Sri Raghavendra Tuition Center

unit - 2 test annual

12th Standard

Maths

Date : 06-Feb-24

Reg.No. : | | | | | | |

Mr Deepak M. Sc., M. A., B. Ed., DCA., TET - 1.,TET - 2.,

Exam Time : 00:30:00 Hrs

Total Marks : 25

I. Answer all question 5 x 1 = 5

1) If z is a non zero complex number, such that $2iz^2 = \bar{z}$ then |z| is

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

2) If z = a + ib lies in quadrant then $\frac{\bar{z}}{z}$ also lies in the III quadrant if _____

(a) a > b > 0 (b) a < b < 0 (c) b < a < 0 (d) b > a > 0

3) If z is a complex number satisfying |z - i Re (z)| = | z -Im(z) | then z lies on _____

(a) y = x (b) y = -x (c) $x = \pm y$ (d) y = -x + 1

4) The value of $\sum_{n=1}^{12} i^n$

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

5) The value of $\left(\frac{1+i}{\sqrt{2}}\right)^8 + \left(\frac{1-i}{\sqrt{2}}\right)^8$ is

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

II. Answer all question 2 x 2 = 4

6) Find the modulus of the following complex number $\frac{2-i}{1+i} + \frac{1-2i}{1-i}$

7) Find the square roots of −6+8i

III. Answer any 2 question 2 x 3 = 6

8) If $\omega \neq 1$ is a cube root of unity, then the show that $\frac{a+b\omega+c\omega^2}{b+c\omega+a\omega^2} + \frac{a+b\omega+c\omega^2}{c+a\omega+b\omega^2} = -1$

9) Show that the following equations represent a circle, and, find its centre and radius
$|2z + 2 - 4i| = 2$

10) Obtain the Cartesian equation for the locus of z = x + iy in each of the following cases:
$|z - 4|^2 - |z - 1|^2 = 16$

IV. Answer all question 2 x 5 = 10

11) If z = x + iy is a complex number such that Im $\left(\frac{2z+1}{iz+1}\right) = 0$ show that the locus of z is $2x^2 + 2y^2 + x - 2y = 0$

12) Find the fourth roots of unity.

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Sri Raghavendra Tuition Center

unit - 2 annual creative one mark

12th Standard

Maths

Date : 07-Feb-24

Reg.No. : | | | | | | |

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Place: Kattuputhur, Trichy (Dt)

Exam Time : 00:45:00 Hrs

Total Marks : 83

I. ANSWER ALL QUESTION 83 x 1 = 83

1) $i^n+i^{n+1}+i^{n+2}+i^{n+3}$ is

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

2) The value of $\sum_{n=1}^{13}\left(i^n+i^{n-1}\right)$ is

(a) 1+ i (b) i (c) 1 (d) 0

3) The area of the triangle formed by the complex numbers z, iz and z+iz in the Argand's diagram is

(a) $\frac{1}{2}|z|^2$ (b) $|z|^2$ (c) $\frac{3}{2}|z|^2$ (d) $2|z|^2$

4) The conjugate of a complex number is $\frac{1}{i-2}$. Then the complex number is

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

5) If $z=\frac{\left(\sqrt{3}+i\right)^3(3i+4)^2}{(8+6i)^2}$, then $|z|$ is equal to

(a) 0 (b) 1 (c) 2 (d) 3

6) If z is a non zero complex number, such that $2iz^2 = \bar{z}$ then $|z|$ is

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

7) If $|z - 2 + i| \le 2$, then the greatest value of $|z|$ is

(a) $\sqrt{3}-2$ (b) $\sqrt{3}+2$ (c) $\sqrt{5}-2$ (d) $\sqrt{5}+2$

8) If $\left|z-\frac{3}{z}\right|=2$, then the least value $|z|$ is

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

9) If $|z| = 1$, then the value of $\frac{1+z}{1+\bar{z}}$ is

(a) z (b) $\bar{z}$ (c) $\frac{1}{z}$ (d) 1

10) The solution of the equation $|z| - z = 1 + 2i$ is

(a) $\frac{3}{2}-2i$ (b) $-\frac{3}{2}+2i$ (c) $2-\frac{3}{2}i$ (d) $2+\frac{3}{2}i$

11) If $|z_1| = 1$, $|z_2| = 2$, $|z_3| = 3$ and $|9z_1z_2 + 4z_1z_3 + z_2z_3| = 12$, then the value of $|z_1+z_2+z_3|$ is

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

12) If z is a complex number such that $z \in \mathbb{C}\setminus\mathbb{R}$ and $z + \frac{1}{z} \epsilon R$, then $|z|$ is

(a) 0 (b) 1 (c) 2 (d) 3

13) z_1, z_2 and z_3 are complex number such that $z_1 + z_2 + z_3 = 0$ and $|z_1| = |z_2| = |z_3| = 1$ then $z_1^2 + z_2^2 + z_3^3$ is

(a) 3 (b) 2 (c) 1 (d) 0

14) If $\frac{z-1}{z+1}$ is purely imaginary, then $|z|$ is

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

15) If $z = x + iy$ is a complex number such that $|z+2| = |z-2|$, then the locus of z is

(a) real axis (b) imaginary axis (c) ellipse (d) circle

16) The principal argument of $\frac{3}{-1+i}$ is

(a) $\frac{-5\pi}{6}$ (b) $\frac{-2\pi}{3}$ (c) $\frac{-3\pi}{4}$ (d) $\frac{-\pi}{2}$

17) The principal argument of $(\sin 40° + i \cos 40°)^5$ is

(a) $-110°$ (b) $-70°$ (c) $70°$ (d) $110°$

18) If $(1+i)(1+2i)(1+3i)\ldots(1+ni) = x + iy$, then $2 \cdot 5 \cdot 10 \ldots \left(1 + n^2\right)$ is

(a) 1 (b) i (c) x^2+y^2 (d) $1+n^2$

19) If $\omega \neq 1$ is a cubic root of unity and $(1+\omega)^7 = A + B\omega$, then (A, B) equals

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

20) The principal argument of the complex number $\frac{(1+i\sqrt{3})^2}{4i(1-i\sqrt{3})}$ is

(a) $\frac{2\pi}{3}$ (b) $\frac{\pi}{6}$ (c) $\frac{5\pi}{6}$ (d) $\frac{\pi}{2}$

21) If α and β are the roots of $x^2+x+1 = 0$, then $\alpha^{2020} + \beta^{2020}$ is

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

22) The product of all four values of $\left(cos\frac{\pi}{3} + isin\frac{\pi}{3}\right)^{\frac{3}{4}}$ is

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

23) If $\omega \neq 1$ is a cubic root of unity and $\begin{vmatrix} 1 & 1 & 1 \\ 1 & -\omega^2 - 1 & \omega^2 \\ 1 & \omega^2 & \omega^7 \end{vmatrix}$ = 3k, then k is equal to

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

24) The value of $\left(\frac{1+\sqrt{3}i}{1-\sqrt{3}i}\right)^{10}$ is

(a) $cis\frac{2\pi}{3}$ (b) $cis\frac{4\pi}{3}$ (c) $-cis\frac{2\pi}{3}$ (d) $-cis\frac{4\pi}{3}$

25) If $\omega = cis\frac{2\pi}{3}$, then the number of distinct roots of $\begin{vmatrix} z+1 & \omega & \omega^2 \\ \omega & z+\omega^2 & 1 \\ \omega^2 & 1 & z+\omega \end{vmatrix}$=0

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

26) The value of $(1+i)(1+i^2)(1+i^3)(1+i^4)$ is _____

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

27) If $\sqrt{a+ib}$ = x + iy, then possible value of $\sqrt{a-ib}$ is _____

(a) x^2+y^2 (b) $\sqrt{x^2+y^2}$ (c) x+iy (d) x-iy

28) If, $i^2 = -1$, then $i^1 + i^2 + i^3 + \ldots.+$ up to 1000 terms is equal to _____

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

29) If $z = \cos\frac{\pi}{4} + i \sin\frac{\pi}{6}$, then _____

(a) $|z| = 1$, $\arg(z) = \frac{\pi}{4}$ (b) $|z| = 1$, $\arg(z) = \frac{\pi}{6}$ (c) $|z| = \frac{\sqrt{3}}{2}$, $\arg(z) = \frac{5\pi}{24}$ (d) $|z| = \frac{\sqrt{3}}{2}$, $\arg(z) = \tan^{-1}\left(\frac{1}{\sqrt{2}}\right)$

30) If $a = \cos\theta + i \sin\theta$, then $\frac{1+a}{1-a}$ = _____

(a) $\cot\frac{\theta}{2}$ (b) $\cot\theta$ (c) $i \cot\frac{\theta}{2}$ (d) $i \tan\frac{\theta}{2}$

31) .If $a = 3+i$ and $z = 2-3i$, then the points on the Argand diagram representing az, 3az and - az are _____

(a) Vertices of a right angled triangle (b) Vertices of an equilateral triangle (c) Vertices of an isosceles

(d) Collinear

32) The least positive integer n such that $\left(\frac{2i}{1+i}\right)^n$ is a positive integer is _____

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

33) If $a = 3 + i$ and $z = 2 - 3i$, then the points on the Argand diagram representing az, 3az and - az are _____

(a) Vertices of a right angled triangle (b) Vertices of an equilateral triangle (c) Vertices of an isosceles

(d) Collinear

34) If $z = \frac{1}{(2+3i)^2}$ then $|z|$ = _____

(a) $\frac{1}{13}$ (b) $\frac{1}{5}$ (c) $\frac{1}{12}$ (d) none of these

35) If $z = 1-\cos\theta + i \sin\theta$, then $|z|$ = _____

(a) $2 \sin\frac{1}{3}$ (b) $2 \cos\frac{\theta}{2}$ (c) $2\left|\sin\frac{\theta}{2}\right|$ (d) $2\left|\cos\frac{\theta}{2}\right|$

36) If $z = \frac{1}{1-\cos\theta-i\sin\theta}$, the Re(z) = _____

(a) 0 (b) $\frac{1}{2}$ (c) $\cot\frac{\theta}{2}$ (d) $\frac{1}{2}\cot\frac{\theta}{2}$

37) If $x + iy = \frac{3+5i}{7-6i}$, they y = _____

(a) $\frac{9}{85}$ (b) $-\frac{9}{85}$ (c) $\frac{53}{85}$ (d) none of these

38) The amplitude of $\frac{1}{i}$ is equal to _____

(a) 0 (b) $\frac{\pi}{2}$ (c) $-\frac{\pi}{2}$ (d) π

39) The value of $(1+i)^4 + (1-i)^4$ is _____

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

40) The complex number z which satisfies the condition $\left|\frac{1+z}{1-z}\right| = 1$ lies on _____

(a) circle $x^2 + y^2 = 1$ (b) x-axis (c) y-axis (d) the lines $x+y = 1$

41) If $z = a + ib$ lies in quadrant then $\frac{\bar{z}}{z}$ also lies in the III quadrant if _____

(a) $a > b > 0$ (b) $a < b < 0$ (c) $b < a < 0$ (d) $b > a > 0$

42) $\frac{1+e^{-i\theta}}{1+e^{i\theta}}$ =_____

(a) $\cos\theta + i \sin\theta$ (b) $\cos\theta - i \sin\theta$ (c) $\sin\theta - i \cos\theta$ (d) $\sin\theta + i\cos\theta$

43) If $z^n = cos\frac{n\pi}{3} + isin\frac{n\pi}{3}$, then $z_1, z_2 \ldots\ldots z_6$ is _____

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

44) If $x = \cos\theta + i \sin\theta$, then the value of $x^n + \frac{1}{x^n}$ is _____

(a) $2 \cos\theta$ (b) $2i \sin n\theta$ (c) $2i \sin n\theta$ (d) $2i \cos n\theta$

45) If ω is the cube root of unity, then the value of $(1-\omega)(1-\omega^2)(1-\omega^4)(1-\omega^8)$ is _____

(a) 9 (b) -9 (c) 16 (d) 32

46) The points represented by 3 - 3i, 4 - 2i, 3 - i and 2 - 2i form _____ in the argand plane.

