots\ldots$

14. The next term of the H.P $1, \frac{2}{3}, \frac{1}{2}, \ldots\ldots\ldots\ldots$ is

a) $\frac{1}{3}$ b) $\frac{2}{5}$ c) $\frac{1}{4}$ d) $\frac{5}{2}$

15. The next term of the sequence
2, 6, 14, 30, 62, 126, …….. is
a) 251 b) 252 c) 253 d) 254

16. The next term of the sequence 8, 64, 216, 512, 1000, ……..
a) 1428 b) 1528 c) 1628 d) 1728

17. How many terms are there in the sequence 64, 32, 16, …… $\frac{1}{128}$
a) 12 b) 13 c) 14 d) 16

18. If $a_{n-5} = 4n - 3$ Then the nth term of the sequence is
a) 4 n b) 4n + 3 c) 4n + 14 d) 4n + 17

19. The sum of 11 terms of an A.P whose middle term is 30 is
a) 320 b) 330 c) 340 d) 350

20. The number of odd numbers between 60 and 360 is
a) 148 b) 150 c) 153 d) None of these

21. If $Sn = 3n^2$ Then the sequence is
a) A .P b) G. P c) H. P d) None of these

22. If G. M is 4 and A.M is 5 Then H.M will be
a) $\frac{16}{5}$ b) $\frac{5}{16}$ c) $\frac{7}{8}$ d) $\frac{25}{7}$

23. The product $(32)\left(32\right)^{\frac{1}{6}}\left(32\right)^{\frac{1}{36}} \ldots\ldots\ldots\ldots \infty$ is equal to
a) 16 b) 32 c) 64 d) None of these

24. The 20^{th} term of the series $2 \times 4 + 4 \times 6 + 6 \times 8 + \ldots\ldots\ldots\ldots$ is
a) 420 b) 840 c) 1680 d) 1600

25. Which of the following series has 35 as its sum
a) $\sum_{k=1}^{15}(K-1)$ b) $\sum_{K=3}^{7}(K+2)$ c) $\sum_{k=3}^{5}\left(\frac{K-2}{3}\right)$ d) None of these

26. Which term of sequence $\{(-1)^{n-1}\}$ is zero
a) 1^{st} b) 3^{rd} c) n^{th} d) no term

27. Sequence $\{\frac{1}{n-3}\}$ is decreasing in interval
a) $[1, \infty)$ b) $(1, \infty)$ c) $[3, \infty)$ d) $(3, \infty)$

28. General term of sequence -5,-3,1,9,…… is
a) $\{2^n-7\}$ b) $\{2^n-6\}$ c) $\{2^n-5\}$ d) $\{2^n-1\}$

29. Which term of the sequence $\{3^n\}$ is even?
a) 1^{st} b) 4^{th} c) 11^{th} d) no term

30. If $4+8+12+\ldots\ldots\ldots\ldots a_n=220$ Then $a_n =$ _____
a) 44 b) 48 c) 42 d) 40

31. If common ratio of G.P is negative then sequence is
a) Positive b) Negative c) Alternating d) None

32. If common ratio of G.P is greater than one there will be exponential growth towards.

a) 0 b) 1 c) $+\infty$ d) $-\infty$

33. Two geometric means between 1 and 8 are
a) 2,3 b) 2,4 c) -2,4 d) 2,-4

34. Which Progression can have zero as its term?
a) A.P b) G.P c) H.P d) (a) and (b)

35. $1.\dot{3}\dot{4} =$ _____
a) $\frac{134}{99}$ b) $\frac{133}{99}$ c) $\frac{132}{99}$ d) $\frac{130}{99}$

36. If $x_1, x_2, x_3, \ldots\ldots\ldots\ldots$ be positive integers in A.P such that $x_4+x_6 = 14$ Then x_5 = _____.
a) 2 b) 7 c) 14 d) None of these

37. The sum up to n terms of the series $\sqrt{2}+\sqrt{8}+\sqrt{18}+\ldots\ldots\ldots$
a) n (n + 1) b) $\frac{n(n+1)}{2}$ c) $\sqrt{n+2}$ d) $\frac{n(n+1)}{\sqrt{2}}$

38. Sum of the series $\frac{9}{4}+\frac{3}{2}+1+\frac{2}{3}\ldots\ldots\ldots\ldots\infty$ is
a) $\frac{18}{3}$ b) $\frac{27}{4}$ c) $\frac{4}{27}$ d) $\frac{23}{4}$

39. The series $y = 1 + \frac{x}{2}+\frac{x^2}{4}+\ldots\ldots\ldots$ Is convergent in the interval.
a) $-4 < x < 4$ b) $-3 < x < 3$ c) $-2 < x < 2$ d) None of these

40. The series 3 + 33 + 333 + …… is
a) A.P b) G.P c) H.P d) None of these

41. If A.M between the roots of a quadratic equation is 10 and their G.M is 8. Then the quadratic equation is
a) $x^2+20x + 64 = 0$ b) $x^2-20x + 64 = 0$ c) $x^2 - 20x - 64 = 0$ d) None of these

42. If the sum of n terms of an A.P is n^2 then its common difference is _____
a) 2 b) 3 c) 4 d) cannot be determine

43. The first term of the G.P whose 5^{th} term is 48 and common ratio is 2 is
a) 6 b) 5 c) [illegible] d) 3

44. Which term of the G.P 16, 12, 8 , …… is $\frac{512}{729}$
a) 7 b) 8 c) 9 d) 10

45. Each term of a sequence after the first is inversely proportional to the term preceding it. If the first two terms are 2 and 6 then the fifths term of the sequence is.
a) 18 b) 36 c) 54 d) $\frac{1}{6}$

Unit#07 Permutation Combination and probability

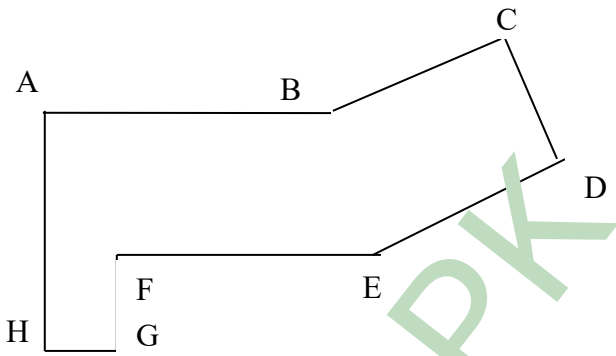
1. Factorial form of $n(n-1)(n-2).....(n-m)$ is:
a) $\frac{n!}{(n-1)!}$ b. $\frac{n!}{(n-(m+1))!}$ c. $\frac{n!}{(n+(m-1))!}$ d. None

2. If E_1 and E_2 are two mutually exclusive events,
$P(E_1 \cup E_2) = \frac{1}{2}$ and $P(E_1) = 2P(E_2)$, then $P(E_1) = ?$
a) 2/3 b.1/3 c. 4/5 d. 3/5

3. ${}^n c_{r-2} + {}^n c_{r-1} =$
a) ${}^{n+1} c_{r-1}$ b. ${}^n c_{r-1}$ c. ${}^{n+1} c_{r-3}$ d. ${}^{n+1} c_{r-2}$

4. A question paper has two parts Part-A and Part-B each containing 10 questions. If a student has to choose 8 from Part-A and 5 from Part-B, in how many ways can be choose the questions?
a) 297 b. 2950 c. 3940 d. 11340

5. A card is drawn at random from an ordinary pack of 52 cards. Find the probability that the card is neither a king nor a queen:
   a) 1/13 b. 2/13 c. 3/13 d. 11/13
6. The probability that a three digit no. chosen at random is divisible by 5 is:
   a) ¼ b. ¾ c. 1/5 d. None
7. In how many ways a committee of 4men and 4women can be seated at a round table in such a way that no two women be seated together:
   a) $3! \times 3!$ b.$3! \times 4!$ c. $4! \times 4!$ d. None
8. Number of quadrilaterals that can be drawn using vertices of the figure is
   a) 8_{p_4} b) 10 c) 70 d) 40



9. If $n_{c_4} = n_{p_3}$ then n = _____
   a) 25 b) 27 c) 28 d) None of these
10. If $\binom{6}{x} = \binom{4}{x}$ then x = _____
    a) 5 b) 4 c) 1 d) 0
11. Three different people get on a bus that has 7 vacant seats. How many ways they can be seated?
    a) 200 b) 210 c) 240 d) None of these
12. A debating team consists of three girls and two boys. The number of ways they can be seated in a row such that all boys and girls sit together.
    a) 48 b) 24 c) 120 d) None of these
13. How many ways can 5 people be seated at a round table.
    a) 120 ways b) 60 ways c) 24 ways d) None of these
14. How many numbers of six digits can be formed by the digits 2,3,4,2,3,3
    a) 58 b) 65 c) 70 d) 60
15. In how many ways a committee of four be selected from nine men so as to always include a particular man.
    a) 84 b) 70 c) 48 d) 56
16. At the end of a meeting all participants shake hands with each other. Twenty-eight hands shakes were exchanged. How many people were at the meeting. (HINT: n(n-1)/2=28)
    a) 14 b) 7 c) 8 d) 28
17. A fair coin is tossed three times. What is the probability that at the most one head appears.
    a) $\frac{1}{3}$ b) $\frac{1}{2}$ c) $\frac{1}{4}$ d) None of these
18. A die is rolled what is the probability of getting a number which is even or greater than 4.
    a) $\frac{2}{3}$ b) $\frac{1}{2}$ c) $\frac{1}{4}$ d) None of these
19. A die is thrown twice. What is the probability that the sum of the numbers of dots shown is 3 or 11.
    a) $\frac{1}{7}$ b) $\frac{1}{6}$ c) $\frac{1}{9}$ d) None of these
20. The probability that your friend was born in January, June or July is $\frac{1}{4}$. What is the probability that he was not born in a month which begins with the letter J.

a) $\frac{3}{4}$ b) $\frac{1}{4}$ c) $\frac{2}{4}$ d) None of these

21. A card is drawn from a deck of 52 playing card. What is the probability that it is a spade card or picture card.

a) $\frac{9}{26}$ b) $\frac{10}{26}$ c) $\frac{11}{26}$ d) None of these

22. The probabilities that A and B will live 15 years is $\frac{5}{7}$ and $\frac{5}{9}$ respectively, Find the probability that both will live 15 years?

a) $1-\left(\frac{5}{7}\times\frac{5}{9}\right)$ b) $\left(\frac{5}{7}\times\frac{5}{9}\right)$ c) $\left(\frac{5}{7}+\frac{5}{9}\right)$ d) None of these

23. A bag contains 30 balls some of which are red and the remaining are blue The probability of drawing red ball is $\frac{1}{6}$, then the number of blue balls is

a) 5 b) 10 c) 20 d) 25

24. The six faces of a perfect cubical wooden block are painted so that four are red and two are green, if the block is rolled twice, what is the probability that it will come to rest on a green face both times.

a) $\frac{2}{3}$ b) $\frac{1}{9}$ c) $\frac{1}{2}$ d) $\frac{1}{18}$

25. Two cards are drawn at random from a deck of 52 cards, containing four different suits of 13 cards each, If the first card is replaced before the second card is drawn what is the probability that both cards will be of a same suit.

a) $\frac{3}{51}$ b) $\frac{12}{51}$ c) $\frac{1}{4}$ d)None

26. If $\frac{n!}{r!}$ = 60 then

a) n = 4, r = 3 b) n=5, r =2 c) n=5, r=3 d) none

27. If $\frac{n!}{r!(n-r)!}$ = 10 and n=5 then r = _____.

a) 9 b) 1 c) 2 d) 4

28. $\frac{(2n+2)!}{(2n)!}$ = _____.