(a) collinear points (b) Vertices of a parallelogram (c) Vertices of a rectangle (d) Vertices of a square

47) $(1+i)^3$ = _____

(a) 3 + 3i (b) 1 + 3i (c) 3 - 3i (d) 2i - 2

48) $\frac{(cos\theta+isin\theta)^6}{(cos\theta-isin\theta)^5}$ = _____

(a) cos 11θ - isin 11θ (b) cos 11θ + isin 11θ (c) cosθ + i sinθ (d) $cos\frac{6\theta}{5}+isin\frac{6\theta}{5}$

49) If a = cos α + i sin α, b = -cos β + i sin β then $\left(ab-\frac{1}{ab}\right)$ is _____

(a) -2i sin(α - β) (b) 2i sin(α - β) (c) 2 cos(α - β) (d) -2 cos(α - β)

50) The conjugate of $\frac{1+2i}{1-(1-i)^2}$ is _____

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

51) The modular of $\frac{(-1+i)(1-i)}{1+i\sqrt{3}}$ is _____

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

52) The value of $\frac{(cos45^0+isin45^0)^2(cos30^0-isin30^0)}{cos30^0+isin30^0}$ is _____

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

53) If x = cos θ + i sin θ, then $x^n + \frac{1}{x^n}$ is _____

(a) 2 cos nθ (b) 2 i sin nθ (c) 2^n cosθ (d) 2^n i sinθ

54) If z_1, z_2, z_3 are the vertices of a parallelogram, then the fourth vertex z_4 opposite to z_2 is _____

(a) $z_1 + z_2 - z_2$ (b) $z_1 + z_2 - z_3$ (c) $z_1 + z_2 - z_3$ (d) $z_1 - z_2 - z_3$

55) If $x_r = cos\left(\frac{\pi}{2^r}\right)+isin\left(\frac{\pi}{2^r}\right)$ then $x_1, x_2, x_3 \ldots x_\infty$ is _____

(a) -∞ (b) -2 (c) -1 (d) 0

56) If $z = x + iy, x, y \in R$ and $3x + (3x - y)i = 4 - 6i$ then z = _____

(a) $\frac{4}{3}+i10$ (b) $\frac{4}{3}-i10$ (c) $-\frac{4}{3}+i10$ (d) $-\frac{4}{3}-i10$

57) The value of $\left[i^{19}+\left(\frac{1}{i}\right)^{25}\right]^2$ is _____

(a) 4 (b) -4 (c) 5 (d) -5

58) If $z = \frac{4+3i}{5-3i}$ then z^{-1} = _____

(a) $\frac{11}{25}-\frac{27}{25}i$ (b) $\frac{-11}{25}-\frac{27}{25}i$ (c) $\frac{-11}{25}+\frac{27}{25}i$ (d) $\frac{11}{25}+\frac{27}{25}i$

59) If the cube roots of unity are $1, \omega, \omega^2$ then $1+\omega+\omega^2 =$ _____

(a) 1 (b) 0 (c) -1 (d) ω

60) The complex numbers sin x + i cos 2x and cos x - i sin 2x are conjugates of each other for _____

(a) $x = k\pi, k \in Z$ (b) x = 0 (c) $x = \left(k+\frac{1}{2}\right)\pi, k \in Z$ (d) no value of x

61) If z = x + iy and |3z| = |z - 4| then $x^2 + y^2 + x$ = _____

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

62) The complex numbers z_1, z_2, and z_3 satisfying $\frac{z_1-z_3}{z_2-z_3}=\frac{1-i\sqrt{3}}{2}$ are the vertices of a triangle which is _____

(a) of area zero (b) right angled isosceles (c) equilateral (d) obtuse-angle isosceles

63) Let z, w be complex numbers such that $\bar{z}+i\bar{w}=0$ and arg $(\mathbf{zw}) = \pi$ then arg z = _____

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

64) If $\frac{(1+i)x-2i}{3+i}+\frac{(2-3i)\cdot y+i}{3-i}$ = i then $(x, y) =$ _____

(a) (3, 1) (b) (3, -1) (c) (-3, 1) (d) (- 3, - 1)

65) Let z be complex number with modulus 2 and argument $\frac{-2\pi}{3}$ then $z =$ _____

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

66) The small positive integer 'n' for which $(1 + i)^{2n} = (1 - i)^{2n}$ is _____

(a) 4 (b) 8 (c) 2 (d) 12

67) If z_1, z_2 are complex numbers and $|z_1 + z_2| = |z_1| + |z_2|$ then _____

(a) $\arg(z_1) + \arg(z_2) = 0$ (b) $\arg(z_1 z_2) = 0$ (c) $\arg(z_1) = \arg(z_2)$ (d) None of these

68) If a, b, c are integers, not all equal and ω is a cube root of unity $(\omega \neq 1)$ then the minimum value of $|a + b\omega + c\omega^2|$ is _____

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

69) If $x = a + b, y = a\alpha + b\beta$ and $z = a\beta + b\alpha,$ where $\alpha, \beta \neq 1$ are cube roots of unity, then x, y, z =_____

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

70) The equation $|z - i| + |z + i| = k$ represents an ellipse if k = _____

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

71) If z is a complex number satisfying $|z - i\,\mathrm{Re}(z)| = |z - \mathrm{Im}(z)|$ then z lies on _____

(a) $y = x$ (b) $y = -x$ (c) $x = \pm y$ (d) $y = -x + 1$

72) If ω is one of the cube root of unity other than 1, then $\begin{vmatrix} 1 & 1 & 1 \\ 1 & -1-\omega^2 & \omega^2 \\ 1 & \omega^2 & \omega^4 \end{vmatrix} =$ _____

(a) 3ω (b) $3\omega(\omega - 1)$ (c) $3\omega^2$ (d) $3\omega(1 - \omega)$

73) If $\begin{vmatrix} 6i & -3i & 1 \\ 4 & 3i & -1 \\ 20 & 3 & i \end{vmatrix} = x +$ iy then _____

(a) x = 3, y = 1 (b) x = 1, y = 3 (c) x = 0, y = 3 (d) x = 0, y = 0

74) If $= \cos\frac{\pi}{3} - i\sin\frac{\pi}{3}$ then $z^2 - z + 1 =$ _____

(a) - 2i (b) 2 (c) 0 (d) -2

75) If z_1, z_2 and z_3, are complex numbers such that $|z_1| = |z_2| = |z_3| = \left|\frac{1}{z_1} + \frac{1}{z_2} + \frac{1}{z_3}\right| = 1$ then $|z_1 + z_2 + z_3|$ is _____

(a) = 1 (b) < 1 (c) > 1 (d) 3

76) arg(0) is _____

(a) ∞ (b) 0 (c) π (d) undefined

77) All complex numbers z which satisfy the equation $\left|\frac{z-6i}{z+6i}\right| = 1$ lie on the _____

(a) real axis (b) imaginary axis (c) circle (d) ellipse

78) If $x = \frac{-1+i\sqrt{3}}{2}$ then the value of $x^2 + x + 1$ _____

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

79) The value of $\mathbf{i}^{201} + \mathbf{i}^{202} + \mathbf{i}^{203}$ is _____

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

80) If a = 3 +i and z =2-3i, then the points on the Argand diagram representing az, 3az and - az are

(a) Vertices of a right angled triangle (b) Vertices of an equilateral triangle (c) Vertices of an isosceles

(d) Collinear

81) The value of $\sum_{n=1}^{12} i^n$

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

82) The value of $\left(\frac{1+i}{\sqrt{2}}\right)^8 + \left(\frac{1-i}{\sqrt{2}}\right)^8$ is

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

83) arg $\left(\frac{3}{-1-i}\right)$=

(a) $\frac{-5\pi}{6}$ (b) $\frac{-2\pi}{3}$ (c) $\frac{3\pi}{4}$ (d) $\frac{-\pi}{2}$

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Sri Raghavendra Tuition Center

unit - 3 question

12th Standard

Maths

Date : 06-Feb-24

Reg.No. : | | | | | | |

Mr Deepak M. Sc., M. A., B. Ed., DCA., TET - 1.,TET - 2.,

Exam Time : 00:25:00 Hrs

Total Marks : 30

I. ANSWER ALL QUESTION 5 x 1 = 5

1) A zero of $x^3 + 64$ is

(a) 0 (b) 4 (c) 4i (d) -4

2) The number of real numbers in [0, 2π] satisfying $\sin^4 x - 2\sin^2 x + 1$ is

(a) 2 (b) 4 (c) 1 (d) ∞

3) The number of positive zeros of the polynomial $\sum_{j=0}^{n} n_{C_r}(-1)^r x^r$ is

(a) 0 (b) n (c) < n (d) r

4) If $p(x) = ax^2 + bx + c$ and $Q(x) = -ax^2 + dx + c$ where $ac \neq 0$ then $p(x).Q(x) = 0$ has at least _____ real roots.

(a) no (b) 1 (c) 2 (d) infinite

5) If α, β, γ are the roots of the equation $x^3 + ax - b = 0$ then the value of $\sum\left(\frac{\alpha}{\beta\gamma}\right)$ _____

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

II. ANSWER ALL QUESTION 2 x 2 = 4

6) Find a polynomial equation of minimum degree with rational coefficients, having $2-\sqrt{3}$ as a root.

7) If α, β and γ are the roots of the cubic equation $x^3 + 2x^2 + 3x + 4 = 0$, form a cubic equation whose roots are −α, -β, -γ

III. ANSWER ALL QUESTION 2 x 3 = 6

8) Solve the equation
$2x^3 - 9x^2 + 10x = 3$

9) Solve: $2\sqrt{\frac{x}{a}} + 3\sqrt{\frac{a}{x}} = \frac{b}{a} + \frac{6a}{b}$

III. ANSWER ALL QUESTION 3 x 5 = 15

10) If the equations $x^2 + px + q = 0$ and $x^2 + p'x + q' = 0$ have a common root, show that it must be equal to $\frac{pq'-p'q}{q-q'}$ or $\frac{q-q'}{p'-p}$.

11) Solve: $(2x-1)(x+3)(x-2)(2x+3)+20 = 0$

12) Solve the equation $6x^4 - 5x^3 - 38x^2 - 5x + 6 = 0$ if it is known that $\frac{1}{3}$ is a solution.

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Sri Raghavendra Tuition Center

unit - 4 annual creative one mark

12th Standard

Maths

Date : 06-Feb-24

Reg.No. : | | | | | | |

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App name: Archangel

Exam Time : 00:45:00 Hrs

Total Marks : 65

II. ANSWER ALL QUESTION 65 x 1 = 65

1) The value of $\sin^{-1}(\cos x)$, $0 \le x \le \pi$ is

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

2) If $\sin^{-1} x + \sin^{-1} y = \frac{2\pi}{3}$; then $\cos^{-1} x + \cos^{-1} y$ is equal to

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

3) $\sin^{-1}\frac{3}{5} - \cos^{-1}\frac{12}{13} + \sec^{-1}\frac{5}{3} - \operatorname{cosec}^{-1}\frac{13}{12}$ is equal to

(a) 2π (b) π (c) 0 (d) $\tan^{-1}\frac{12}{65}$

4) If $\sin^{-1}x = 2\sin^{-1}\alpha$ has a solution, then

(a) $|\alpha| \le \frac{1}{\sqrt{2}}$ (b) $|\alpha| \ge \frac{1}{\sqrt{2}}$ (c) $|\alpha| < \frac{1}{\sqrt{2}}$ (d) $|\alpha| > \frac{1}{\sqrt{2}}$

5) $\sin^{-1}(\cos x) = \frac{\pi}{2} - x$ is valid for

(a) $-\pi \le x \le 0$ (b) $0 \le x \le \pi$ (c) $-\frac{\pi}{2} \le x \le \frac{\pi}{2}$ (d) $-\frac{\pi}{4} \le x \le \frac{3\pi}{4}$

6) If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \frac{3\pi}{2}$, the value of $x^{2017} + y^{2018} + z^{2019} - \frac{9}{x^{101}+y^{101}+z^{101}}$ is

(a) 0 (b) 1 (c) 2 (d) 3

7) If $\cot^{-1} x = \frac{2\pi}{5}$ for some $x \in R$, the value of $\tan^{-1} x$ is

(a) $-\frac{\pi}{10}$ (b) $\frac{\pi}{5}$ (c) $\frac{\pi}{10}$ (d) $-\frac{\pi}{5}$

8) The domain of the function defined by $f(x) = \sin^{-1}\sqrt{x-1}$ is

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

9) If $x = \frac{1}{5}$, the value of $\cos(\cos^{-1}x + 2\sin^{-1}x)$ is

(a) $-\sqrt{\frac{24}{25}}$ (b) $\sqrt{\frac{24}{25}}$ (c) $\frac{1}{5}$ (d) $-\frac{1}{5}$

10) $\tan^{-1}\left(\frac{1}{4}\right) + \tan^{-1}\left(\frac{2}{9}\right)$ is equal to

(a) $\frac{1}{2}\cos^{-1}\left(\frac{3}{5}\right)$ (b) $\frac{1}{2}\sin^{-1}\left(\frac{3}{5}\right)$ (c) $\frac{1}{2}\tan^{-1}\left(\frac{3}{5}\right)$ (d) $\tan^{-1}\left(\frac{1}{2}\right)$

11) If the function $f(x) = \sin^{-1}(x^2 - 3)$, then x belongs to

(a) [-1, 1] (b) $[\sqrt{2}, 2]$ (c) $[-2, -\sqrt{2}] \cup [\sqrt{2}, 2]$ (d) $[-2, -\sqrt{2}]$

12) If $\cot^{-1} 2$ and $\cot^{-1} 3$ are two angles of a triangle, then the third angle is

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

13) $\sin^{-1}\left(\tan\frac{\pi}{4}\right) - \sin^{-1}\left(\sqrt{\frac{3}{x}}\right) = \frac{\pi}{6}$. Then x is a root of the equation

(a) $x^2 - x - 6 = 0$ (b) $x^2 - x - 12 = 0$ (c) $x^2 + x - 12 = 0$ (d) $x^2 + x - 6 = 0$

14) $\sin^{-1}(2\cos^2 x-1)+\cos^{-1}(1-2\sin^2 x)=$

(a) $\frac{\pi}{2}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{6}$

15) If $\cot^{-1}(\sqrt{\sin\alpha})+\tan^{-1}(\sqrt{\sin\alpha})=u$, then cos2u is equal to

(a) $\tan^2\alpha$ (b) 0 (c) -1 (d) $\tan 2\alpha$

16) If $|x|\leq 1$, then $2\tan^{-1} x-\sin^{-1}\frac{2x}{1+x^2}$ is equal to

(a) $\tan^{-1}x$ (b) $\sin^{-1}x$ (c) 0 (d) π

17) The equation $\tan^{-1} x-\cot^{-1} x=\tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$ has

(a) no solution (b) unique solution (c) two solutions (d) infinite number of solutions

18) If $\sin^{-1} x+\cot^{-1}\left(\frac{1}{2}\right)=\frac{\pi}{2}$, then x is equal to

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

19) If $\sin^{-1}\frac{x}{5}+\operatorname{cosec}^{-1}\frac{5}{4}=\frac{\pi}{2}$, then the value of x is

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

20) $\sin(\tan^{-1}x)$, $|x|<1$ is equal to

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

21) If $tan^{-1}\left\{\frac{\sqrt{1+x^2}-\sqrt{1-x^2}}{\sqrt{1+x^2}+\sqrt{1-x^2}}\right\}=\alpha$ then x^2 = _____

(a) $sin2\alpha$ (b) $sin\alpha$ (c) $cos2\alpha$ (d) $cos\alpha$

22) If $sin^{-1}x-cos^{-1}x=\frac{\pi}{6}$ then _____

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

23) The number of solutions of the equation $tan^{-1}2x+tan^{-1}3x=\frac{\pi}{4}$ _____

(a) 2 (b) 3 (c) 1 (d) none

24) If $\alpha=tan^{-1}\left(tan\frac{5\pi}{4}\right)$ and $\beta=tan^{-1}\left(-tan\frac{2\pi}{3}\right)$ then _____

(a) $4\alpha=3\beta$ (b) $3\alpha=4\beta$ (c) $\alpha-\beta=\frac{7\pi}{12}$ (d) none

25) The number of real solutions of the equation \(\sqrt { 1+cos2x } ={ 2sin }^{ -1 }\left(sinx \right) ,-\pi is _____

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

26) If $\alpha=tan^{-1}\left(\frac{\sqrt{3}}{2y-x}\right),\beta=tan^{-1}\left(\frac{2x-y}{\sqrt{3y}}\right)$ then $\alpha-\beta$ _____

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

27) $tan^{-1}\left(\frac{1}{4}\right)+tan^{-1}\left(\frac{2}{11}\right)$ = _____

(a) 0 (b) $\frac{1}{2}$ (c) -1 (d) none

28) If $\tan^{-1}(3)+\tan^{-1}(x)=\tan^{-1}(8)$ then x = _____

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

29) The value of $cos^{-1}\left(\cos\frac{5\pi}{3}\right)+sin^{-1}\left(\sin\frac{5\pi}{3}\right)$ is _____

(a) $\frac{\pi}{2}$ (b) $\frac{5\pi}{3}$ (c) $\frac{10\pi}{3}$ (d) 0

30) $sin\left\{2cos^{-1}\left(\frac{-3}{5}\right)\right\}=$ _____

(a) $\frac{6}{15}$ (b) $\frac{24}{25}$ (c) $\frac{4}{5}$ (d) $\frac{-24}{25}$

31) If $4cos^{-1}x+sin^{-1}x=\pi$ then x is _____

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

32) If $tan^{-1}\left(\frac{x+1}{x-1}\right)+tan^{-1}\left(\frac{x-1}{x}\right)=tan^{-1}(-7)$ then x is _____

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

33) If $cos^{-1}x>x>sin^{-1}x$ then _____

(a) \(\cfrac { 1 }{ \sqrt { 2 } }\) (b) $0\leq x<\frac{1}{\sqrt{2}}$ (c) $-1\leq x<\frac{1}{\sqrt{2}}$ (d) x > 0

34) In a ΔABC if C is a right angle, then $tan^{-1}\left(\frac{a}{b+c}\right)+tan^{-1}\left(\frac{b}{c+a}\right)=$ _____

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{4}$ (c) $\frac{5\pi}{2}$ (d) $\frac{\pi}{6}$

35) $cot\left(\frac{\pi}{4} - cot^{-1}3\right)$

(a) 7 (b) 6 (c) 5 (d) none

36) If $\tan^{-1}(\cot\theta) = 2\theta$, then θ = _____

(a) ± 3 (b) $\pm\frac{\pi}{4}$ (c) $\pm\frac{\pi}{6}$ (d) none

37) The domain of $\cos^{-1}(x^2 - 4)$ is_____

(a) [3, 5] (b) [-1, 1] (c) $\left[-\sqrt{5}, -\sqrt{3}\right] \cup \left[\sqrt{3}, \sqrt{5}\right]$ (d) [0, 1]

38) The value of $\tan\left(cos^{-1}\frac{3}{5} + tan^{-1}\frac{1}{4}\right)$ is _____

(a) $\frac{19}{8}$ (b) $\frac{8}{19}$ (c) $\frac{19}{12}$ (d) $\frac{3}{4}$

39) The value of $\sin 2(\tan^{-1} 0.75)$ is _____

(a) 0.75 (b) 1.5 (c) 0.96 (d) $\sin^{-1}(1.5)$

40) If x > 1, then $2tan^{-1}x + sin^{-1}\left(\frac{2x}{1+x^2}\right)$ _____

(a) $4\tan^{-1}x$ (b) 0 (c) $\frac{\pi}{2}$ (d) π

41) If $\theta = sin^{-1}\left(sin(-60^0)\right)$ then one of the possible values of θ is _____

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{2}$ (c) $\frac{2\pi}{3}$ (d) $\frac{-2\pi}{3}$

42) The value of $sin^{-1}\left(cos\frac{33\pi}{5}\right)$ is_____

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

43) If x < 0, y < 0 such that xy = 1, then $\tan^{-1}(x) + \tan^{-1}(y)$ =_____

(a) $\frac{\pi}{2}$ (b) $\frac{-\pi}{2}$ (c) $-\pi$ (d) none

44) The pricipal value of $sin^{-1}\left(\frac{-1}{2}\right)$ is _____

(a) $\frac{\pi}{6}$ (b) $\frac{-\pi}{6}$ (c) $\frac{\pi}{3}$ (d) $\frac{-\pi}{3}$

45) $tan^{-1}\left(tan\frac{9\pi}{8}\right)$

(a) $\frac{9\pi}{8}$ (b) $\frac{-9\pi}{8}$ (c) $\frac{\pi}{8}$ (d) $\frac{-\pi}{8}$

46) The value of $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$ is _____

(a) $\frac{\pi}{6}$ (b) $-\frac{\pi}{6}$ (c) $\frac{7\pi}{6}$ (d) $\frac{5\pi}{6}$

47) The principal value of $\sin^{-1}\left\{\sin\frac{5\pi}{6}\right\}$ is _____

(a) $\frac{\pi}{6}$ (b) $\frac{5\pi}{6}$ (c) $\frac{7\pi}{6}$ (d) None of these

48) The value of $\sin\left[\frac{\pi}{3} - \sin^{-1}\left(-\frac{1}{2}\right)\right]$ is _____