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

29. If $\frac{(n+1)!}{(n-1)!}$ = 12 then n= _____.

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

30. For positive integer x, solution of (x-2)!=(x-1)! is

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

31. Equation n!-(n-1)! = 4 holds for n= _____.

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

32. If there are n_1, n_2, n_3 alike things of one kind, second kind and third kind respectively then the number of permutations of n things taken all at a time is

a) $\frac{(n_1)!}{n!}+\frac{(n_2)!}{n!}+\frac{(n_3)!}{n!}$ b) $\frac{n!}{(n_1)!(n_2)!(n_3)!}$ c) $\frac{n!}{(n_1)!+(n_2)!+(n_3)!}$ d) none of these

33. Probability of drawing one red and one white ball from a bag containing 6 red and 4 white balls is

a) $\frac{8}{15}$ b) $\frac{2}{15}$ c) $\frac{7}{15}$ d) $\frac{4}{15}$

34. For two mutually exclusive events p(A∩B) = _____.

a) φ b) 1 c) 0 d) P(A).P(B)

35. P(A∩B)= P(A).P(B) if A and B are;

a) dependent events b) independent events
c) mutually exclusive d) exhaustive events

36. Six men and five women are available to form a mixed doubles pair for a tennis match. How many pairs are possible?
a) 5! x 6! b) 30! c) 30 d) None of these

37. A quiz consists of 5 multiple –choice questions. Each question has four choices of which one is correct answer. In how many ways can Ahmed who is totally unfamiliar with the topic answer all questions?
a) 5^4 b) 4^5 c) 4 x 5 d) None of these

38. How many 3 digit numbers can be made from digits 4,5 when digits can be repeated.
a) 8 b) 18 c) 6 d) None of these

39. Ammar has to do the following during his lunch break, take lunch, post a letter, go to the bank, buy the afternoon paper. In how many ways he can do his job.
a) 3! b) 4! c) 5! d) None of these

40. Eight people have been short listed for an interview. In how many ways can the interviewer see them one after another?
a) 40000 b) 40320 c) 30222 d) None of these

41. If 4 boys and 5 girl are to form a line, so no two girls stand next to each other. Then no. of possible ways is
a) $9_{c_4} \times 9_{c_5}$ b) $9_{c_4,5}$ c) $9_{p_4} \times 9_{p_5}$ d) 5! x 4!

42. In an 'n' sided figure, there are 14 diagonals then n is
a) 6 b) 7 c) 8 d) 9

43. How many members b/w 20,000 and 30,000 can be formed by using the digits 2, 3, 5, 6, 7. If each digit may be repeated any number of times:
a) 125 b. 625 c. 3125 d. None

Unit#08 Binomial Theorem

1. If n < 0 in binomial series $(1 + x)^n$, then $T_{r+1} =$
a) $\binom{n}{r}x^r$ b. $\frac{n(n-1)(n-2)\ldots(n-r+1)}{r(r-1)(r-2)\ldots.3\,.\,2\,.\,1}x^r$ c. $\frac{n!}{r!(n-r)!}x^r$ d. All of these

2. The general term of $\left(\frac{2}{x}+\frac{x}{2}\right)^7$ is:
a) $\binom{7}{r}\left(\frac{2}{x}\right)^{7-2r}$ b. $(-1)^r\binom{7}{r}\left(\frac{2}{x}\right)^{7-r}$ c. $2r\binom{7}{r}\left(\frac{2}{x}\right)^{7-r}$ d. None

3. The coefficient of a^{17} in the expansion of $a^5(1-a^2)^{12}$ is
a) 12376 b) -12376 c) -924 d)924

4. The term independent of x in $\left(1+x^2\right)^3\left(1+\frac{1}{x^2}\right)^4$ is:
a) ${}^4c_3$ b. ${}^3c_2$ c. ${}^7c_4$ d. ${}^7c_3$

5. The sum of binomial coefficients in $(x+y)^7$ is:
a) 64 b. 32 c. ${}^6c_6$ d.128

6. Last term of the expression $\left(a+\sqrt{b}\right)^{12}$ is:
a) a^{12} b. a^{13} c. b^6 d. b^{12}

7. In the expansion of $\left(3x-\frac{1}{x^2}\right)^{10}$, then from end 5th term is:
a) $\frac{14681}{x^5}$ b. $\frac{17010}{x^8}$ c. $\frac{13486}{x^7}$ d. $\frac{14851}{x^6}$

8. The sum of all coefficients in the expansion of $(3+2x)^4$ is:
a) 16 b. 625 c. 30 d. 32

9. If n is even the expansion of $(a + b)^n$ then $\left(\frac{n}{2}+1\right)$th term will be _____ term.

a) Last b) First c) Middle d) None of these

10. ${}^nC_0$ ${}^nC_1$ ${}^nC_2$ etc. does not exist when n is _____
a) Whole number b) Even number
c) Prime number d) Negative or Fraction

11. $(a+x)^n = \sum_{r=0}^{n} \binom{n}{r} a^{n-r}x^r$ where a and x are_____
a) Only Natural number b) Only Whole numbers
c) Complex numbers d) Only Real numbers

12. ${}^nc_4$ exists when n is _____
a) n = 1 b) n <4 c) n ≥ 4 d) None of these

13. If n is any positive integer then $n! > 3^{n-1}$ When
a) n > 5 b) n ≥ 5 c) n ≥ 3 d) n > 3

14. The sum of the odd coefficients in the expansion of $(1+x)^5$ is
a) 4 b) 8 c) 12 d) 16

15. If n is any positive integer then $\binom{5}{5}+\binom{6}{5}+\binom{7}{5}+\ldots\ldots\ldots+\binom{n+4}{5}$
a) $\binom{n+5}{6}$ b) $\binom{n+5}{5}$ c) $\binom{n+4}{4}$ d) $\binom{n+6}{6}$

16. General term of $(x^2-\frac{1}{x})^{2n}$ involves
a) $\binom{2n}{r}$ b) x^{4n-3r} c) $(-1)^r$ d) all (a), (b)&(c)

17. If x is so small that its square and higher power can be neglected then $\frac{1-x}{\sqrt{1-x}} \approx$ _____
a) $1+\frac{3}{2}x$ b) $1-\frac{1}{2}x$ c) 1 + x d) 1-x

18. Middle term in the expansion of $(\frac{1}{x}-\frac{x^2}{2})^{12}$ is
a) $\frac{231}{16}x^6$ b) $\frac{1}{64}x^4$ c) $\frac{1}{216}x^8$ d) $\frac{231}{16}x^7$

19. Term independent of x in the expansion of $(3a-\frac{x}{3a})^4$ is
a) $27a^4$ b) $81a^4$ c) $-36a^2$ d) $6a^2$

20. Sixth term in the expansion of $(\frac{x}{2}-\frac{2}{x^2})^6$ is
a) $-96/x^9$ b) $-3x^3/8$ c) 15/4 d) $-20/x^3$

21. $x^{2n-1}+y^{2n-1}(x \neq -y)$ has a factor
a) x+y b) x-y c) y-x d) (b) and (c)

22. Inequality $n^2 > n+3$ holds for integral values
a) $n \geq 0$ b) $n \geq 1$ c) $n \geq 3$ d) $n \leq 2$

23. Statement x+1 is a factor of $x^{2n}+a$ is true $\forall n \in Z^+$ If a=_____
a) 1 b) -1 c) 0 d) 2

24. The coefficient of the third term of $(x + y)^4$ is
a) 4 b) 5 c) 6 d) 7

25. The third term of $(a + b)^{10}$ is _____
a) $15a^8b^2$ b) $45a^8b^2$ c) $45a^2b^8$ d) $15a^6b^8$

26. In the expansion of $(a + b)^n$,The middle term when n is odd is

a) $\left(\frac{n}{2}+n\right)$ th b) $\left(\frac{n+1}{2}\right)$ th and $\left(\frac{n+3}{2}\right)$ th

c) $\left(\frac{n+1}{2}\right)$ th d) $\left(\frac{n+3}{2}\right)$ th

27. The expansion of $(8-5x)^{-2/3}$ is valid when

a) $-5 < x < 5$ b) $\frac{-5}{8} < x < \frac{5}{8}$ c) $-\frac{8}{5} < x < \frac{8}{5}$ d) $1 < x < \frac{5}{4}$

28. No of terms in the expansion of $(2x^2 - 3y^3)^7$ is

a) 6 b) 7 c) 8 d) 9

29. The fourth term of $(a-2b)^{12}$ is

a) $-1760a^9b^3$ b) $-1760a^3b^9$

c) $-1760a^9b^9$ d) $-1760a^3b^3$

30. The middle term of $(a-b)^8$ is

a) $70\ a^5\ b^5$ b) $70\ a^4\ b^4$ c) $70\ a^3\ b^5$ d) $70\ a^5\ b^3$

Unit#09 TRIGONOMETRY(Part-I)

1. If $\tan\theta = \frac{7}{13}$ then value of $\frac{3\sin\theta + 2\cos\theta}{\cos\theta + \sin\theta} = ?$

a) 27/10 b. 27/12 c. 10/27 d. None

2. $\cos 1^\circ \cos 2^\circ \cos 3^\circ \ldots\ldots \cos 180^\circ =$ is:

a) 1 b. 0 c. – 1 d. None

3. If $90^\circ < \alpha < 180^\circ$ and $270^\circ < \beta < 360^\circ$ then which cannot be true:

a) $\sin\alpha = \sin\beta$ b. $\tan\alpha = \sin\beta$ c. $\tan\alpha = \tan\beta$ d. $\sin\alpha = \cos\beta$

4. 3 radians = _____ degrees:

a) 180° 171.8° 160 190°

5. If $\cos\theta = \frac{1}{2}$ and θ lies in the 4th quadrant then $\cos\frac{\theta}{2} =$ _____

a. $\sqrt{\frac{3}{2}}$ b. $\frac{\sqrt{3}}{2}$ c. $\sqrt{\frac{3}{2}}$ d. $-\frac{\sqrt{3}}{2}$

6. A sector AoB of a circular region having radius 8m and angle 45° at the centre of the sector has area:

a) 2π b. $2\pi^2$ c. 8π d. $8\pi^2$

7. $\cos 255^\circ + \sin 165^\circ =$

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

8. Range of $y = 3\sin(3x+1)$ is:

a) $-1 \le y \le 1$ b. $-3 \le y \le 3$ c. $-\frac{1}{3} \le y \le \frac{1}{3}$ d. None

9. $\cos(x+y) = \frac{1}{2}$ and $\sin(x-y) = \frac{1}{2}$ then:

a) $x = 30^\circ,\ y = 30^\circ$ b. $x = 45^\circ,\ y = 15^\circ$ c. $x = 15^\circ,\ y = 45^\circ$ d. $x = 60^\circ,\ y = 30^\circ$

10. $\sin^2\frac{\pi}{3} + \cos^2\frac{\pi}{3} + \cot^3\frac{\pi}{4} =$

a. 3/2 b.1 c. – 2 d.2

11. $\sec^2 A + \operatorname{cosec}^2 A = \sec^2 A \operatorname{cosec}^2 A$ is valid for :

a. $A \neq \frac{n\pi}{2}, n \in Z$ b. $A \neq \left(\frac{2n+1}{2}\right)\pi,\ n \in Z$ c. $A \neq n\pi,\ n \in Z$ d. $A \neq (2n+1)\pi,\ n \in Z$

12. If $\sqrt{2+\sqrt{2+2\cos 4\theta}} = k\cos\theta$, then k = ?

a) – 2 b.1 c. $\cos\theta$ d. 12

13. $\sin 19^\circ \cos 11^\circ + \sin 71^\circ \sin 11^\circ = ?$

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

14. If $x \to \frac{\pi}{2} + \theta^{\circ}$, then graph of tanx increases infinitely in:

a) I-quadrant b. II-quadrant c. III-quadrant d. IV-quadrant

15. The vertical asymptotes in the graph of $f(x) = \tan 2x$ are of:

a) $x = \frac{\pi}{6} \pm n\pi,\ n \in Z$ b) $x = \frac{\pi}{4} \pm \frac{n\pi}{2},\ n \in Z$ c) $x = \frac{\pi}{6} \pm \frac{n\pi}{3},\ n \in Z$ d) $x = \frac{\pi}{8} \pm \frac{n\pi}{4},\ n \in Z$