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

49) The value of $\sin\left[arc\,cos\left(\frac{-1}{2}\right)\right]$ is _____

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

50) The principal value of $\cos^{-1}(\cos 5)$ is _____

(a) 5 (b) $\pi - 5$ (c) $5 - \pi$ (d) $2\pi - 5$

51) The value of $\cos\left[\frac{\pi}{6} + \cos^{-1}\left(\frac{-1}{2}\right)\right]$ is equal to _____

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

52) The value of $\sin^{-1}(\sin 12) + \cos^{-1}(\cos 12)$ is equal to _____

(a) Zero (b) $24 - 2\pi$ (c) $4\pi - 24$ (d) None of these

53) The value of $\sin^{-1}\left[\cos\left(\sin^{-1}\sqrt{\left(\frac{2-\sqrt{3}}{4}\right)} + \cos^{-1}\frac{\sqrt{12}}{4} + \sec^{-1}\sqrt{2}\right)\right]$ is _____

(a) 0 (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{6}$ (d) $\frac{\pi}{2}$

54) Solution of the equation $\cot^{-1}x + \sin^{-1}\frac{1}{\sqrt{5}} = \frac{\pi}{4}$ _____

(a) x = 3 (b) $x = \frac{1}{\sqrt{5}}$ (c) x = 0 (d) None of these

55) $\cos\left[\tan^{-1}\left\{\sin\left(\cot^{-1}x\right)\right\}\right]$ is equal to _____

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

56) The value of $\sin\left[\sin^{-1}\frac{\sqrt{5}}{4}+\tan^{-1}\sqrt{\frac{5}{11}}\right]$ is _____

(a) $\frac{\sqrt{5}}{4\sqrt{11}}$ (b) $\frac{4}{\sqrt{35}}$ (c) $\frac{\sqrt{55}}{8}$ (d) None of these

57) If $\sin^{-1}\alpha+\sin^{-1}\beta+\sin^{-1}\gamma=\frac{3\pi}{2}$, then $\alpha\beta+\alpha\gamma+\beta\gamma$ is equal to _____

(a) 1 (b) 0 (c) 3 (d) -3

58) If $\sum_{i=1}^{2n}\cos^{-1}x=0$, then $\sum_{i=1}^{2n}x$ is _____

(a) n (b) 2n (c) $\frac{n(n+1)}{2}$ (d) None of these

59) If $\sin\left(\sin^{-1}\frac{1}{5}+\cos^{-1}x\right)=1$ then x is equal to

(a) 1 (b) 0 (c) $\frac{4}{5}$ (d) $\frac{1}{5}$

60) If $\sin^{-1}x-\cos^{-1}x=\frac{\pi}{6}$ then x is _____

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

61) If $a\le\tan^{-1}x+\cot^{-1}x+\sin^{-1}x\le b$, then _____

(a) $a=0,b=\pi$ (b) $b=\frac{\pi}{2}$ (c) $a=\frac{\pi}{4}$ (d) None of these

62) If $\sin^{-1}\left(x-\frac{x}{2}+\frac{x}{4}-\ldots\right)+\cos^{-1}\left(x-\frac{x}{2}+\frac{x}{4}-\ldots\right)=\frac{\pi}{2}$ For $0<|x|<\sqrt{2}$, then x equals _____

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

63) If $\cos^{-1}x>\sin^{-1}x$ then _____

(a) x < 0 (b) -1 < x < 0 (c) $0\le x<\frac{1}{\sqrt{2}}$ (d) $-1\le x<\frac{1}{\sqrt{2}}$

64) Find the principal value of $\sin^{-1}\left(-\frac{1}{2}\right)$ is

(a) $-\frac{\pi}{6}$ (b) $-\frac{\pi}{4}$ (c) 0 (d) $\frac{\pi}{2}$

65) The value of $\sin^{-1}\left(\frac{1}{2}\right)+\cos^{-1}\left(\frac{1}{2}\right)$ is

(a) 0 (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{3}$ (d) π

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Sri Raghavendra Tuition Center

Unit - 4 Qp

12th Standard

Maths

Date : 07-Feb-24

Reg.No. : | | | | | | |

பி.தீபக் M.Sc., M.A., B.Ed., DCA., TET-1., TET - 2.,

Exam Time : 00:45:00 Hrs

Total Marks : 25

I. Answer all Question 5 x 1 = 5

1) $\sin^{-1}(\cos x) = \frac{\pi}{2} - x$ is valid for

(a) $-\pi \leq x \leq 0$ (b) $0 \leq x \leq \pi$ (c) $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$ (d) $-\frac{\pi}{4} \leq x \leq \frac{3\pi}{4}$

2) Find the principal value of $\sin^{-1}\left(-\frac{1}{2}\right)$ is

(a) $-\frac{\pi}{6}$ (b) $-\frac{\pi}{4}$ (c) 0 (d) $\frac{\pi}{2}$

3) $\tan^{-1}\left(\frac{1}{4}\right) + \tan^{-1}\left(\frac{2}{9}\right)$ is equal to

(a) $\frac{1}{2}\, cos^{-1}\left(\frac{3}{5}\right)$ (b) $\frac{1}{2} sin^{-1}\left(\frac{3}{5}\right)$ (c) $\frac{1}{2} tan^{-1}\left(\frac{3}{5}\right)$ (d) $tan^{-1}\left(\frac{1}{2}\right)$

4) The value of $\sin^{-1}(\frac{1}{2}) + \cos^{-1}(\frac{1}{2})$ is

(a) 0 (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{3}$ (d) π

5) If $\sin^{-1}\frac{x}{5} + \text{cosec}^{-1}\frac{5}{4} = \frac{\pi}{2}$, then the value of x is

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

II.Answer all Question 2 x 2 = 4

6) For what value of x, the inequality $\frac{\pi}{2} < cos^{-1}(3x - 1) < \pi$ holds?

7) Solve $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$, if $6x^2 < 1$

III.Answer all Question 2 x 3 = 6

8) If $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = \pi$ and $0 < x, y, z < 1$, show that $x^2 + y^2 + z^2 + 2xyz = 1$

9) Solve $2tan^{-1}x = cos^{-1}\frac{1-a^2}{1+a^2} - cos^{-1}\frac{1-b^2}{1+b^2}, a > 0, b > 0$

IV. Answer all Question 2 x 5 = 10

10) Prove that $\tan^{-1} x + \tan^{-1} z = \tan^{-1}\left[\frac{x+y+z-xyz}{1-xy-yz-zx}\right]$

11) Find the number of solution of the equation $\tan^{-1}(x-1) + \tan^{-1}x + \tan^{-1}(x + 1) = \tan^{-1}(3x)$

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Sri Raghavendra Tuition Center

unit - 6 annual creative one mark

12th Standard

Maths

Date : 07-Feb-24

Reg.No. : | | | | | | |

பி.தீபக் M.Sc., M.A., B.Ed., DCA., TET-1., TET - 2.,

App: Archangel (playstore)

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Place: Kattuputhur, Trichy (Dt)

Exam Time : 00:45:00 Hrs

Total Marks : 91

I. ANSWER ALL QUESTION 91 x 1 = 91

1) If $\vec{a}$ and $\vec{b}$ are parallel vectors, then $[\vec{a}, \vec{c}, \vec{b}]$ is equal to

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

2) If a vector $\vec{\alpha}$ lies in the plane of $\vec{\beta}$ and $\vec{\gamma}$, then

(a) $[\vec{\alpha}, \vec{\beta}, \vec{\gamma}] = 1$ (b) $[\vec{\alpha}, \vec{\beta}, \vec{\gamma}] = -1$ (c) $[\vec{\alpha}, \vec{\beta}, \vec{\gamma}] = 0$ (d) $[\vec{\alpha}, \vec{\beta}, \vec{\gamma}] = 2$

3) If $\vec{a}.\vec{b} = \vec{b}.\vec{c} = \vec{c}.\vec{a} = 0$, then the value of $[\vec{a}, \vec{b}, \vec{c}]$ is

(a) $|\vec{a}||\vec{b}||\vec{c}|$ (b) $\frac{1}{3}|\vec{a}||\vec{b}||\vec{c}|$ (c) 1 (d) -1

4) If $\vec{a}, \vec{b}, \vec{c}$ are three unit vectors such that $\vec{a}$ is perpendicular to $\vec{b}$ and is parallel to $\vec{c}$ then $\vec{a} \times (\vec{b} \times \vec{c})$ is equal to

(a) $\vec{a}$ (b) $\vec{b}$ (c) $\vec{c}$ (d) $\vec{0}$

5) If $[\vec{a}, \vec{b}, \vec{c}] = 1$, then the value of $\frac{\vec{a}\cdot(\vec{b}\times\vec{c})}{(\vec{c}\times\vec{a})\cdot\vec{b}} + \frac{\vec{b}\cdot(\vec{c}\times\vec{a})}{(\vec{a}\times\vec{b})\cdot\vec{c}} + \frac{\vec{c}\cdot(\vec{a}\times\vec{b})}{(\vec{c}\times\vec{b})\cdot\vec{a}}$ is

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

6) The volume of the parallelepiped with its edges represented by the vectors $\hat{i}+\hat{j}, \hat{i}+2\hat{j}, \hat{i}+\hat{j}+\pi\hat{k}$ is

(a) $\frac{\pi}{2}$ (b) $\frac{\pi}{3}$ (c) π (d) $\frac{\pi}{4}$

7) If $\vec{a}$ and $\vec{b}$ are unit vectors such that $[\vec{a}, \vec{b}, \vec{a} \times \vec{b}] = \frac{1}{4}$, then the angle between $\vec{a}$ and $\vec{b}$ is

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$

8) If $\vec{a} = \hat{i}+\hat{j}+\hat{k}$, $\vec{b} = \hat{i}+\hat{j}$, $\vec{c} = \hat{i}$ and $(\vec{a} \times \vec{b}) \times \vec{c} = \lambda\vec{a} + \mu\vec{b}$, then the value of $\lambda + \mu$ is

(a) 0 (b) 1 (c) 6 (d) 3

9) If $\vec{a}, \vec{b}, \vec{c}$ are non-coplanar, non-zero vectors such that $[\vec{a}, \vec{b}, \vec{c}] = 3$, then $\{[\vec{a} \times \vec{b}, \vec{b} \times \vec{c}, \vec{c} \times \vec{a}]\}^2$ is equal to

(a) 81 (b) 9 (c) 27 (d) 18

10) If $\vec{a}, \vec{b}, \vec{c}$ are three non-coplanar vectors such that $\vec{a} \times (\vec{b} \times \vec{c}) = \frac{\vec{b}+\vec{c}}{\sqrt{2}}$, then the angle between $\vec{a}$ *and* $\vec{b}$ is

(a) $\frac{\pi}{2}$ (b) $\frac{3\pi}{4}$ (c) $\frac{\pi}{4}$ (d) π

11) If the volume of the parallelepiped with $\vec{a} \times \vec{b}, \vec{b} \times \vec{c}, \vec{c} \times \vec{a}$ as coterminous edges is 8 cubic units, then the volume of the parallelepiped with $(\vec{a} \times \vec{b}) \times (\vec{b} \times \vec{c}), (\vec{b} \times \vec{c}) \times (\vec{c} \times \vec{a})$ and $(\vec{c} \times \vec{a}) \times (\vec{a} \times \vec{b})$as coterminous edges is,

(a) 8 cubic units (b) 512 cubic units (c) 64 cubic units (d) 24 cubic units

12) Consider the vectors $\vec{a}, \vec{b}, \vec{c}, \vec{d}$ such that $(\vec{a} \times \vec{b}) \times (\vec{c} \times \vec{d}) = \vec{0}$ Let P_1 and P_2 be the planes determined by the pairs of vectors $\vec{a}, \vec{b}$ and $\vec{c}, \vec{d}$ respectively. Then the angle between P_1 and P_2 is

(a) 0° (b) 45° (c) 60° (d) 90°

13) If $\vec{a} \times (\vec{b} \times \vec{c}) = (\vec{a} \times \vec{b}) \times \vec{c}$ where $\vec{a}, \vec{b}, \vec{c}$ are any three vectors such that $\vec{b} \cdot \vec{c} \neq 0$ and $\vec{a} \cdot \vec{b} \neq 0$, then $\vec{a}$ and $\vec{c}$ are

(a) perpendicular (b) parallel (c) inclined at an angle $\frac{\pi}{3}$ (d) inclined at an angle $\frac{\pi}{6}$

14) If $\vec{a} = 2\hat{i} + 3\hat{j} - \hat{k}, \vec{b} = \hat{i} + 2\hat{j} - 5\hat{k}, \vec{c} = 3\hat{i} + 5\hat{j} - \hat{k}$, then a vector perpendicular to $\vec{a}$ and lies in the plane containing $\vec{b}$ and $\vec{c}$ is

(a) $-17\hat{i} + 21\hat{j} - 97\hat{k}$ (b) $17\hat{i} + 21\hat{j} - 123\hat{k}$ (c) $-17\hat{i} - 21\hat{j} + 97\hat{k}$ (d) $-17\hat{i} - 21\hat{j} - 97\hat{k}$

15) The angle between the lines $\frac{x-2}{3} = \frac{y+1}{-2}, z = 2$ and $\frac{x-1}{1} = \frac{2y+3}{3} = \frac{z+5}{2}$ is

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$

16) If the line $\frac{x-2}{3} = \frac{y-1}{-5} = \frac{z+2}{2}$ lies in the plane x + 3y - αz + β = 0, then (α, β) is

(a) (-5, 5) (b) (-6, 7) (c) (5, -5) (d) (6, -7)

17) The angle between the line $\vec{r} = (\hat{i} + 2\hat{j} - 3\hat{k}) + t(2\hat{i} + \hat{j} - 2\hat{k})$ and the plane $\vec{r}.(\hat{i} + \hat{j}) + 4 = 0$ is

(a) 0° (b) 30° (c) 45° (d) 90°

18) The coordinates of the point where the line $\vec{r} = (6\hat{i} - \hat{j} - 3\hat{k}) + t(-\hat{i} + 4\hat{j})$ meets the plane $\vec{r}.(\hat{i} + \hat{j} - \hat{k}) = 3$ are

(a) (2, 1, 0) (b) (7, -1, -7) (c) (1, 2, -6) (d) (5, -1, 1)

19) Distance from the origin to the plane 3x − 6y + 2z + 7 = 0 is

(a) 0 (b) 1 (c) 2 (d) 3

20) The distance between the planes x + 2y + 3z + 7 = 0 and 2x + 4y + 6z + 7 = 0

(a) $\frac{\sqrt{7}}{2\sqrt{2}}$ (b) $\frac{7}{2}$ (c) $\frac{\sqrt{7}}{2}$ (d) $\frac{7}{2\sqrt{2}}$

21) If the direction cosines of a line are $\frac{1}{c}, \frac{1}{c}, \frac{1}{c}$, then

(a) $c = \pm 3$ (b) $c = \pm\sqrt{3}$ (c) c > 0 (d) 0 < c < 1

22) The vector equation $\vec{r} = (\hat{i} - 2\hat{j} - \hat{k}) + t(6\hat{j} - \hat{k})$ represents a straight line passing through the points

(a) (0, 6, −1) and (1, −2, −1) (b) (0, 6, −1) and (-1, −4, −2) (c) (1, -2, -1) and (1, 4, -2) (d) (1, -2, -1) and (0, -6, 1)

23) If the distance of the point (1, 1, 1) from the origin is half of its distance from the plane x + y + z + k = 0, then the values of k are

(a) ±3 (b) ±6 (c) -3, 9 (d) 3, -9

24) If the planes $\vec{r}.(2\hat{i} - \lambda\hat{j} + \hat{k}) = 3$ and $\vec{r}.(4\hat{i} + \hat{j} - \mu\hat{k}) = 5$ are parallel, then the value of λ and μ are

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

25) If the length of the perpendicular from the origin to the plane 2x + 3y + λz =1, λ > 0 is $\frac{1}{5}$, then the value of λ is

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

26) The vector, $\hat{i} + \hat{j} + 2\hat{k}, \hat{i} + \lambda\hat{j} - \hat{k}$ and $2\hat{i} - \hat{j} + \lambda\hat{k}$ are co-planar if _____

(a) λ = -2 (b) $\lambda = 1+\sqrt{3}$ (c) $\lambda = 1 - \sqrt{3}$ (d) $\lambda = -2, 1 \pm \sqrt{3}$

27) Let $\vec{a}, \vec{b}$ and $\vec{c}$ be three non- coplanar vectors and let $\vec{p}, \vec{q}, \vec{r}$ be the vectors defined by the relations $\vec{P} = \frac{\vec{b} \times \vec{c}}{[\vec{a}\vec{b}\vec{c}]}, \vec{q} = \frac{\vec{c} \times \vec{a}}{[\vec{a}\vec{b}\vec{c}]}, \vec{r} = \frac{\vec{a} \times \vec{b}}{[\vec{a}\vec{b}\vec{c}]}$ Then the value of $(\vec{a} + \vec{b}).\vec{p} + (\vec{b} + \vec{c}).\vec{q} + (\vec{c} + \vec{a}).\vec{r}$= _____

(a) 0 (b) 1 (c) 2 (d) 3

28) The number of vectors of unit length perpendicular to the vectors $(\hat{i} + \hat{j})$ and $(\hat{j} + \hat{k})$ is _____

(a) 1 (b) 2 (c) 3 (d) ∞

29) If $\vec{d} = \vec{a} \times (\vec{b} \times \vec{c}) + \vec{b} \times (\vec{c} \times \vec{a}) + \vec{c} \times (\vec{a} + \vec{b})$, then _____

(a) $|\vec{d}|$ (b) $\vec{d} = \vec{a} + \vec{b} + \vec{c}$ (c) $\vec{d} = \vec{0}$ (d) a, b, c are coplanar

30) If $\vec{a}$ and $\vec{b}$ are two unit vectors, then the vectors $(\vec{a} + \vec{b}) \times (\vec{a} \times \vec{b})$ is parallel to the vector _____

(a) $\vec{a} - \vec{b}$ (b) $\vec{a} + \vec{b}$ (c) $2\vec{a} - \vec{b}$ (d) $2\vec{a} + \vec{b}$

31) The area of the parallelogram having diagonals $\vec{a} = 3\hat{i} + \hat{j} - 2\hat{k}$ and $\vec{b} = \hat{i} - 3\hat{j} + 4\hat{k}$ is _____

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

32) If $\vec{a}$, $\vec{b}$ and $\vec{c}$ are any three vectors, then $\vec{a} \times \left(\vec{b} \times \vec{c}\right) = \vec{a} \times \left(\vec{b} \times \vec{c}\right)$ if and only if _____

(a) $\vec{b}$, $\vec{c}$ are collinear (b) $\vec{a}$ and $\vec{c}$ are collinear (c) $\vec{a}$ and $\vec{b}$ are collinear (d) none

33) The volume of the parallelepiped whose sides are given by $\overrightarrow{OA} = 2\hat{i} - 3\hat{j}$, $\overrightarrow{OB} = \hat{i} + \hat{j} - \hat{k}$ and $\overrightarrow{OC} = 3\hat{i} - \hat{k}$ is _____

(a) $\frac{4}{13}$ (b) 4 (c) $\frac{2}{7}$ (d) $\frac{4}{9}$

34) If $\left|\vec{a}\right| = \left|\vec{b}\right| = 1$such that $\vec{a} + 2\vec{b}$ and $5\vec{a} - \vec{b}$ are perpendicular to each other, then the angle between $\vec{a}$ and $\vec{b}$ is _____

(a) 45° (b) 60° (c) $\cos^{-1}\left(\frac{1}{3}\right)$ (d) $\cos^{-1}\left(\frac{2}{7}\right)$

35) The angle between the vector $3\hat{i} + 4\hat{j} + 5\hat{k}$ and the z-axis is _____

(a) 30° (b) 60° (c) 45° (d) 90°

36) The p.v, OP of a point P make angles 60° and 45° with X and Y axis respectively. The angle of inclination of $\overrightarrow{OP}$ with z-axis is _____

(a) 75° (b) 60° (c) 45° (d) 3

37) If $\vec{a} = \hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{b} = -\hat{i} + 2\hat{j} + \hat{k}$, $\vec{c} = 3\hat{i} + \hat{j}$ then $\vec{a} + \left(-\vec{b}\right)$ will be perpendiculur to $\vec{c}$ only when t = _____

(a) 5 (b) 4 (c) 3 (d) $\frac{7}{3}$

38) If θ is the angle between the vectors $\vec{a}$ and $\vec{b}$, then sin θ is _____

(a) $\frac{\vec{a}.\vec{b}}{\left|\vec{a}\right|\left|\vec{b}\right|}$ (b) $\frac{\left|\vec{a}\times\vec{b}\right|}{\vec{a}.\vec{b}}$ (c) $\sqrt{1-\left(\frac{\vec{a}.\vec{b}}{\left|\vec{a}\right|\left|\vec{b}\right|}\right)^2}$ (d) 0

39) If the vector $\hat{i} + \hat{j} + 2\hat{k}$, $-\hat{i} + 2\hat{k}$ and $2\hat{i} + x\hat{j} - y\hat{k}$ are mutually orthogonal, then the values of x, y, z are _____

(a) (10, 4, 1) (b) (-10, 4, 1) (c) (-10, -4, $\frac{1}{2}$) (d) (-10, 4, $\frac{1}{2}$)

40) If $\vec{a} = \left|\vec{a}\right|\vec{e}$ then $\vec{e}.\vec{e}$ is _____

(a) 0 (b) e (c) 1 (d) $\vec{0}$

41) The value of $\left|\vec{a} + \vec{b}\right|^2 + \left|\vec{a} - \vec{b}\right|^2$ is _____

(a) $2\left(\left|\vec{a}\right|^2 + \left|\vec{b}\right|^2\right)$ (b) $4\ \vec{a}.\vec{b}$ (c) $2\left(\left|\vec{a}\right|^2 - \left|\vec{b}\right|^2\right)$ (d) $4\ \left|\vec{a}\right|^2\left|\vec{b}\right|^2$

42) If $\vec{p} \times \vec{q} = 2\hat{i} + 3\hat{j}$, $\vec{r} \times \vec{s} = 3\hat{i} + 2\hat{k}$ then $\vec{p}.\left(\vec{q}\left(\vec{r} \times \vec{s}\right)\right)$ is _____

(a) 9 (b) 6 (c) 2 (d) 5

43) If the work done by a force $\vec{F} = \hat{i} + m\hat{j} - \hat{k}$ in moving the point of application from(1, 1, 1) to (3, 3, 3) along a straight line is 12 units, then m is _____

(a) 5 (b) 2 (c) 3 (d) 6

44) The two planes 3x + 3y - 3z - 1 = 0 and x + y - z + 5 = 0 are _____

(a) mutually perpendicular (b) parallel (c) inclined at 45° (d) inclined at 30

45) The straight lines $\frac{x-3}{2} = \frac{y+5}{4} = \frac{z-1}{-13}$ and $\frac{x+1}{3} = \frac{y-4}{5} = \frac{z+2}{2}$ are _____

(a) parallel (b) perpendicular (c) inclined at 45° (d) none

46) For what value of $\left(\vec{a}\right)$ will the straight lines $\frac{x+2}{a} = \frac{y}{3} = \frac{z-1}{4}$and $\frac{x-3}{a} = \frac{y-1}{4} = \frac{z-7}{a}$be perpendicular?