16. Which of the following is correct

a) Tan 1 = Tan2 b) Tan 1 < Tan 2

c) Tan 1 > Tan2 d) Tan 1 = $\frac{2}{3}$ Tan2

17. Function having amplitude 2 and period π

a) $\frac{1}{2}Cos\frac{x}{2}$ b) 2Cos2x c) $\frac{1}{2}Sin\frac{x}{2}$ d) $2\text{Cos}\frac{x}{2}$

18. Sin 187° + Cos187° is

a) Zero b) Positive c) Negative d) Zero or N gative

19. $\frac{Tan180^{o} + Tan60^{o}}{1 - Tan180^{o}\,Tan60^{o}} =$ _____

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

20. $Cos^{4}_{40^{o}} - Sin^{4}_{40^{o}} =$ _____

a) Sin80° b) Tan80° c) Cot80° d) Cos80°

21. If $\text{Sin}\,\theta = \frac{2}{3}$ and $\text{Cos}\,\theta < 0$ Then $\text{Tan2}\,\theta =$ _____

a) $-4\sqrt{5}$ b) $\frac{4\sqrt{5}}{5}$ c) [illegible] d) $\frac{4\sqrt{5}}{9}$

22. The function f(x) = $\sqrt{3}$ Cos x + Sin x ha[illegible] amplitude of

a) $\sqrt{3}$ b) $2\sqrt{3}$ [illegible] d) 2

23. Sin 300° = _____

a) Sin120° b) Cos240° c) Sin240° d) Cos60°

24. For what value of P is the period of the function y = $\frac{1}{3}$ Cos px equals to $\frac{2\pi}{3}$

a) 3 b) [illegible] c) 2 d) 6

25. If $0 \le x \le \pi/2$ Then the maximum value of $\text{Sin}\frac{1}{3}x$ is

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

26. Period of the function f(x) = $\frac{Sinx}{1 + Cosx}$ is

a) 2π b) π c) $\pi/2$ d) 4π

27. $\frac{Cot38^{o}}{Tan52^{o}} =$ _____.

a) 0 b) $\sqrt{3}$ c) ∞ d) 1

28. If the graph of y = Sin2x is drawn for all values of x between 10° and 350° This graph crosses the x – axis.

a) One Time b) Two Times c) Three Times d) Six Times

29. If $\frac{1 - Cos\theta}{Sin\theta} = \frac{\sqrt{3}}{3}$ Then $\theta =$ _____

a) 15° b) 30° c) 45° d) 60°

30. The angle between 0° and 360° and co terminal with -620° is
a) 60° b) 100° c) 130° d) None of these

31. If $\text{Tan}^2\theta + 1 = \text{Sec}^2\theta$, Then $\theta \in R$ but
a) $\theta \neq n\pi, n \in Z$ b) $\theta \neq (2n+1)\frac{\pi}{2}, n \in Z$ c) $\theta \neq 2n(\pi/2)\frac{\pi}{2}, n \in Z$ d) None of these

32. If $\text{Sin}\theta + \text{Cosec}\theta = 2$ Then $\text{Sin}^2\theta + \text{Cosec}^2\theta =$ _____
a) 2 b) 4 c) 0 d) 8

33. If horizontal line between y = -1 and y = 1 intersects the graph of y = Sinx _____ time.
a) One b) Two c) Infinite d) None of these

34. $Tan\frac{A}{2} + Cot\frac{A}{2} =$ _____
a) 2Cosec2A b) 2Cos2A c) 2CosecA d) 2SinA

35. $\frac{Tan2\theta}{1+Sec2\theta} =$ _____
a) $\text{Cot}\theta$ b) $\text{Cos}\theta$ c) $\text{Sin}\theta$ d) $\text{Tan}\theta$

36. A co-terminal angle of $-\frac{17\pi}{3}$ such that $0 \leq$ co-terminal angle $\leq 2\pi$ is
a) $\frac{2\pi}{3}$ b) $\frac{\pi}{3}$ c) $-\frac{\pi}{3}$ d) $\frac{\pi}{2}$

37. Negative co-terminal angle of -200 is
a) -560^0 b) -500^0 c) -460^0 d) -400^0

38. Which point do not lies on terminal side of a quadrantal angle.
a) (1,0) b) (0,1) c) (-1,0) d) none of these

39. Which trigonometric function can be undefined for some quadrantal.
ne of th
a) secx b) cosecx c) tanx d) all of these

40. $1+\cot\theta = \text{cosec}2\theta$, where θ is not an integral multiple of
a) π b) $\frac{\pi}{2}$ c) $\frac{3\pi}{2}$ d) none of these

41. Which is undefined.
a) $\text{cosec}5\pi$ b) $\cot 5\pi$ c) $\cot 360^0$ d) $\tan 360^0$

42. Which one is not the trigonometric identity.
a) $\tan\theta = \frac{\sin\theta}{\cos\theta}$ b) $\sin\theta + \cos\theta = 0$ c) $\sin\theta^2 + \cos\theta^2 = 1$ d) none

43. $\frac{3}{4}$ rotation in anti-clockwise direction is
a) 270 b) -270^0 c) 90^0 d) none

44. If $\sin\theta + \text{coseco}\,\theta = 2$ then $\sin^2\theta + \text{cosec}^2\theta =$ _____.
a) 1 b) 2 c) 4 d) none of these

45. $\text{Sin}\frac{235}{2}\pi + \text{Cos}\frac{235}{2}\pi =$ _____.
a) 0 b) -1 c) $\frac{\sqrt{3}}{2}$ d) $\sqrt{3}$

46. Cot 315° = _____
a) 1 b

47. Sin(-780 °) = _____
a) ½ b) -½ c) $\frac{\sqrt{3}}{2}$ d) $-\frac{\sqrt{3}}{2}$

48. Cos15 ° - Sin15 ° = _____
a) $\frac{1}{\sqrt{2}}$ b) $-\frac{1}{\sqrt{2}}$ c) $\sqrt{2}$ d) $-\sqrt{2}$

49. A reference angle θ is always

$a)\ \pi/2 < \theta < \pi$ $b)\ \pi < \theta < 3\pi/2$

$c)\ 0 < \theta < \pi/2$ $d)\ 3\pi/2 < \theta < 2\pi$

50. If θ = 210 ° then reference angle is

a) 60 ° b) 40 ° c) 30 ° d) 20 °

51. The period of 15 sec $2\pi/3$ is _____.

$a)\ 3\pi$ $b)\ 2\pi$ $c)\ \pi$ $d)\ \pi/3$

52. Domain of the function $Tan\frac{4}{3}x$ *is*

a) R b) $R-\left\{x/x=\frac{3K\pi}{8}\right\}$

c) $R-\left\{x/x=(k+1)\frac{3\pi}{8}\right\}$ $d)\ R-\left\{x/x=(2k+1)\frac{3\pi}{8}\right\}$ Where $K\in Z$

53. Range of Cosec $\left(\pi/5\,x+3/4\right)$*is* _____

a) R b) $R-\left\{y/y\in R\text{^}-\frac{4}{3}\le y\le \frac{}{3}\right\}$

c) $R-\{y/y\in R\text{^}-1\le y\le 1\}$ d) $R-\left\{y/y\in R\text{^}-\frac{1}{5}\le y\le \frac{}{5}\right\}$

54. Range of function 3Tan5x is

a) R – [-5, 5] b) R – [-1, 1] c) R d) None

55. If $\text{Sec}\,\theta = -\frac{5}{4}$ and $\text{Sin}\,\theta > 0$ Then $\text{T}\,.\text{n}\,\theta$ = _____

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

56. If a sector of circle has an arc length of 2π inches and an area of 6π square inches what is the radius of the circle.

a) 1 b) 6 c) 2 d) 3

57. If a circle has circumference of 16 inches. Then the area of a sector with a central angle $\frac{3\pi}{2}$ radians is

a) 24π c) 48π c) $\frac{96}{\pi^2}$ d) $\frac{48}{\pi}$

58. Tan (- 135°) equals to

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

59. Sec $\frac{11\pi}{6}$ equals to

a) -1 b) $2/\sqrt{3}$ c) $\frac{\sqrt{6}}{3}$ d) $-\sqrt{2}$

60. If Sin 37° = 0.6 Then Sin 74° = _____

a) 0.12 b) 0.84 c) 0.96 d) 0.76

Unit#10 Trigonometric (Part-II)

Inverse Trigonometric functions, solution of triangle and Trigonometric Equations.

1. $\tan^{-1}\left(\frac{2x}{1-x^2}\right) =$

a) $\tan^{-1} x$ b. $2\tan^{-1} x$ c. $\tan^{-1}\frac{2}{x}$ d. $2\tan x$

2. If $\sin x = 0$, then $x =$

a) $0, \pi/2$ b. $0, -\pi/2$ c. $n\pi$ d. $-\pi, -\pi/2$

3. The value of angle α in ΔABC, if angle $\beta = \tan^{-1}(2)$ and angle $\gamma = \tan^{-1}(3)$

a) $\frac{\pi}{4}$ b. $\frac{\pi}{3}$ c. $\frac{3\pi}{4}$ d. π

4. The value of x if $\cos^{-1}\frac{\sqrt{3}}{2} = \frac{\pi}{2} - \sin^{-1} x$

a) $\frac{1}{2}$ b. $\frac{1}{\sqrt{2}}$ c. $\frac{\sqrt{3}}{2}$ d.1

5. The general solutions of $\sin x \cos x = \frac{1}{2}$ are:

a) $\{x / x = \frac{\pi}{6} + 2k\pi, k \in Z\}$ b. $\{x / x = \frac{3\pi}{4} + k\pi, k \in Z\}$ c. $\{x / x = \frac{\pi}{12} + k\pi, k \in Z\}$ d .None

6. In any ΔABC, if a = 10, b = 8, c = 6, the angle opposite to the largest side is:

a) 90° b. 60° c. 45° d. 30°

7. $\text{Cosec}^{-1}x =$ _____

a) $Sin^{-1}\frac{1}{x}$ b) $Sec^{-1}\frac{1}{x}$ c) $Sec^{-1}(-x)$ d) $Sin^{-1}\left(-\frac{1}{x}\right)$

8. $\sin^{-1} x + \sin^{-1} y = \frac{2\pi}{3}$, then $\cos^{-1} x + \cos^{-1} y = ?$

a) $\frac{2\pi}{3}$ b. $\frac{\pi}{2}$ c. $\frac{\pi}{3}$ d. $\frac{\pi}{6}$

9. $\text{Sin}\left[ArcCos\frac{3}{5}\right] =$ _____

a) $\frac{3}{5}$ b) $\frac{4}{5}$ c) $\frac{1}{5}$ d) $\frac{2}{5}$

10. Which of the following is not defined?

a) Arc Sin $\frac{1}{9}$ b) Arc Cos $\left(-\frac{4}{3}\right)$ c) Arc Tan $\frac{11}{2}$ d) None of these

11. Graph of $y = \text{Tan}^{-1}x$ is along

a) x - axis b) y - axis c) y = x d) None of these

12. If $x = \text{Tain}^{-1}\frac{1}{2}$ and $y = \text{Tan}^{-1}\frac{1}{3}$ Then $x + y =$ _____

a) $\frac{\pi}{6}$ b) $\frac{\pi}{3}$ c) $\frac{\pi}{5}$ d) $\frac{\pi}{4}$

13. Which of the following is (are) true.

I) Arc Sin (1) + Arc Sin (-1) = 0 II) Arc Cos (1) + Arc Cos (-1) = 0

III) Arc Cos x = Arc Cos (-x) for all x

a) I Only b) II Only c) III only d) I and II Only

14. Arc Sin (0.8) + Arc Cos (0.8) = _____

a) 74^o b) 16^o c) 90^o d) 0^o

15. If $x = \text{Tan}^{-1}\frac{1}{3}$ Then Tan 2 x = _____

a) $\frac{3}{5}$ b) $\frac{2}{3}$ c) $\frac{3}{4}$ d) None of these

16. To make a trigonometric function one to one its _____ is restricted.

a) Domain b) Period c) Range d) None of these

17. If $\text{Tan}^{-1} 3 + \text{Tan}^{-1} x = \text{Tan}^{-1} 8$ Then x = _____

a) $\frac{1}{5}$ b) 5 c) $\frac{5}{14}$ d) $\frac{14}{5}$

18. If two sides of triangle are 15m and 20m and area of triangle is $75m^2$ Then the included angle is

a) 30^o b) 60^o c) 50^o d) None of these

19. In ΔABC if c = 2 and $\hat{C} = 30^o$ Then the area of the circumcircle of ΔABC is
a) π b) 2π c) 4π d) 6π

20. If ΔABC is and equilateral triangle and one side of Δ is 2m, then area of Δ is
a) 1 m^2 b) $\sqrt{3}$ m^2 c) 2 m^2 d) $\frac{3}{2}$ m^2

21. If the length of the sides of triangle are 3,4,5 units Then radius of circumcircle is
a) 3.5 b) 3.2 c) 2 d) 2.5

22. If the lengths of the sides of triangle are 3,5,7 Then the largest angle of the triangle is
a) $\pi/2$ b) $5\pi/6$ c) $2\pi/3$ d) $3\pi/4$

23. In ΔABC if a = 13cm, b = 12cm, c = 5cm Then area of triangle is
a) 60 b) 50 c) 40 d) 30

24. $rr_1r_2r_3$ = _____
a) $\frac{abc}{\Delta}$ b) abc c) Δ d) Δ^2

25. Solution set of the equation $2Cos\theta + \sqrt{3} = 0$ *is*
a) ϕ b) Finite c) Infinite d) None

26. If $Sin\theta_1 + Sin\theta_2 + Sin\theta_3 = 3$ then $Cos\theta_1 + Cos\theta_2 + Cos\theta_3$ = _____
a) 3 b) 0 c) Any real number d) It can be determined

27. Which trigonometric equation has secondary solution?
a) $Sin\theta = 1$ b) $Cos\theta = 1$ c) $Sec\theta = 0$ d) $Tan\theta = 1$

28. If n is the number of solutions of $\sin\theta\ Cos\theta = 0$ where $0 \le \theta \le 2\pi$ Then n is
a) 0 b) 2 c) 4 d) 5

29. Solution of Sin2x+ Cos2x = $\sqrt{2}$ is
a) $\left\{\pi/8 + \frac{n\pi}{2}\right\} : n \in Z$ b) $\left\{\frac{\pi}{\ } + n\pi\right\} : n \in Z$
c) $\{\pi/4 + n\pi\} : n \in Z$ d) $\left\{\pi/4 + \frac{n\pi}{2}\right\} : n \in Z$

30. Solution of 3 Tan^2 X = 1 is
a) $\left\{\frac{5\pi}{6} + n\pi\right\} : n \in Z$ b) $\left\{\frac{\pi}{6} + n\pi\right\} : n \in Z$
c) $\{\pi/3 + n\pi\} : n \in Z$ d) None of these

31. sinx+cosx=2 has
a) no solution b) exactly one solution
c) at least one solution d) infinitely many solution

32. $Sec^{-1}x$ =_____.
a) cosx b) $(secx)^{-1}$ c) $\cos^{-1}(\frac{1}{x})$ d) none

33. $Cos^{-1}(-x)$ = _____.
a) $\cos^{-1}x$ b) $\pi - \cos^{-1}x$ c) $-\cos^{-1}x$ d) none

34. The sides of a triangle are 13,14 and 15 then r=_____.
a) $\frac{67}{8}$ b) $\frac{65}{4}$ c) 4 d) 24

35. If for a ΔABC, a=7, b = 9, c=7 then $m\angle C$ = _____.
a) 40^0 b) 45^0 c) 50^0 d) 55^0

36. If for a ΔABC, a=3, b=4 and m<c=30^0 then area of triangle is
a) 2 b) ½ c) 3 d) 1/3

37. If sinx=x then x in radians is
a) π/4 b) π/2 c) 0 d) π/3

38. Maximum value of Cosx-Sinx is

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

39. Sin $[2\sin^{-1}(0.8)]$ = _____.

a) 1.2 b) 1.6 c) 0.48 d) 0.96

40. If $4\sin^{-1}x+\cos^{-1}x=\pi$ then x=_____.

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

41. The range of $y = \text{Sin}^{-1}x$ is

a) $\left(-\pi/2, 0\right)$ b) $\left[-\pi/2, \pi/2\right]$ c) R d) $\left(-\pi/2, \pi/2\right)$

42. The domain of the function $y = \text{Cos}^{-1}x$ is

a) $[0,1]$ b) $[1,0]$ c) $[-1,1]$ d) R

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

a) $-\frac{2\pi}{3}$ b) $-\pi/3$ c) $\frac{4\pi}{3}$ d) $\frac{5\pi}{3}$

44. Tan (are Sin x) = _____ when $-1 < x < 1$

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

45. If $\text{Sin}^{-1}\ x = \frac{\pi}{5}$ for some $x \in (-1, 1)$ Then $\text{Cos}^{-1}x$ = _____

a) $\frac{3\pi}{10}$ b) $\frac{5\pi}{10}$ c) $\frac{7\pi}{10}$ d) $\frac{9\pi}{10}$

46. $\text{Tan}^{-1}x > \text{Cot}^{-1}x$ holds for

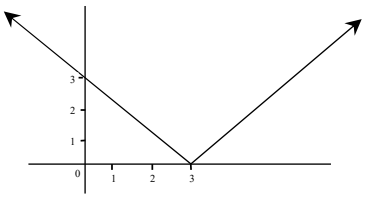
a) $x > 1$ b) $x < 1$ c) $x = 1$ d) All values of x

47. The principal value of $\text{Sin}^{-1}\left(Sin\frac{2\pi}{3}\right)$ is

a) $-\frac{2\pi}{3}$ b) $\frac{2\pi}{3}$ c) $\frac{4\pi}{3}$ d) None of these

Unit#11 **Function and Limit**

1. The graph of which function is



a) $y = |x + 3|$ b. $y = x - 3$

b) $y = |x - 3|$ d. None

2. The function $f(|x|) = |x| + x$ is (if $x > 0$)

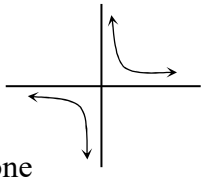
a) Even function b. Odd function

b) Neither even nor odd d. Both even & odd function

3. If $f(x) = \frac{e^x + 1}{e^x - 1}$ then $f(x)$ is

a) Odd function b. Even function c. Both d. Not a function

4. The graph



a) Odd b. Even

c. Neither even nor odd d. Both even & odd

5. The domain of $y^2 = -4x$ is

a) R b. $[0,\infty)$ c. $x \le 0$ d. None

6. Range of $y = 2x^3 - 4$ is

a. $R - \{4\}$ b. $[4,\infty)$ c. R d. $(2,4)$

7. The domain of $f(x)=\frac{1}{\sqrt{|x|-x}}$ is $|x|-x>0$ $|x|>x \ \forall \ x<0$

a) $(-\infty,0)$ b. R c. $(0,\infty)$ d. None

8. If $f(x)=ax+b$ and $g(x)=cx+d$ then $f(g(x))=g(f(x))$ only if $f(g(x))=g(f(x))$ then,

a) $f(a)=g(a)$ b. $f(b)=g(a)$ c. $f(d)=g(b)$ d. $f(c)=g(a)$

9. $\lim_{x\to\infty}\frac{3^{x+1}-5^{x+1}}{3^x-5^x}$

a. – 5 b. $-\frac{1}{5}$ c. $\frac{1}{5}$ d. 5

10. The formula to calculate a certain quantity is given by $\frac{3n^2}{n^2+10,000n}$, what will be the quantity, when "n" be very large?

a) 2 b. 0 c. ∞ d. 3

11. If f = {(x, y) / y = 4}, g = {(x, y) / $x^2 - y^2 = 1$} and h = {(x, y) / x = 3}, Then which of these is a function?

a) f and g only b. g only c. f only d. h only

12. If $f(x) = x^2 + 5x + 6$ Then for what value of x, does f(x) reach its minimum value

a) $-\frac{5}{2}$ b) 0 c) - 3 d) 2

13. Domain of $f(x) = \sqrt{\frac{x-4}{x+1}}$ is

a) $(-\infty,+\infty)$ b) $[4, +\infty)$ c) $(-\infty, -1)$ d) $(-\infty,-1)\cup[4,\infty]$

14. If fog (x) = $4x^2$ -8x and f(x) = x^2 -4 [illegible] g(x) _____

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

15. Which of the following relation [illegible] to be both odd and even?

(I) $x^2 - y^2 = a^2$ (II) $x^2 + y^2 = a^2$ (III) x +y = 0

a) I Only b) I Only II only c) III Only d) I, II, and III only

16. The range of the function $f(x) = \frac{x+5}{|x+5|}, x \neq -5$ is

a) {1} b) {-1, 1} c) (0, ∞) d) {-1,0,1}

17. If f(x) = $\frac{x+2}{(x-2)(x^2-5)}$ Then graph of f(x) has

a) One horizontal and 3 Vertical asymptotes
b) One horizontal and 2 Vertical asymptotes
c) One horizontal and one Vertical asymptotes
d) Zero horizontal and one Vertical asymptotes

18. If f(x) = Cos x and g(x) = 2x + 1 Then which of the following are even functions

(I) f(x). g(x) (II). g(f(x)) (III) f (g(x))

a) II Only b) I Only II only c) III Only d) I, II, and III only

19. Function $f: R \to R$, $f(x) = x^2 + x$ is

a) one – one and onto b) one – one and into
c) Many – one and onto d) Many one and into

20. If x ∈ R Then $\lim_{x\to\infty}\left(\frac{x-3}{x+2}\right)^x$ = _____

a) e b) e^{-1} c) e^{-5} d) e^5

21. $\lim_{x\to 0}\frac{e^{x^2}-\cos x}{x^2}$ = _____

a) $3/2$ b) $\frac{1}{2}$ c) 2 d) $2/3$

22. $\lim_{x\to 0} \frac{\log(Cosx)}{x} =$ _____

a) 1 b) ∞ c) 0 d) None of these

23. If f(x) = $\begin{cases} xSin\frac{1}{x}, x \neq 0 \\ 0 \quad , x = 0 \end{cases}$ Then $\lim_{x\to 0}$ f(x)= _____

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

24. $\lim_{x\to \infty} \frac{x^2 + x}{x^3 + x^2 + 1} =$ _____

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

25. $\lim_{x\to -\infty} \frac{x+2}{\sqrt{3x^2 - 4}} =$ _____

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

26. f(x) = $\frac{x^n + a^n}{x + a}$ is polynomial if n >0 and:

a) n is prime b) n is odd c) x≠ -a d) b and c

27. If $x = a^y$, they $y=\log_a x$, provided:

a) a>0 b) a≥0 c) a>0, a≠1 d) a≠0

28. If y is a function 'f' of x such that $\frac{f(-x)}{y} - 1 = 0$, then f is

a) even b) odd c) neither even nor odd d) does not exists

29. Domain of f(x) = $\begin{cases} x^2 + 1 & x \geq 0 \\ -x + 1 & x < 0 \end{cases}$ s;

a) [0, ∞) b) [-∞ 0) c) R d) R-{0}

30. Range of y = $\sqrt{7x+6}$ is ;

a) [6, ∞) b) [-∞, 6] c) [0, ∞) d) (6, ∞)

31. Range of $\frac{x^2 - 9}{x - 3}, x$ is;

a) R-{3} b) R-{9} c) R-{0} d) R-{6}

32. Range of y = $\frac{x^3 + 2x^2 - 2x + 1}{x + 1}$, $x \neq 1$ is;

a) R-{-1} b) R-{0} c) R-{1} d) none

33. Function f(x) = $\frac{x}{|x|}$ is continuous at;

a) - ∞<x<∞ b) x=0 c) 0≤x<∞ d) R-{0}

34. Identity function is symmetrical with respect to

a) x-axis b) y-axis c) origin d) all of these

35. Inverse function of $y = e^x$ is;

a) natural logarithmic function of x b) Common logarithmic function of x
c) natural logarithmic function of y b) common logarithmic function of y