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

47) If $\left[\vec{a}, \vec{b}, \vec{c}\right]$= 3 and $\left|\vec{c}\right| = 1$ then $\left|\left(\vec{b} \times \vec{c}\right) \times \left(\vec{c} \times \vec{a}\right)\right|$ is _____

(a) 1 (b) 3 (c) 6 (d) 9

48) If $\lambda\hat{i} + 2\lambda\hat{j} + 2\lambda\hat{k}$ is a unit vector, then the value of λ is _____

(a) $\pm\frac{1}{3}$ (b) $\pm\frac{1}{4}$ (c) $\pm\frac{1}{9}$ (d) $\frac{1}{2}$

49) For any three vectors $\vec{a}, \vec{b}$ and $\vec{c}$, $\left(\vec{a}+\vec{b}\right).\left(\vec{b}+\vec{c}\right)\times\left(\vec{c}+\vec{a}\right)$ is _____

(a) 0 (b) $\left[\vec{a},\vec{b},\vec{c}\right]$ (c) $2\left[\vec{a},\vec{b},\vec{c}\right]$ (d) $\left[\vec{a},\vec{b},\vec{c}\right]^2$

50) If the vectors $a\hat{i}+\hat{j}+\hat{k}$, $\hat{i}+b\hat{j}+\hat{k}$ and $\hat{i}+\hat{j}+c\hat{k}$ (a ≠ b ≠ c ≠ 1) are coplaner, then $\frac{1}{1-a}+\frac{1}{1-b}+\frac{1}{1-c}$ = _____

(a) 0 (b) 1 (c) 2 (d) $\frac{abc}{(1-a)(1-b)(1-c)}$

51) The angle between the planes 2x + y - z = 9 and x + 2y + z = 7 is_____

(a) $\cos^{-1}(5/6)$ (b) $\cos^{-1}(5/36)$ (c) $\cos^{-1}(1/2)$ (d) $\cos^{-1}(1/12)$

52) The unit normal vector to the plane 2x + 3y + 4z = 5 is _____

(a) $\frac{2}{\sqrt{29}}\hat{i}+\frac{3}{\sqrt{29}}\hat{j}+\frac{4}{\sqrt{29}}\hat{k}$ (b) $\frac{2}{\sqrt{29}}\hat{i}-\frac{3}{\sqrt{29}}\hat{j}+\frac{4}{\sqrt{29}}\hat{k}$ (c) $\frac{2}{\sqrt{29}}\hat{i}-\frac{3}{\sqrt{29}}\hat{j}-\frac{4}{\sqrt{29}}\hat{k}$ (d) $\frac{2}{5}\hat{i}+\frac{3}{5}\hat{j}+\frac{4}{5}\hat{k}$

53) The work done by the force $\vec{F}=\hat{i}+\hat{j}+\hat{k}$ acting on a particle, if the particle is displaced from A(3, 3, 3) to the point B(4, 4, 4) is _____ units

(a) 2 (b) 3 (c) 4 (d) 7

54) The angle between the vectors $\hat{i}-\hat{j}$ and $\hat{j}-\hat{k}$ is _____

(a) $\frac{\pi}{3}$ (b) $\frac{-2\pi}{3}$ (c) $\frac{-\pi}{3}$ (d) $\frac{2\pi}{3}$

55) The unit normal vectors to the plane 2x - y + 2z = 5 are _____

(a) $2\hat{i}-\hat{j}+2\hat{k}$ (b) $\frac{1}{3}\left(2\hat{i}-\hat{j}+2\hat{k}\right)$ (c) $-\frac{1}{3}\left(2\hat{i}-\hat{j}+2\hat{k}\right)$ (d) $\pm\frac{1}{3}\left(2\hat{i}-\hat{j}+2\hat{k}\right)$

56) The distance from the origin to the plane $\vec{r}.\left(2\hat{i}-\hat{j}+5\hat{k}\right)=7$ is _____

(a) $\frac{7}{\sqrt{30}}$ (b) $\frac{\sqrt{30}}{7}$ (c) $\frac{30}{7}$ (d) $\frac{7}{30}$

57) If $\vec{a},\vec{b},\vec{c}$ are mutually $\perp^r$ unit vectors, then $\left|\vec{a}+\vec{b}+\vec{c}\right|$ is _____

(a) 3 (b) 9 (c) $3\sqrt{3}$ (d) $\sqrt{3}$

58) Let $\vec{u},\vec{v},\vec{w}$ be vectors such that $\vec{u}+\vec{v}+\vec{w}=\vec{0}$. If $\left|\vec{u}\right|=3$, $\left|\vec{v}\right|=4$, $\left|\vec{w}\right|=5$ then $\vec{u}.\vec{v}+\vec{v}.\vec{w}+\vec{w}.\vec{u}$ is _____

(a) 25 (b) -25 (c) 5 (d) $\sqrt{5}$

59) The length of the $\perp^r$ from the origin to plane $\vec{r}.\left(3\hat{i}+4\hat{j}+12\hat{k}\right)=26$ is _____

(a) 2 (b) $\frac{1}{2}$ (c) 26 (d) $\frac{26}{169}$

60) If $\left|\vec{a}\times\vec{b}\right|=\vec{a}.\vec{b}$, then the angle between the vector $\vec{a}$ and $\vec{b}$ is _____

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{6}$ (d) $\frac{\pi}{2}$

61) The value of $\left|\vec{a}+\vec{i}\right|^2+\left|\vec{a}+\vec{j}\right|^2+\left|\vec{a}+\vec{k}\right|^2$ if $|a|=1$ is _____

(a) 0 (b) 1 (c) 2 (d) 3

62) If $\vec{a},\vec{b},\vec{c}$ are three non - coplanar vectors, then $\frac{\vec{a}.\vec{b}\times\vec{c}}{\vec{c}\times\vec{a}.\vec{b}}+\frac{\vec{b}.\vec{a}\times\vec{c}}{\vec{c}.\vec{a}\times\vec{b}}$ = _____

(a) 0 (b) 1 (c) -1 (d) $\frac{\vec{a}.\vec{b}\times\vec{c}}{\vec{b}\times\vec{c}.\vec{c}}$

63) If $\vec{d}=\lambda\left(\vec{a}\times\vec{b}\right)+\mu\left(\vec{b}\times\vec{c}\right)+\omega\left(\vec{c}\times\vec{a}\right)$ and $\left|\vec{c}\times\vec{a}\right|=\frac{1}{8}$ then λ + μ + ω is _____

(a) 0 (b) 1 (c) 8 (d) $8\vec{d}.\left(\vec{a}+\vec{b}+\vec{c}\right)$

64) The area of the parallelogram having diagonals $\vec{a}=3\hat{i}+\hat{j}-2\hat{k}$ and $\vec{b}=\hat{i}-3\hat{j}+4\hat{k}$ is _____

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

65) Let $\vec{a}, \vec{b},$ and $\vec{c}$ be three vectors having magnitudes 1, 1, 2 respectively. If $\vec{a} \times (\vec{a} \times \vec{c}) + \vec{b} = 0$ then the acute angle between $\vec{a}$ and $\vec{c}$ is _____

(a) 0 (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{6}$ (d) $\frac{2\pi}{3}$

66) If $\vec{a}$ is a non-zero vector and m is a non-zero scalar then $m\vec{a}$ is a unit vector if _____

(a) $m = \pm 1$ (b) $a = |\vec{m}|$ (c) $a = \frac{1}{|m|}$ (d) a = 1

67) If $\vec{a}$ and $\vec{b}$ are two unit vectors and θ is the angle between them, then $(\vec{a} + \vec{b})$ is unit vector if _____

(a) $\theta = \frac{\pi}{3}$ (b) $\theta = \frac{\pi}{4}$ (c) $\theta = \frac{\pi}{2}$ (d) $\theta = \frac{2\pi}{3}$

68) If $\vec{a}$ and $\vec{b}$ include an angle 120° and their magnitude are 2 and $\sqrt{3}$ then $\vec{a}.\vec{b}$ is equal to _____

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

69) If $\vec{u} = \vec{a} \times (\vec{b} \times \vec{c}) + \vec{b} \times (\vec{c} \times \vec{a}) + \vec{c} \times (\vec{a} \times \vec{b})$, then _____

(a) u is a unit vector (b) $\vec{u} = \vec{a} + \vec{b} + \vec{c}$ (c) $\vec{u} = \vec{0}$ (d) $\vec{u} \neq \vec{0}$

70) If $\vec{a} + \vec{b} + \vec{c} = 0, |\vec{a}| = 3, |\vec{b}| = 4, |\vec{c}| = 5$ then the angle between $\vec{a}$ and $\vec{b}$ is _____

(a) $\frac{\pi}{6}$ (b) $\frac{2\pi}{3}$ (c) $\frac{5\pi}{3}$ (d) $\frac{\pi}{2}$

71) The vectors $2\hat{i} + 3\hat{j} + 4\hat{k}$ and $a\hat{i} + b\hat{j} + c\hat{k}$ are perpendicular when _____

(a) a = 2, b = 3, c = -4 (b) a = 4, b = 4, c = 5 (c) a = 4, b = 4, c = -5 (d) a = -2, b = 3, c = 4

72) The area of the parallelogram having a diagonal $3\hat{i} + \hat{j} - \hat{k}$ and a side $\hat{i} - 3\hat{j} + 4\hat{k}$ is _____

(a) $10\sqrt{3}$ (b) $6\sqrt{30}$ (c) $\frac{3}{2}\sqrt{30}$ (d) $3\sqrt{30}$

73) If $|\vec{a} + \vec{b}| = |\vec{a} - \vec{b}|$ then _____

(a) $\vec{a}$ is parallel to $\vec{b}$ (b) $\vec{a}$ is perpendicular to $\vec{b}$ (c) $|\vec{a}| = |\vec{b}|$ (d) $\vec{a}$ and $\vec{b}$ are unit vectors