36. Which of the following functions has an inverse which is also a function?

(I) $y = x^2 - 24$ (II) $y = \sqrt{4 - 9x^2}$ (III) $|x+1|$

a) III only b) II only c) I only d) None of these

37. If f(x) = $\frac{1}{3}$x + 2 and g(f(x)) = x Then g(x) = _____

a) $-\frac{1}{3}x - 2$ b) $3x - 6$ c) $\frac{3}{x+6}$ d) $\frac{1}{3}x - 2$

38. If $f(x-1) = x^2 + 2$ Then $f(x) =$
a) $x^2 - 3x + 2$ b) $x^2 - 2x + 3$ c) $x^2 + 2x + 3$ d) $x^2 + 2$

39. For all real numbers x, a function f(x) is defined as $f(x) = \begin{cases} 9, x \neq 7 \\ 8, x = 7 \end{cases}$ Then $f(2) - f(3) =$
a) 1 b) 0 c) 2 d) 1

40. Which of the following is the inverse of the function $f(x) = \sqrt{x} - 1$ for all $x > 0$
a) $(x+1)^2$ b) $(x-1)^2$ c) $x^2 + 1$ d) $x^2 + 1$

41. If f(x) is a function which of the following must be false
(I) $f(5) = 3, f(6) = 3$ (II) $f(8) = 4, f(9) = 6$
(III) The graph of f(x) is same as that for the line $x = 7$
a) II Only b) I and II Only c) II and III Only d) I,II, and III

42. If x and yare real numbers and $y = \sqrt{4 - x^2}$ Then Minimum valu of y is
a) $-\infty$ b) -4 c) -2 d) 0

43. The domain of $f(x) = \frac{x^2 - 1}{x^2 - x}$ is
a) R b) $R - \{1\}$ c) $R - \{-1\}$ R = {0, 1}

44. The domain of $f(x) = \frac{x^2}{x^2 - 4}$ is
a) All Real numbers c) All Real num rs except ± 2
c) All Real numbers greater than 1or less than or e al to 0
d) None of these

Unit#12 Derivative

1. $\frac{d}{dx}\sqrt{\sin\sqrt{x}} =$
a) $\frac{1}{4x\tan\sqrt{x}}$ b) $x\tan\sqrt{x}$ c. $\frac{\cos\sqrt{x}}{4\sqrt{x}\sin\sqrt{x}}$ d $\frac{\cos\sqrt{x}}{4\sqrt{\sin\sqrt{x}}}$

2. The graph of the derivati e of $y = x^2$ and function itself intersect at a point
a) (4, 2) b.(2, 4) c.(-2, -4) d. None

3. Equation of tangent t (2,) to he curve $y = x^5$ is
a) $x - y - 4 = 0$ 4x – y – 4 =0 c) $x - 4y + 4 = 0$ d) None

4. If $x + y = \sin(x + y)$ then $\frac{dy}{dx} = ?$
a) $\cos(x + y$ b. $\frac{-\sin(x+y)}{x+y}$ c. -1 d. 0

5. $\frac{d}{dx}\left(3^{\sqrt{2x}}\right) =$
a) $3^{\sqrt{2x}-1}\sqrt{2x}$ b. $3^{\sqrt{2x}}\ln 3$ c. $\ln 3\frac{3^{\sqrt{2x}}}{\sqrt{2x}}$ d. $\sqrt{2x}3^{\sqrt{2x}-1}$

6. If $y = x^6 + 5x^5 - 7x^4 + 6x - 20$, then $y_6 = ?$
a) 6! b. 5! c. 7! d. None of these

7. $3^x + 3^y = 3^{x+y}$, then $\frac{dy}{dx} = ?$
a) 3^{x-y} b. 3^{y-x} c. -3^{x-y} d. -3^{y-x}

8. The value of x at the point on the curve $y = x^2 - 8x + 3$ where the gradient is 2
a) -5 b) -3 c) 1 5d)

9. The function $f(x) = 1 + x^3$ has
a) a minimum value at (0,0) b) a maximum value at (0,0)

c) Point of Infection at (0,1) d) None of these

10. The two positive real integers whose sum is 30 and their product is maximum are
a) 25,5 b)10,20 c) 40,-10 d) 15,15

11. When x = 0, the function $x^3 - 2$ is.
a) Stationary b) Increasing c) Maximum d) Minimum

12. If $f(x) = \left(\frac{x^a}{x^b}\right)^{a+b}\left(\frac{x^b}{x^c}\right)^{b+c}\left(\frac{x^c}{x^a}\right)^{c+a}$ then $f'(x)$ is
a) x^{a+b+c} b)0 c) 1 d) None

13. The point (1,1) on the curve $y = x^3 - 3x^2 + 3x$ is:
a) a maximum point b) a point of inflexion
c) a minimum point d) None of these

14. The radius of a circle is increasing at the rate of 0.7 cm/sec. what is the rate of increase of its circumference.
a) 2π b) 1.4π c) 2.4π d) None of these

15. The absolute maximum and minimum values of the function f(x) = Sinx+Cosx $x \in [0,\pi]$ are
a) $\frac{1}{\sqrt{2}}, -1$ b) 1,-1 c) $\sqrt{2}, -1$ d) None of these

16. If $f(x) = \begin{vmatrix} x^3 & Cosx \\ 7 & 4 \end{vmatrix}$ then $f'(x) =$ _____
a) $\begin{vmatrix} 3x^2 & -Sinx \\ 0 & 0 \end{vmatrix}$ b) $\begin{vmatrix} 3x^2 & -Sinx \\ 7 & 4 \end{vmatrix}$ c) $\begin{vmatrix} 3x^2 & -Sinx \\ 0 & 4 \end{vmatrix}$ d) None

17. If f(x) = x +3, $g(x) = x^3$ then $(g\ of)'(x) =$ _____
a)1 b)2x c)$2(x+3)$ d) $3(x+3)^2$

18. $\frac{d}{dx} Cot^{-1}\sqrt{\frac{1+Cosx}{1-Cosx}}$
a) 1 b) $\frac{1}{2}$ c) 0 d) None

19 If $x = at^2$, $y = 2at$ then dy/dx = _____
a) 2a b) $\frac{1}{t}$ c) $\frac{2a}{y}$ d) $\frac{y}{2a}$

20. Derivate of Sinx w.r.t cosx is
a) –Cotx b) –Tanx c) Sinx d) Cosx

21 If $y = Sin^{-1}x^2$ then $dy/dx =$ _____
a) $\frac{2x}{\sqrt{x^4-1}}$ b) $\frac{-2x}{\sqrt{x^4-1}}$ c) $\frac{2x}{\sqrt{1-x^4}}$ d) $\frac{-2x}{\sqrt{1-x^4}}$

22. Which of the following can't be expanded as a Maclaurin's series?
a) Sinx b) Cosx c) Tanx d) lnx

23. Area between the curves $y = Sinx$ When $-\pi \le x \le +\pi$ & x- axis is
a) 0 b) 2 c) 4 d) None

24. If f(x) = ln $|2x|, x \neq 0$ then $f'(x) =$ _____
a) $\frac{1}{|x|}$ b) $-\frac{1}{x}$ c) $\frac{1}{x}$ d) None of these

25. If $y = x^x$ then dy/dx = _____
a) x^x lnx b) $x^x(1+lnx)$ c) $x^x(1-lnx)$ d) None of these

26. The function $f(x) = \frac{1}{x}$ has a stationary value when.
a) x = 1 b) x = 0 c) x = -1 d) undefined value

27. $\frac{1}{\sqrt{x^2+1}}$ is the differential coefficient of:

a) $\sinh^{-1}x$ b) $\ln(x+\sqrt{x^2+1})$ c) $2\ln\sqrt{x+\sqrt{x^2+1}}$ all of d) these

28. $\frac{d}{dx}|3-x|=$

a) ± 1 b) $\begin{cases} 1 & if\ x>3 \\ 0 & if\ x=3 \\ -1 & if\ x<3 \end{cases}$ c) $\begin{cases} +1 & if\ x>3 \\ undefine & if\ x=3 \\ -1 & if\ x<3 \end{cases}$ d) $\pm$ (3-x)

29. Derivative of $\begin{vmatrix} 3x^2+1 & \cos x \\ 2 & 3 \end{vmatrix}$ w.r.t x is

a) $\begin{vmatrix} 6x & -\sin x \\ 0 & 0 \end{vmatrix}$ b) $\begin{vmatrix} 6x & -\sin x \\ 2 & 3 \end{vmatrix}$ c) $\begin{vmatrix} 6x & \sin x \\ 2 & 3 \end{vmatrix}$ d) 0

30. $f(x)=\sin^{-1}x$ is not differentiable at x =

a) 1 b) -1 c) 2 d) all of these

31. Derivative of $f(x)=\cos^{-1}(\frac{x}{2})$ does not exists at:

a) x = 2 b) = -2 x c)0 d) a & b

32. $f(x)=\ln\left(\frac{1}{x}\right)$ is differentiable in the interval:

a) $(-\infty, 0)$ b) $(0, \infty)$ c) $(-\infty,\infty)$ d) R-{0}

33. Exponential function of x, $f(x)=e^x$ increases in interval:

a) $(0, \infty)$ b) $(-\infty,0)$ c) $(-\infty,\infty)$ d) R-{0}

34. Derivative of a function of a function whose graph is a horizontal line is ;

a) 1 b) y=1 c) 0 d) -1

35. Identity function do not have;

a) stationary point b) turning point c) critical point d) all of these

36. If $y=e^{\ln(\text{Sinx})}$ then $\frac{dy}{dx}=$ _____

a) $\frac{1}{Sinx}e^{\ln(Sinx)}$ b) $Cos\,e^{\ln Sinx}$ c) Cosx d) Sinx

37. A turning point of the graph of $y=\frac{Sinx}{x}$ occurs when.

a) Tan x = -x b) Tan $x=\frac{1}{x}$ c) Tan x = x d) Tan $x=\frac{-1}{x}$

38. If (x) = x - e^x then the graph of f (x) has

a) a minimum value at x = 0 b) a maximum value at x = 0

c) a minimum value at x = 0 d) a maximum value at x = 1

39. Maclaurin's expansion of e^x= _____

a) $1+x+\frac{x^2}{2}+\frac{x^3}{3}+\ldots\ldots$ b) $1+x-\frac{x^2}{2!}-\frac{x^3}{3!}+\ldots\ldots$

c) $1+x+\frac{x^2}{2!}+\frac{x^3}{3!}+\ldots\ldots$ None of these

40. $f(x)=x^2+2x-3$ then f(x) is increasing in the interval.

a) $(-\infty,-1)$ b) $(-1,\infty)$ c) $(-\infty,+\infty)$ d) None of these

Unit#13 Integration

1. $\int \frac{\sin^2 x-\cos^2 x}{\sin^2 x\cos^2 x}dx=$

a) $\ln(\sin 2x)$ b. $-2\ln(\sin 2x)$ c. $-\frac{1}{8}\ln(\sin^2 x\cos^2 x)+c$ d. $\cot x+\tan x+c$

2. $\int e^{\sqrt{x}}\,dx =$

a) $2\sqrt{x}\,e^{\sqrt{x}}+c$ b. $\frac{1}{2}e^{\sqrt{x}}+\sqrt{x}+c$ c. $2\left(\sqrt{x}+1\right)e^{\sqrt{x}}+c$ d. $2\left(\sqrt{x}-1\right)e^{\sqrt{x}}+c$

3. $\int\left[\sin^{-1}x+\frac{1}{\sqrt{1-x^2}}\right]e^x\,dx = ?$

a) $e^x\cos^{-1}x+c$ b. $e^x\sin^{-1}x+c$ c. $e^x\,cosec^{-1}x+c$ d. None of these

4. $\int_{-2}^{3}\frac{|x|}{x}\,dx = ?$ is

a) 2 b. 1 c. 4 d. 0

5. $\int_0^k \frac{1}{1+x^2}dx=\frac{\pi}{4},\ then\ \ k=?$

a) 0 b. 0.5 c. 1 d. 2

6. $\int\frac{x}{x+1}dx =$ _____.

a) $x-\ln|x+1|+c$ b) $x+\ln|x+1|+c$ c) [illegible] d) *None of these*

7. $\int\left(e^{a\ln x}+e^{x\ln a}\right)dx =$ _____

a) $\frac{1}{x}e^{a\ln x}+e^{x\ln a}+c$ b) $\frac{e^{a\ln x}}{\ln x}+\frac{e^{x\ln a}}{\ln a}+c$ c) $\frac{x^{a+1}}{+1}+\frac{a^x}{\ln a}+c$ d) *None* of these

8. If $f'(x)=\frac{1}{x}+\frac{1}{x^2+1}\ then f(x) =$ _____

a) $\ln|x|+Co\sec^{-1}x+c$ b) $\ln|x|+Cot^{-1}x+c$ c) $\ln|x|+Tanc^{-1}x+c$ d) $\ln|x|+Cos^{-1}x+c$

9. The general solution of the differential equation $\frac{dy}{dx}=\frac{x}{x^2+1}$ is

a) y = 2ln(x²+1)+c b) y = ln(x²+1)+c c) y = ½ ln(x²+1)+c d) y = ½ ln(x+1)+c

10. $\int\left(Cos^{-1}x+Sin^{-1}x\right)dx =$ _____

a) $\frac{\pi}{2}+x+c$ b) $\frac{1}{2}\pi x+c$ c) $Sin^{-1}x-Cos^{-1}x+c$ d) $Cosx-Sinx+c$

11. e^{x^2} Could be integral w.r.t. x of

a) e^{2x} b) [illegible] c) $2xe^{x^2}$ d) $x^{2e^{x2-1}}$

12. $\int Sec^2(ax+b)dx =$ _____

a) $Tan^2(ax+b)+c$ b) $\frac{Tan^2(ax+b)}{a}+c$ c) $\frac{Tan(ax+b)}{a}+c$ d) $Tan(ax+b)+c$

13. $\int\frac{Sec^2(\ln x)}{x}dx =$ _____

a) Tanx + c b) Sec(lnx) + c c) Tan(lnx) + c d) None of these

14. If $\frac{dy}{dx}=3x^2-4$ then y = _____

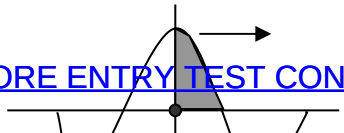
a) x^3-4x b) x^2+4x+3 c) $(x+1)(x^2-x+3)$ d) $(x-1)(x^2+x-3)$

15. $\int_0^{\frac{x}{4}}\frac{Sin^4x}{Cos^6x}dx =$ _____

a) ¼ b) 1/5 c) 1/6 d) None of these

16. The area of the shaded region shown in the fig. is

a) ¼ square units b) ½ square units c) 5/4 square units d) 2 square units

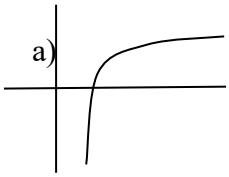
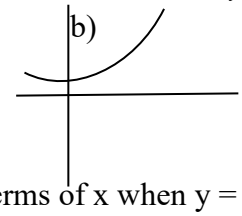
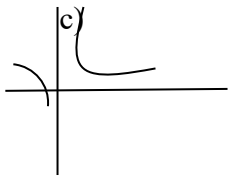
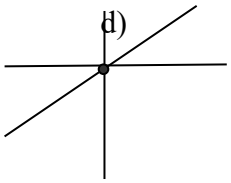


Y=Cos4x

17. $\int \ln x dx =$ _____

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

18. If the differential equation of the curve is $\frac{x}{y}\frac{dy}{dx}=1$, then curve is

a)  b)  c)  d) 

19. *If* $\frac{dy}{dx}=2e^{-x}$ then y in terms of x when y = -1, x = 0

a) $y=5+\frac{1}{e^x}$ b) $y=-1-\frac{2}{e^x}$ c) $y=-1+\frac{3}{e^x}$ d) *None of these*

20. x-lnx2 + k is the result of integrating w.r.t. x

a) $\frac{1}{1-x^5}$ b) $\frac{1-2x}{x^2}$ c) $\frac{x-2}{x}$ d) $1-\frac{2}{x^2}$

21. The order of the differential equation $4\frac{d^3y}{dx^3}-7\frac{dy}{dx}-y=0$ is

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

22. If $\int_{-1}^{0} f(x)dx = 6 \& \int_{-1}^{2} f(x)dx = 25$ then $\int_{0}^{2} f(x)dx =$ _____

a) 19 b) 31 c) -1 d) -31

23. $\int e^x\left(\frac{1+x\ln x}{x}\right)dx =$ _____

a) $-e^x \ln x + c$ b) $e^x \ln x + c$ c) $\frac{e^x}{\ln x}+c$ d) None

24. $\int Cos\left(\pi/2 - x\right)dx =$ _____

a) Sinx + c b) Cosx + c c) –Sinx + c d) –Cosx + c

25. $\int \frac{Sinx - Cosx}{\sqrt{1-Sin2x}}dx$

a) Sinx + c b) Cosx + c c) Sinx – Cosx + c d) x + c

26. $dy \approx \delta y$ if

a) $\delta x = 0$ b) $\delta x \to 0$ c) $\delta x = dx$ d) $\delta y = 0$

27. $\frac{d}{dx}\int_{1}^{x^2} dy =$ _____,

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

28. $\frac{d}{dx}\int f(x)dx =$ _____.

a) $f'(x)+c$ b) f(x)+c c) f(x) d) $f'(x)$

29. Integral $\int_{2}^{x} f(t)dt$ is a function of ;

a) t b) x c) constant d) does f′ exist.

30. If $\lim_{\delta x \to 0} \frac{F(x+\delta x)-F(x)}{\delta x} = f(x)$, then;

a) $\int f(x)dx = F(x)+c$ b) $\int F(x)dx = f(x)+c$ c) Both a & b. d) $f(x)=F'(x)$

31. If $F(x)= \int_a^x f(x)dx$, then F(a)=_____.

a) F(x)-F(a) b) 1 c) f(x)-f(a) d) 0

32. An integral presenting the area bounded by the curve $y = 4-x^2$ and x-axis have range of integration from;

a) -2 to 0 b) 0 to 2 c) -2 to 2 d) 0 to 4

33. Order of differential equation $\left(\frac{dy}{dx}\right)^4 + \frac{d^2y}{dx^2} = \frac{y}{x}$ is;

a) 4 b) 2 c) 6 d) 1

34. If $2\int_2^1 (x-k)dx = 1$, then k =

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

35. For a+ve constant c, d [ln c] =

a) $\frac{1}{c}$ b) $\frac{1}{\ln c}.c$ c) 0 d) 1

36. $\int 0dx =$ _____

a) 1 b) 0 c) Undefined d) Constant

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

a) $\frac{1}{4}x^4$ b) x^3 c) 3x21 d) None of these

38. $\int \frac{e^{\tan^{-1}x}}{1+x^2}dx =$ _____

a) $e^{\tan^{-1}x}$ b) ½ $e^{\tan^{-1}x}$ c) $xe^{\tan^{-1}x}$ d) None of these

39. $\int (x+a^x-x^a)dx =$ _____

a) $\frac{x^2}{a}+a^x-\frac{x^{a+1}}{a+1}+c$ b) $\frac{x^2}{2}+\frac{a^x}{Ina}-\frac{x^{a-1}}{a+1}+c$ c) $\frac{x^2}{2}+\frac{a^x}{Ina}-\frac{x^{a+1}}{a+1}+c$ d) None

40. $\int Cosxe^{\sin x}dx =$ _____

a) $e^{\sin x}+c$ b) $e^{\cos x}+c$ c) $Sinxe^{\cos x}+c$ d) None of these

Unit#14 Analytic Geometry

1. The graph of $|x|+|y|=4$ consists of

a) One straight line b. A pair of straight line c. The sides of a square d. A point

2. The length of perpendicular from origin to the line 4x – 3y = 10 is

a) 11/5 b. 5/12 c. 12/5 d. 2

3. A $(a,0)$, B $(at_1^2, 2at_1)$, C $(at_2^2, 2at_2)$ are collinear then which of the following is also true, $t_1 \neq t_2$?

a) $t_1.t_2 = -1$ b. $t_1.t_2 = 1$ c. $t_1.t_2 = -a$ d. $t_1.t_2 = a$

4. In the line $\sqrt{3}x+y+6=0$ is reduced to the form $x\cos\theta + y\sin\theta = P$, then the value of P is

a) $\sqrt{3}$ b. 1/3 c. 3 d. 2

5. The ratio in which point $\left(\frac{1}{2},6\right)$ divide the line segment joining the points $(3,5)$ and $(-7,9)$ is

a) 1 : 3 b. 3 : 1 b. 2 : 3 d. 3 : 4

6. The point P(x, y) is on x-axis and it's distance 6 units from (5, 2), then coordinates of P are

a) $(2,\sqrt{5})$ b. $(\sqrt{3},4)$ c. $(2,10)$ d. None of these

7. The intercept form of a straight line y = x is

a) $\frac{x}{1}-\frac{y}{1}=0$ b. $\frac{y}{1}-\frac{x}{1}=0$ c. $\frac{x}{1}+\frac{y}{1}=1$ d. None of these

8. The point (11,-3) lies _____ the line 2x + 3y – 5 = 0

a) Below b) Above c) Pm d) None of these

9. If the graph of $\pi x+\sqrt{2}y+\sqrt{7}=0$ is perpendicular to the graph of ax + 3y + 2 =0 then a = _____

a) $\frac{3}{\pi}$ b) $\frac{3\sqrt{2}}{\pi}$ c) $-\frac{3\sqrt{2}}{\pi}$ d) None of these

10. Distance between parallel lines 3x + 4y – 8 = 0 and 6x + 8y + 9 = 0 is

a) 0 b) 5 c) $\frac{5}{2}$ d) $-\frac{5}{2}$

11. If θ is the angle formed between the line 3x – 2y +7 =0 and the x – axis, then angle θ is

a) 56° b) 72° c) 45° d) $\tan^{-1}\left(\frac{3}{2}\right)$

12. The equation of the straight line passing through the point (1,2) and making intercepts on the coordinate axes whose sum is -1 is

a) $\frac{x}{2}+\frac{y}{3}=1$ b) $\frac{x}{2}-\frac{y}{1}=1$ c) $\frac{x}{2}-\frac{y}{3}=1$ d) None of these

13. The extremities of the diagonal of a parallelogram are the points (3,-4) and (-6,5) if the third vertex is the point (-2,1) then the coordinates of the fourth vertex are

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

14. In translation of axes _____ is shifted to another point in the plane.

a) x-axis b) y-axis c) Origin d) Point

15. In homogenous equation $ax^2 + 2hxy + by^2 = 0$ the lines are real and coincident if

a) $h^2 = ab$ b) $h^2 < ab$ c) $h^2 > ab$ d) $h^2 = 0$

16. The equation of the straight line passing through the point (2,-4) and perpendicular to the line 8x -4y +7 = 0 is

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

17. The equation of the straight line whose intercepts on x-axis and y-axis are respectively twice and thrice of those by the line 2x + 4y = 12 is

a) 9x – 8y = 72 b) 9x + 8y = 72 c) 8x + 9y = 72 d) None of these

18. The joint equation of the straight lines x + y = 1 and x – y = 4 is

a) $x^2 – y^2 = 4$ b) $x^2 + y^2 – 2xy = 4$ c) $x^2 + y^2 + 2xy – 4 = 0$ d) $(x + y – 1)(x – y – 4) = 0$