74) If $\vec{p}, \vec{q}$ and $\vec{p} + \vec{q}$ are vectors of magnitude λ then the magnitude of $|\vec{p} - \vec{q}|$ is _____

(a) 2λ (b) $\sqrt{3}\lambda$ (c) $\sqrt{2}\lambda$ (d) 1

75) If $\vec{a} \times (\vec{b} \times \vec{c}) + \vec{b} \times (\vec{c} \times \vec{a}) + \vec{c} \times (\vec{a} \times \vec{b}) = \vec{x} \times \vec{y}$ then _____

(a) $\vec{x} = \vec{0}$ (b) $\vec{y} = \vec{0}$ (c) $\vec{x}$ and $\vec{y}$ are parallel (d) $\vec{x} = \vec{0}$ or $\vec{y} = \vec{0}$ or $\vec{x}$ and $\vec{y}$ are parallel

76) If $\overrightarrow{PR} = 2\hat{i} + \hat{j} + \hat{k}, \overrightarrow{QS} = -\hat{i} + 3\hat{j} + 2\hat{k}$ then the area of the quadrilateral PQRS is _____

(a) $5\sqrt{3}$ (b) $10\sqrt{3}$ (c) $\frac{5\sqrt{3}}{2}$ (d) $\frac{3}{2}$

77) The projection of $\overrightarrow{OP}$ on a unit vector $\overrightarrow{OQ}$ equals thrice the area of parallelogram OPRQ Then ∠POQ is _____

(a) $\tan^{-1}\frac{1}{3}$ (b) $\cos^{-1}\left(\frac{3}{10}\right)$ (c) $\sin^{-1}\left(\frac{3}{\sqrt{10}}\right)$ (d) $\sin^{-1}\left(\frac{1}{3}\right)$

78) If the projection of $\vec{a}$ on $\vec{b}$ and projection of $\vec{a}$ on $\vec{b}$ are equal then the angle befween $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$ is _____

(a) $\frac{\pi}{2}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{4}$ (d) $\frac{2\pi}{3}$

79) If $\vec{a} \times (\vec{b} \times \vec{c}) = (\vec{a} \times \vec{b}) \times \vec{c}$ for non-coplanar vectors $\vec{a}, \vec{b}, \vec{c}$ then _____

(a) $\vec{a}$ parallel to $\vec{b}$ (b) $\vec{b}$ parallel to $\vec{c}$ (c) $\vec{c}$ parallel to $\vec{a}$ (d) $\vec{a} + \vec{b} + \vec{c} = \vec{0}$

80) If a line makes 45°, 60° with positive direction of axes x and y then the angle it makes with the z axis is _____

(a) 30° (b) 90° (c) 45° (d) 60°

81) If $[\vec{a} \times \vec{b}, \vec{b} \times \vec{c}, \vec{c} \times \vec{a}] = 64$ then $[\vec{a}, \vec{b}, \vec{c}]$ is _____

(a) 32 (b) 8 (c) 128 (d) 0

82) If $[\vec{a} + \vec{b}, \vec{b} + \vec{c}, \vec{c} + \vec{a}] = 8$ then $[\vec{a}, \vec{b}, \vec{c}]$ is _____

(a) 4 (b) 8 (c) 32 (d) -4

83) The value of $\left[\hat{i} + \hat{j}, \hat{j} + \hat{k}_3\hat{k} + \hat{i}\right]$ is equal to _____

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

84) The shortest distance of the point (2, 10, 1) from the plane $\vec{r} \cdot (3\hat{i} - \hat{j} + 4\hat{k}) = 2\sqrt{26}$ is _____

(a) $2\sqrt{26}$ (b) $\sqrt{26}$ (c) 2 (d) $\frac{1}{\sqrt{26}}$

85) The vector $(\vec{a} \times \vec{b}) \times (\vec{c} \times \vec{a})$ is _____

(a) perpendicular to $\vec{a}, \vec{b}, \vec{c}$ and $\vec{d}$ (b) parallel to the vectors $(\vec{a} \times \vec{b})$ and $(\vec{c} \times \vec{d})$

(c) parallel to the line of intersection of the plane containing $\vec{a}$ and $\vec{b}$ and the plane containing $\vec{c}$ and $\vec{d}$

(d) perpendicular to the line of intersection of the plane containing $\vec{a}$ and $\vec{b}$ and the plane containing $\vec{c}$ and $\vec{d}$

86) If $\vec{a}, \vec{b}, \vec{c}$ are a right handed triad, of mutually perpendicular vectors of magnitude a, b, c then the value of $[\vec{a}, \vec{b}, \vec{c}]$is _____

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

87) If $\vec{a}, \vec{b}, \vec{c}$ are non-coplanar and $[\vec{a} \times \vec{b}, \vec{b} \times \vec{c}, \vec{c} \times \vec{a}] = [\vec{a} + \vec{b}, \vec{b} + \vec{c}, \vec{c} + \vec{a}]$ then $[\vec{a}, \vec{b}, \vec{c}]$ is _____

(a) 2 (b) 3 (c) 1 (d) 0

88) If the magnitude of moment about the point $\hat{j} + \hat{k}$ of a force $\hat{i} + a\hat{j} - \hat{k}$ acting through the point $\hat{i} + \hat{j}$ is $\sqrt{8}$ then the value of a is _____

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

89) $\vec{r} = \hat{si} + \hat{tj}$ is the equation of _____ (s, t are parameters)

(a) zox plane (b) a straight line joining the points $\hat{i}$ and $\hat{j}$ (c) xoy plane (d) yoz plane

90) If the line $\frac{x-1}{3} = \frac{y-2}{4} = \frac{z-3}{\lambda}$ is perpendicular to the plane $\vec{r} \cdot (2\hat{i} + 3\hat{j} + 4\hat{k}) = 0$ then, the value of λ is _____

(a) $-\frac{13}{4}$ (b) -13 (c) -4 (d) $\frac{-9}{2}$

91) The equation of the plane passing through (3, 4, 5) and parallel to the plane x + 2y - 2z - 9 = 0 is _____

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

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Sri Raghavendra Tuition Center

6th qp

12th Standard

Maths

Date : 07-Feb-24

Reg.No. : | | | | | | |

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Exam Time : 00:30:00 Hrs

Total Marks : 20

I. ANSWER ALL QUESTION

5 x 1 = 5

1) The angle between the lines $\frac{x-2}{3} = \frac{y+1}{-2}, z = 2$ and $\frac{x-1}{1} = \frac{2y+3}{3} = \frac{z+5}{2}$ is

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$

2) Distance from the origin to the plane 3x − 6y + 2z + 7 = 0 is

(a) 0 (b) 1 (c) 2 (d) 3

3) If the planes $\vec{r}.(2\hat{i} - \lambda\hat{j} + \hat{k}) = 3$ and $\vec{r}.(4\hat{i} + \hat{j} - \mu\hat{k}) = 5$ are parallel, then the value of λ and μ are

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

4) The value of $\left|\vec{a} + \vec{i}\right|^2 + \left|\vec{a} + \vec{j}\right|^2 + \left|\vec{a} + \vec{k}\right|^2$ if $|a| = 1$ is _____

(a) 0 (b) 1 (c) 2 (d) 3

5) The equation of the plane passing through (3, 4, 5) and parallel to the plane x + 2y - 2z - 9 = 0 is _____

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

II. ANSWER ALL QUESTION

1 x 2 = 2

6) If $\hat{a}, \hat{b}, \hat{c}$ are three unit vectors such that $\hat{b}$ and $\hat{c}$ are non-parallel and $\hat{a} \times \hat{b} \times \hat{c} = \frac{1}{2}\hat{b}$ the angle between $\hat{a}$ and $\vec{c}$.

III. ANSWER ALL QUESTION

1 x 3 = 3

7) If $2\hat{i} - \hat{j} + 3\hat{k}, 3\hat{i} + 2\hat{j} + \hat{k}, \hat{i} + \hat{m}j + 4\hat{k}$ are coplanar, find the value of m.

IV. ANSWER ALL QUESTION

2 x 5 = 10

8) Prove by vector method that sin(α −β) = sinα cosβ −cosα sinβ

9) Find the non-parametric form of vector equation, and Cartesian equations of the plane passing through the points (2, 2, 1), (9, 3, 6) and perpendicular to the plane 2x + 6y + 6z = 9

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Sri Raghavendra Tuition Center

unit - 9 annual creative one mark

12th Standard

Maths

Date : 07-Feb-24

Reg.No. : | | | | | | |

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Place: Kattuputhur, Trichy (Dt)

Exam Time : 00:45:00 Hrs

Total Marks : 65

65 x 1 = 65

I. ANSWER ALL QUESTION

1) The value of $\int_{-4}^{4}\left[tan^{-1}\left(\frac{x^2}{x^4+1}\right)+tan^{-1}\left(\frac{x^4+1}{x^2}\right)\right]dx$ is

(a) π (b) 2π (c) 3π (d) 4π

2) The value of $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}}\left(\frac{2x^7-3x^5+7x^3-x+1}{cos^2x}\right)dx$ is

(a) 4 (b) 3 (c) 2 (d) 0

3) If $f(x)=\int_0^x t\cos t dt$, then $\frac{df}{dx}=$

(a) cos x - x sin x (b) sin x + x cos x (c) x cos x (d) x sin x

4) The area between $y^2 = 4x$ and its latus rectum is

(a) $\frac{2}{3}$ (b) $\frac{4}{3}$ (c) $\frac{8}{3}$ (d) $\frac{5}{3}$

5) The value of $\int_0^1 x(1-x)^{99}dx$ is

(a) $\frac{1}{11000}$ (b) $\frac{1}{10100}$ (c) $\frac{1}{10010}$ (d) $\frac{1}{10001}$

6) The value of $\int_0^{\pi}\frac{dx}{1+5^{cos\,x}}$ is

(a) $\frac{\pi}{2}$ (b) π (c) $\frac{3\pi}{2}$ (d) 2π

7) If $\frac{\Gamma(n+2)}{\Gamma(n)}=90$ then n is

(a) 10 (b) 5 (c) 8 (d) 9

8) The value of $\int_0^{\frac{\pi}{6}} cos^3 3x\,dx\,is$

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

9) The value of $\int_0^{\pi} sin^4 x dx$ is

(a) $\frac{3\pi}{10}$ (b) $\frac{3\pi}{8}$ (c) $\frac{3\pi}{4}$ (d) $\frac{3\pi}{2}$

10) The value of $\int_0^{\infty} e^{-3x}x^2dx$ is

(a) $\frac{7}{27}$ (b) $\frac{5}{27}$ (c) $\frac{4}{27}$ (d) $\frac{2}{27}$

11) If $\int_0^a \frac{1}{4+x^2}dx=\frac{\pi}{8}$ then a is

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

12) The volume of solid of revolution of the region bounded by $y^2 = x(a - x)$ about x-axis is

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

13) If $f(x)=\int_1^x \frac{e^{\sin u}}{u}du, x>1$ and $\int_1^3 \frac{e^{\sin x^2}}{x}dx=\frac{1}{2}[f(a)-f(1)]$, then one of the possible value of a is