19. The angle between pair of lines represented by $2x^2 – 7xy + 3y^2 = 0$

a) 30° b) 45° c) 75° d) 90°

20. If one diagonal of square is 7x – y +8 = 0 then equation of other diagonal whose one vertex is (-4,5) is

a) 7x – y + 23 = 0 b) x + 7y = 31 c) x –7 y = 31 d) None

21. The two straight lines given by the equation $ax^2 + 2hxy + by^2 = 0$ are perpendicular if

a) $h^2 – ab = 0$ b) $a^2 + b^2 = 0$ c) a + b = 0 d) a – b = 0

22. Equation of line through (-8, 5) having slope undefined is

a) y + 8 = 0 b) y = 8 c) y = x + 8 d) x + 8 = 0

23. If the points A(-3,-4) and C(5,4) are the ends of the diagonal of a rhombus ABCD then the equation of the diagonal BD is :

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

24. If P(2,5) , Q(12,5) and R(8,-7) form a triangle then the point of intersection of three medians is:

a) (22,3) b) (11,1) c) $\left(\frac{22}{3},3\right)$ d) None of these

25. The vertices of a triangle are A(0,0), B(2,0) and C(0,3). Its orthocenter is

a) (0,0) b) (1, 3/2) c) (2,3) d) (1,1)

26. Centroid of a triangle divides each median in ratio.

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

27. If inclination α of a line satisfies the inequality $90^0 < \alpha < 180^0$, then its
a) +ve b) –ve c) 0 d) ∞

28. A line that cuts the x-axis at (2,0) and y-axis at (0,-4) is:
a) 2x+y= 4 b) 2x-y-4=0 c) 2x + y + 4=0 d) none

29. Condition for lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ to be parallel
a) $a_1a_2+b_1b_2 = 0$ b) $a_1b_2-b_1a_2 = 0$ c) $a_1b_2+b_1a_2 = 0$ d) $a_1a_2-b_1b_2 = 0$

30. Which equation does not represent coordinate axis;
a) x=0 b) x=1 c) y=0 d) y + 2=2

31. Which point does not lie in the location $x \geq 2$, $y \geq 2$;
a) (3,4) b) (3,2) c) (1,5) d) (2,5)

32. A line passing through (x_1,y_1) and (x_1,y_2) is;
a) Horizontal b) vertical c) inclined d) all of these

33. Perpendicular distance of line 3x + 4y + 5 = 0 from origin is;
a) 5 b) 1 c) 25 d) none

34. If point (0,3) lies on a non-vertical line L, then y-intercept =
a) 0 b) 3 c) $\frac{3}{2}$ d) none

35. Inclination of a line having slope $\sqrt{3}$ is ,
a) 30^0 b) 45^0 c) 60^0 d) 0^0

36. The distance of the point (-1,2) from y-axis is
a) -2 b) 1 c) -1 d) 2

37. The point which divides segment joining points (4,-2) and (8,6) in the ratio: 7:5 externally is
a) $\left(\frac{19}{3},\frac{8}{3}\right)$ b) $\left(\frac{8}{3},\frac{19}{3}\right)$ c) $\left(\frac{-8}{3},\frac{19}{3}\right)$ d) (18,26)

38. If the lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are perpendicular then
a) $a_1a_2 - b_1b_2 = 0$ b) $a_1a_2 \div b_1b_2 = 0$
c) $a_1b_2 - a_2b_1 = 0$ d) $a_1a_2 + b_1b_2 = 0$

39. The Cartesian system of coordinates was introduced by
a) Euler b) Euclid c) Descartes d) Maclaurin

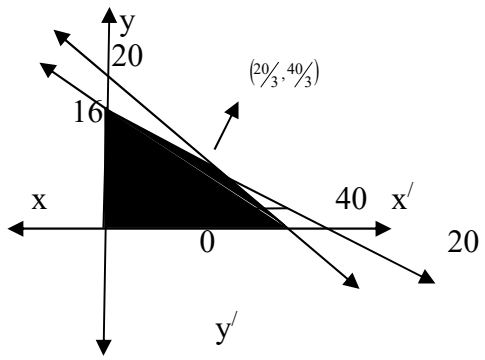
40. If the lines 3x – y =2, 5x + ay = 7 and 2x +y = 3 are concurrent then a = _____
a) -1 b) -2 c) 5 d) -4

41. Two lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ will be identical (coincident) if
a) $a_1a_2 = b_1b_2 = c_1c_2$ b) $a_1a_2 + b_1b_2 + c_1c_2=0$
c) $a_1a_2 + b_1b_2 + c_1c_2=0$ d) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

42. The curves $y = x^2$, $y = x(2-x)$ intersect at
a) (0,0),(1,1) b) (0,0),(2,4) c) (0,0),(-1,1) d) None

Test#15 Linear Programming

1. Shaded region is represented by
a) $2x + 5y \geq 80$, $x + y \leq 20$
$x \geq 0$, $y \geq 0$
b) $2x + 5y \geq 80$, $x + y \geq 20$
$x \geq 0$, $y \geq 0$
c) $2x + 5y \leq 80$, $x + y \leq 20$
$x \geq 0$, $y \geq 0$
d) $2x + 5y \leq 80$, $x + y \leq 20$
$x \geq 0$, $y \leq 0$



2. Which of the following is not a convex set.
a) $\{(x,y)/2x+5y<7\}$ b) $\{(x,y)/x^2+y^2 \leq 4\}$ c) $\{x/|x| \geq 5\}$ d) $\{(x,y)/3x^2+2y^2 \leq 6\}$

3. The set of the constraints
$x+2y \geq 11$, $3x+4y \geq 30$, $2x+5y \geq 30$, $x \geq 0, y \geq 0$ Includes the points.
a) (2, 3) b) (3, 2) c) (7, 4) d) (4, 3)

4. The equations $3x - y \geq 3$ and $4x + y \geq 4$
a) Have solution for positive values of x and y.
b) Have solution for positive x and any value of y.
c) Have solution for any values of x and y.
d) Have solution for only positive y.

5. Maximum value of P = 6x + 8y subject to the constraints $2x + y \leq 30, x + 2y \leq 24,$
$x \geq 0, y \geq 0$ Is
a) 90 b) 120 c) 96 d) 240

6. Number of feasible solutions in the feasible region is
a) Exactly one b) Three c) Infinite d) Five

7. Graph of $ax + by + c \leq 0; (a \neq 0, b \neq 0, c \neq 0)$ is
a) Complete plane. b) Closed half plane.
c) Straight line. d) A pair of straight lines.

8. The function which is to be maximized or minimized is known as ____________ function.
a) Objective b) Maximum c) Minimum d) None

9. The feasible solution which maximizes or minimizes the objective function is called ______________ solution.
a) Linear b) Maximum c) Minimum d) Optimal

10. For convex polygonal region the extreme points are ___________________ points.
a) Boundary b) Inside the region c) Outside the region d) None

11. A ________________ line divides the plane into upper and lowers half planes.
a) Vertical b) Horizontal c) Non-vertical d) Vertical & horizontal

12. In linear programming equations or in-equations should not contain the terms like
a) x, y b) ax, by c) bx, ay d) x^2, y^2, xy

13. The region of the graph ax + by = c is called the ________ of half planes ax + by > c and ax + by < c
a) Boundary b) Mid c) Half d) None

14. The ordered pair which doesn't satisfy the inequality $2x - 3y \geq 6$ is
a) (5, 1) b) (0, -3) c) (3, 1) d) (3, 0)

15. A solution of $x + 2y \leq 7$ is
a) (1, 3) b) (2, 5) c) (1, 5) d) None

16. Solution of inequality 2x + 1 < 0 is
a) $-\infty < x < \frac{1}{2}$ b) $-\infty < x \leq \frac{1}{2}$ c) $-\infty < x < -\frac{1}{2}$ d) $-\infty < x \leq -\frac{1}{2}$

17. The solution of $ax + by \geq c$ is
a) A straight line b) A triangle
c) Open half plane d) Closed half plane.

18. The corner point for the inequations $x + y \leq 7$ and $2x - 3y \geq -11$ is
a) (0, 0) b) (3, 4) c) (2, 5) d) (5, 2)

19. The variables present in the non-negative constraints are called
a) Dependent variables. b) Independent variables
c) Decision variables d) None

20. If f (x, y) = 2x – 3y Then f (1, 2) = _____________
a) -5 b) -4 c) 4 d) None

21. Feasible solution is the set of values of variables satisfying ______________ constraints.
a) Two b) Three c) Four d) All the given.

22. Inequations have ___________________
a) Two symbols b) Three symbols c) Four symbols d) Many symbols.

23. The region all of whose points satisfy the in equations in the problem concerned is called
a) First Quadrant b) Feasible solution c) Feasible region d) None.

24. Corner points of the feasible region are also called ________________
a) Points of intersection b) Constraints c) Vertices d) Decision variables.

25. (1, 1) is the solution of the in equality

a) $x + y < 0$ b) $x + y \leq 0$ c) $x + 2y < 3$ d) $x - 2y \leq 3$

26. $ax + b < c$ is linear inequality in
a) Two variables b) Three variables c) Four variables d) One variable.

27. If the line segment joining any two points of a certain region lies entirely with in the region then such a region is called the _____ region.
a) Convex b) Concave c) Feasible d) Objective

28. The theorem of linear programming states that the maximum and minimum values of the objective functions occur at _____ points of the feasible region.
a) Boundary b) Corner c) Mid d) None

29. $2x + 3y < 5$ is inequation in
a) Two variables b) One variables c) Three variables d) Four variables.

30. The variables used in the system of linear in equations are _____
a) Integers b) Real numbers c) Non-negative d) None.

31. The graph of linear in equation $2x + 3y < 10$ is _____
a) Straight line b) Parabola c) A plane d) Hyperbola.

32. The constraints $-x + y \leq 1, \quad -x + 3y \leq 9, \quad x \geq 0, y \geq 0$ defines on
a) Bounded feasible space. b) An unbounded feasible space.
c) Both bounded and unbounded. d) None of these

Unit#16 Conic Section

1. The circle $x^2 + y^2 - 8x + 4y + 4 = 0$ touches
a) x - axis b) y - axis
c) Both the axes d) neither x – axis nor y – axis

2. Radius of circle $x^2 + y^2 + 12x - 10y = 0$
a) $\sqrt{61}$ b) 61 c) 62 d) 64

3. $x = aCosht$, $y = bSinht$ are the parametric equations of
a) Parabola b) Circle c) Ellipse d) Hyperbola

4. Area of circle $x^2 + y^2 + 2x + 2y + 1 = 0$ is
a) π b) 2π c) 4π d) 8π

5. $x = at^2$, $y = 2at$ are the paracmetric equations of
a) Circle b) Ellipse c) Parabola d) Hyperbola

6. Line x+2=0 meets the circle $x^2 + y^2 = 4$ at
a) one point b) two points c) at most two points d) none of these

7. In a circle of radius 5cm if there are two parallel chords of lengths 8cm and 6cm on the opposite side of diameter Then distance between the chords is
a) 10 cm b) 9 cm c) 8 cm d) 7 cm

8. If the cutting plane is parallel to the generator of the cone but intersects its both of the nappes then the section is
a) Circle b) Ellipse c) Parabola d) Hyperbola

9. If a plane cuts the cone perpendicular to the axis of the cone then the section is a
a)Circle b) Ellipse c) Parabola d) Hyperbola

10. The mid point of the foci of an ellipse is called
a) Focus b) Latus Rectum c) Covertices d) Centre

11. Foci of ellipse lie along
a) x-axis b) y-axis c) Major axis d) Minor axis

12. $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is symmetric to
a) Both the axis b) Only y-axis c) Only x-axis d) line y = x

13. The parabola $y^2 = 2x$ passes through
a) $\left(\frac{1}{4}, \frac{1}{4}\right)$ b) (2, 2) c) $\left(\frac{1}{2}, \frac{1}{4}\right)$ d) $\left(\frac{1}{4}, \frac{1}{2}\right)$

14. The vertex of the parabola $(x + 1)^2 = 8(y - 2)$ is

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

15. The centre of the ellipse $\frac{(2x-1)^2}{16}+\frac{(y-2)^2}{4}=1$ is

a) (1, 2) b) (0, 2) c) $(\frac{1}{2}, 2)$ d) None of these

16. The eccentricity of the ellipse $x^2 + 4y^2 = 16$ is

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

17. The centre of the ellipse $x^2 + 16x + 4y^2 - 16y + 76 = 0$ is

a) (0, 0) b) (8, -2) c) (-8, 2) d) (4, 0)

18. The Co-vertices of hyperbola $\frac{x^2}{16}-\frac{y^2}{4}=1$ are

a) $(0, \pm 2)$ b) $(\pm 2, 0)$ c) $(\pm 4, 0)$ d) $(0, \pm 4)$

19. If the determinant $h^2 - ab > o$ then the conic will be

a) Ellipse (or Circle) b) Parabola c) Hyperbola d) Degenerate conic

20. Axis of parabola $y^2 = 4x + 4y$ is

a) $y = 1$ b) $y = 2$ c) $y = 0$ d) None of these

21. The number of real tangents that can be drawn from the point (2, 3) to the parabola $y^2 = 8x$ is

a) 3 b) 2 c) 1 d) 0

22. Hyperbola is _____

(I) An open figure (II) A closed figure (III) If extends to infinity

a) I Only b) II only c) I, II, III d) I and III only

23. The equation $ax^2 + by^2 + 2gh + 2fy + 2hxy + c = 0$ represents a circle if

a) a = b b) h = 0 c) g = 0 and f = g d) h = 0 and a = b

24. The distance between two vertices of an ellipse is the length of

a) Transverse axis b) Conjugate axis c) Major axis d) Minor axis

25. The given conic $8x^2 - 5y^2 - 6x - 20y - 3 = 0$ is

a) Circle b) Hyperbola c) Parabola d) Ellipse

26. The graph of which of the following is a portion of an ellipse

a) $|y| = x^2$ b) $y = 4x^2$ c) $y = \sqrt{4-x^2}$ d) $y = \sqrt{-4x^2}$

27. Which of the following is an asymptote of $3x^2 - 4y^2 - 12 = 0$

a) $y = \frac{4}{3}x$ b) $y = \frac{4}{3}x$ c) $y = \frac{\sqrt{3}}{2}x$ d) $y = -\frac{2}{\sqrt{3}}x$

28. The graph of $x^2 = (2y - 3)^2$ is

a) A Circle b) An Ellipse c) A Point d) Two intersecting lines

29. The parabola $y^2 = -12x$ opens

a) Rightwards b) Leftwards c) Downwards d) Upwards

30. The length of the latus rectum of the hyperbola whose equation is $x^2 - 4y^2 = 16$ is

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

31. Circle can contains no term involving;

a) x^2 b) y^2 c) xy d) x

32. Point of parabola $y^2 = -4a(x-1)$, which is closet to the focus is;

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

33. Ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ meets y-axis at

a) (b,0) b) (-b,0) c) $(0,\pm b)$ d) all of these

34. Centre of hyperbola lies on its;

a) transverse axis b) conjugate axis c) focal axis d) all of these

35. Equation $x^2+y^2-2x-4y+a=0$ represents a point circle if a =

a) 0 b) -5 c) 5 d) none

36. Centre of a point circle lies;

a) inside b) on c) outside d) none

37. Directrix of parabola with vertex at origin, focus at (8,0) is:
a) x+8=0 b) x-8=0 c) x+4=0 d) x+2=0

38. Point (1,-1) does not lie on parabola;
a) $(x-1)^2=4(y+1)$ b) $x^2+y=0$ c) $y^2-x=0$ d) $y^2+x=0$

39. In conic, if c:a = 2:4, then it represents;
a) parabola b) ellipse c) hyperbola d) circle

40. Centre of hyperbola with asymptotes 2x-y=3, 2x+y=1 is;
a) (1,-1) b) (0, 0) c) (-1, 1) d) none

Unit#17 Vectors

1. If $\overline{V}=[-1,4]$ and the resultant of $\overline{U}$ is $[4,5]$ then $\overline{U}=$ _____
a) [1, 5] b) [5, 1] c) [4, 5] d) None of these

2. Vector $\overline{V}=[3,-7]$ as a linear combination of (i.e in term of) vectors $\overline{U}=[-6,8]$ and $\overline{W}=[9,-13]$ is
a) $\overline{V}=\overline{U}+\overline{W}$ b) $\overline{V}=4\overline{U}+\overline{W}$ c) $\overline{V}=4\overline{U}+3\overline{W}$ d) None of these

3. If $\overline{V}=[3,-1], \overline{U}=[5,-5]$ then the magnitude of the resultant of $\overline{V}$ and $\overline{U}$ is
a) 5 b) 7 c) 10 d) None of these

4. A unit vector perpendicular to $\overline{V}=[3,-4]$ is
a) [4, 3] b) $\left[\frac{4}{5},\frac{3}{5}\right]$ c) $\left[-\frac{3}{5},\frac{4}{5}\right]$ d) $\left[-\frac{3}{5},-\frac{4}{5}\right]$

5. The vector whose magnitude is 5 and has the same direction as the vector $4\hat{i}-3\hat{j}+\hat{k}$ is
a) $5\left(4\hat{i}-3\hat{j}+\hat{k}\right)$ b) $\frac{5}{\sqrt{26}}\left(4\hat{i}-3\hat{j}+\hat{k}\right)$ c) $\frac{1}{\sqrt{26}}\left(4\hat{i}-3\hat{j}+\hat{k}\right)$ d) None of these

6. If $2\hat{i}-\hat{j}+2\hat{k}$ and $3\hat{i}+x\hat{j}+\hat{k}$ are perpendicular then $x=$ _____
a) 8 b) 2 c) 0 d) 3

7. Unit vector perpendicular to $\vec{a}=\hat{i}+\hat{j}+2k$ and $\vec{b}=2\hat{i}+3\hat{j}+\hat{k}$ is
a) $\frac{4\hat{i}-3\hat{j}+\hat{k}}{\sqrt{26}}$ b) $\frac{-4\hat{i}+3\hat{j}-\hat{k}}{\sqrt{26}}$ c) $\frac{4\hat{i}+3\hat{j}+\hat{k}}{\sqrt{26}}$ d) None of these

8. $\overline{a}\times\overline{b}=\overline{\mathbf{b}}\times\overline{c}=\overline{c}\times\overline{a}$ If
a) $\vec{a}=\vec{b}+\vec{c}$ b) $\vec{a}+\vec{b}+\vec{c}=0$ c) $\vec{a}=\vec{b}=\vec{c}$ d) Both b and c

9. Which of the following vectors are parallel?
a) i- j + 3k and 3i – 3j + 9k b)2 i- j + k and -4i + 2j - 2k
c) i- j + 3k and -2i + 4j - 6k d) Both a and b

10. If the vector $\vec{a}$ lies in the plane of the vectors $\vec{b}$ and $\vec{c}$ then $\vec{a}.\left(\vec{b}\times\vec{c}\right)=$ _____
a) 1 b) -1 c) 0 d) 2

11. If $\vec{a}$ and $\vec{b}$ are mutually perpendicular then $\left(\vec{a}+\vec{b}\right)^2=$ _____
a) $\vec{a}-\vec{b}$ b) $\vec{a}+\vec{b}$ c) $\left(\vec{a}-\vec{b}\right)^2$ d) 0

12. Which of the following can be the direction angles of same vector?
a) 30°, 45°, 60° b) 45°, 45°, 60° c) 45°, 60°, 60° d) None

13. Measure of angle θ between two vectors is always
a) $0<\theta<\pi$ b) $0\le\theta\le\pi/2$ c) $0\le\theta\le\pi$ d) $0\le\theta\le2\pi$

14. The direction cosines of z-axis are
a) 0, 0, 0 b) 0, 1, 0 c) 0, 0, 1 d) 1, 0, 0

15. If $\vec{a}$ and $\vec{b}$ are two vectors then $\vec{a}-\vec{b}=\vec{b}-\vec{a}$ *if*

a) $\left|\vec{a}\right|=\left|\vec{b}\right|$ b) $\vec{a}=\vec{b}$ c) $\vec{a}\perp\vec{b}$ d) $\vec{a}\,//\,\vec{b}$

16. If $\vec{a}$ and $\vec{b}$ are two perpendicular vectors then

a) $\left(\vec{a}+\vec{b}\right)^2=a^{-2}+b^{-2}$ b) $\left(\vec{a}-\vec{b}\right)^2=a^{-2}+b^{-2}$ c) $\left(\vec{a}+\vec{b}\right)^2=\left(\vec{a}-\vec{b}\right)^2$ d) *All three*

17. If $\vec{a}=3\hat{i}+\hat{j}-\hat{k}$ *and* $\vec{b}=-2\hat{i}-\hat{j}+\hat{k}$ then projection of $\vec{a}$ *along* $\vec{b}$ *is*

a) $\frac{-8}{\sqrt{11}}$ b) $\frac{-8}{\sqrt{6}}$ c) -8 d) $\sqrt{11}$

18. The angle between the vectors $2\hat{i}-\hat{j}+\hat{k}$ *and* $-\hat{i}+\hat{j}$ *is*

a) $3\pi/2$ b) $2\pi/3$ c) $5\pi/6$ d) $\pi/3$

19. If $\vec{a}=2\hat{i}+5\hat{j}$ *and* $\vec{b}=2\hat{i}-\hat{j}$ the unit vector along $\vec{a}+\vec{b}$ *is*

a) $\frac{\hat{i}+\hat{j}}{\sqrt{2}}$ b) $\sqrt{2}\left(\hat{i}+\hat{j}\right)$ c) $\hat{i}+\hat{j}$ d) *None*

20. If $\vec{a}=\hat{i}+2\hat{j}+3\hat{k},\vec{b}=-\hat{i}+2\hat{j}+\hat{k}$ *and* $\vec{c}=3\hat{i}+t\hat{j}-\hat{k}$ *and* $\vec{a}+\vec{b}$ is at right angle to $\vec{c}$ then t =_____

a) 5 b) 4 c) 6 d)1

21. If $\vec{a}$ & $\vec{b}$ are two non zero vectors the component of $\vec{b}$ *along* $\vec{a}$ is

a) $\vec{a}-\vec{b}$ b) $\hat{a}.\hat{b}$ c) $\vec{a}.\hat{b}$ d) $b.\hat{a}$

22. If the position vectors of A and B be $6\hat{i}-\hat{j}-5\hat{k}$ and $4\hat{i}-3\hat{j}-2\hat{k}$ then the work done by the force $\vec{F}=\hat{i}-3\hat{j}+5\hat{k}$ in displacing a particle from A to B is

a) 15 units b) 17 units c) -15 units d) None of these

23. If the vectors $2\hat{i}-3\hat{j}+4\hat{k},\hat{i}-2\hat{j}-\hat{k}$ *and* $x\hat{i}-\hat{j}+2\hat{k}$ are coplanar then x = _____

a) $\frac{5}{8}$ b) 1 c) 0 d) $\frac{8}{11}$

24. If $\vec{a}$ *and* $\vec{b}$ are two vectors such that and $\left|\vec{a}.\vec{b}\right|=\left|\vec{a}\times\vec{b}\right|$, then the angle between vectors $\vec{a}$ *and* $\vec{b}$ is

a) π b) $\frac{\pi}{4}$ c) $\frac{\pi}{4}$ d) $\frac{3\pi}{4}$

25. The perimeter of the triangle whose sides are $\hat{i}+\hat{j}+\hat{k},5\hat{i}+3\hat{j}-3\hat{k}$ *and* $2\hat{i}+5\hat{j}+9\hat{k}$ is

a) $\sqrt{15}-\sqrt{157}$ b) $15-\sqrt{157}$ c) $15+\sqrt{157}$ d) None of these