(a) 3 (b) 6 (c) 9 (d) 5

14) The value of $\int_0^1 (sin^{-1}x)^2 dx$ is

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

15) The value of $\int_0^a (\sqrt{a^2 - x^2})^3 dx$ is

(a) $\frac{\pi a^3}{16}$ (b) $\frac{3\pi a^4}{16}$ (c) $\frac{3\pi a^2}{8}$ (d) $\frac{3\pi a^4}{8}$

16) If $\int_0^x f(t)dt = x + \int_x^1 tf(t)dt$, then the value of f (1) is

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

17) The value of $\int_0^{\frac{2}{3}} \frac{dx}{\sqrt{4-9x^2}}$ is

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{4}$ (d) π

18) The value of $\int_{-1}^2 |x|dx$ is

(a) $\frac{1}{2}$ (b) $\frac{3}{2}$ (c) $\frac{5}{2}$ (d) $\frac{7}{2}$

19) For any value of $n \in \mathbb{Z}$, $\int_0^\pi e^{\cos^2 x} \cos^3[(2n+1)x]dx$ is

(a) $\frac{\pi}{2}$ (b) π (c) 0 (d) 2

20) The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} sin^2x\ cos\ x\ dx$ is

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

21) The value of $\int_0^{\frac{\pi}{2}} \frac{dx}{1+tanx}$ _____

(a) π (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{4}$ (d) 0

22) The value of $\int_{\frac{\pi}{2}}^{\frac{\pi}{2}} \sqrt{\frac{1-cos2x}{2x}}$ dx is _____

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

23) $\int_1^{\sqrt{3}} \frac{dx}{1+x^2}$ is _____

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{6}$ (c) $\frac{\pi}{12}$ (d) $-\frac{\pi}{6}$

24) If $\int_0^{2a} f(x)dx = 2\int_0^a f(x)$ then _____

(a) f(2a -x) = - f(x) (b) f(2a - x) = f(x) (c) f(x) is odd (d) f(x) is even

25) The value of $\int_{-\pi}^{\pi} sin^3x\ cos^3x\ dx$ is _____

(a) 0 (b) π (c) 2π (d) 4π

26) The area enclosed by the curve y = $\frac{x^2}{2}$, the x - axis and the lines x = 1, x = 3 is _____

(a) 4 (b) $8\frac{2}{3}$ (c) 13 (d) $4\frac{1}{3}$

27) The area bounded by the parabola $y = x^2$ and the line y = 2x is _____

(a) $\frac{4}{3}$ (b) $\frac{2}{3}$ (c) $\frac{51}{3}$ (d) $\frac{30}{3}$

28) The ratio of the volumes generated by revolving the ellipse $\frac{x^2}{9} + \frac{y^2}{4}$ = 1 about major and minor axes is _____

(a) 4 : 9 (b) 9 : 4 (c) 2 : 3 (d) 3 : 2

29) $\int_0^\infty e^{-mx}x^7$ dx is _____

(a) $\frac{\lfloor m}{7^m}$ (b) $\frac{\lfloor 7}{m^7}$ (c) $\frac{\lfloor m}{7^{m+1}}$ (d) $\frac{\lfloor 7}{m^8}$

30) If $\int_0^a f(x)dx + \int_0^a f(2a-x)dx =$ _____

(a) $\int_0^a f(x)dx$ (b) $2\int_0^a f(x)dx$ (c) $\int_0^{2a} f(x)dx$ (d) $\int_0^{2a} f(a-x)dx$

31) $\int_{-1}^1 x\ dx$ = ...

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

32) $\int_0^{2a} f(x)dx = 2\int_0^{2a} f(x)dx$ if _____

(a) f(2a -x) = f(x) (b) f(a -x) = f(x) (c) f(x) = - f(-x) (d) f(-x) = f(x)

33) The area enclosed by the curve y^2 = 4x, the x-axis and its latus rectum is _____ sq.units.

(a) $\frac{2}{3}$ (b) $\frac{4}{3}$ (c) $\frac{8}{3}$ (d) $\frac{16}{3}$

34) The area of the ellipse $\frac{x^2}{9}+\frac{y^2}{4}=1$ _____

(a) 6π (b) 36π (c) $6\pi^2$ (d) $36\pi^2$

35) The volume generated by the curve y^2 = 16x from x = 2 to x = 3 rotating about x - axis ..... cu. units

(a) 72π (b) $\frac{256\times19}{3}\pi$ (c) 40π (d) 80π

36) $\int_a^b f(x)dx =$ .....

(a) $2\int_0^a f(x)dx$ (b) $\int_a^b f(a-x)dx$ (c) $\int_b^a f(b-x)dx$ (d) $\int_a^b f(a+b-x)dx$

37) $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{sinx}{2+cosx}dx =$ _____

(a) 0 (b) 2 (c) log 2 (d) log 4

38) The value of $\int_0^{\frac{\pi}{3}} tanx\,dx$ _____

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

39) $\int_0^{\frac{\pi}{2}} \frac{sin\,x-cos\,x}{1+sin\,xcos\,x}dx =$ .....

(a) $\frac{\pi}{2}$ (b) 0 (c) $\frac{\pi}{4}$ (d) π

40) The volume when $y=\sqrt{3+x^2}$ from x = 0 to x = 4 is rotated about x-axis is .....

(a) 100π (b) $\frac{100\pi}{9}$ (c) $\frac{100\pi}{3}$ (d) $\frac{100}{3}$

41) $\int_0^{\pi/2} \frac{\sin x}{1+\cos^2 x}dx =$ _____

(a) $\frac{\pi}{2}$ (b) π (c) $\frac{\pi}{4}$ (d) 0

42) If f(x) is a continuous function and $F(x)=\int_a^x f(t)dt$ then we have the equation _____

(a) F'(x) = f(x) (b) F(x) = f(x) (c) F(x) = f'(x) (d) F'(x) = f'(x)

43) $\int_{-1}^{1} \log\left(\frac{3-x}{3+x}\right)dx =$ _____

(a) 3 (b) $\frac{3}{2}$ (c) 0 (d) 6

44) $\int_{-\pi/2}^{0} \sin^7 x dx =$ _____

(a) $\frac{\pi}{2}$ (b) $\int_{-\pi/2}^{0} \cos^7 x dx =$ (c) 0 (d) 1

45) The area bounded by the line y = x , x axis x = 1 and x = 2 is _____

(a) $\frac{3}{2}$ (b) $\frac{5}{2}$ (c) $\frac{1}{2}$ (d) $\frac{7}{2}$

46) The area of the region bounded by the graph of y = sinx and y = cosx between x = 0 and _____$x=\frac{\pi}{4}$

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

47) The area bounded by the parabola y^2 = x and its latus rectum is _____

(a) $\frac{4}{3}$ (b) $\frac{1}{6}$ (c) $\frac{2}{3}$ (d) $\frac{8}{3}$

48) The volume of the solid obtained by revolving $\frac{x^2}{9}+\frac{y^2}{16}=1$about the minor axis is _____

(a) 48π (b) 64π (c) 32π (d) 128π

49) The volume, when the curve $y=\sqrt{3+x^2}$ from x = 0 to x = 4 is rotated about x axis is _____

(a) 100π (b) $\frac{100}{9}\pi$ (c) $\frac{100}{3}\pi$ (d) $\frac{100}{3}$

50) The volume, when the region bounded by y = x, y = 1, x = 0 is rotated about y axis _____

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

51) The value of $\int_0^{\pi} \frac{dx}{1+6^{\tan x}}$ _____

(a) $\frac{\pi}{2}$ (b) π (c) $\frac{3\pi}{2}$ (d) 2π

52) The value of $\int_{-3}^{3}\left[\sin^{-1}\left(\frac{x^2+1}{2}\right)+\sec^{-1}\left(\frac{2}{x^2+1}\right)\right]dx$ _____

(a) π (b) 2π (c) 3π (d) 4π

53) The value of $\int_0^1 x^5(1-x)^5dx$ _____

(a) $\frac{1}{2772}$ (b) $\frac{15}{126}$ (c) $\frac{5}{126}$ (d) $\frac{25}{625}$

54) The value of $\int_0^2 \left(\sqrt{4-x^2}\right)^3 dx$ is _____

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

55) The value of $\int_0^{\pi} (\sin x + \cos x) dx$ _____

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

56) The area bounded by the curve $y^2 = 4x$ and the lines. x = 1, x = 4 and x - axis in the first quadrant is _____

(a) $\frac{11}{3}$ (b) $\frac{17}{3}$ (c) $\frac{28}{3}$ (d) $\frac{31}{3}$

57) The value of $\int_0^1 \log\left(\frac{x}{1-x}\right) dx$ _____

(a) 0 (b) 2 (c) 4 (d) 5

58) The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\sin x}{2+\cos x} dx$ _____

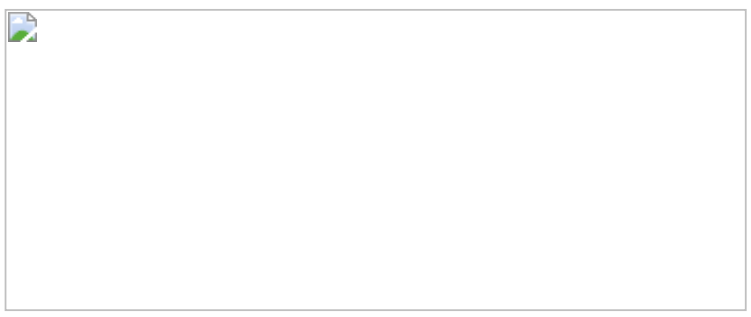
(a) 0 (b) 2 (c) log 2 (d) log 4

59) The differential equation of all circles with centre at the orgin is _____

(a) xdy + ydx = 0 (b) xdy - ydx = 0 (c) xdxy + ydy = 0 (d) xdx - ydy = 0

60) The value of $\int_0^{\infty} e^{-x} x^n dx$ is

(a) a) 1 / 12

61) 

(a) a) 1

62) The value of $\int_0^{\infty} e^{-x} x^n dx$ is

(a) a) 2

63) The degree of the differential equation $\sqrt{1+\left(\frac{dy}{dx}\right)} = \frac{d^2y}{dx}$

(a) a

64) The value of $\int_0^{\infty} e^{-x} x^n dx$ is

(a) a) 2

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Sri Raghavendra Tuition Center

unit - 3 annual creative one mark

12th Standard

Maths

Date : 06-Feb-24

Reg.No. : | | | | | | |

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Exam Time : 00:30:00 Hrs

Total Marks : 49

I. Answer all question 49 x 1 = 49

1) A zero of $x^3 + 64$ is

(a) 0 (b) 4 (c) 4i (d) -4

2) If f and g are polynomials of degrees m and n respectively, and if h(x) = (f ◦ g)(x), then the degree of h is

(a) mn (b) m+n (c) m^n (d) n^m

3) A polynomial equation in x of degree n always has

(a) n distinct roots (b) n real roots (c) n complex roots (d) at most one root

4) If α, β and γ are the zeros of $x^3 + px^2 + qx + r$, then $\Sigma\frac{1}{\alpha}$ is

(a) $-\frac{q}{r}$ (b) $-\frac{p}{r}$ (c) $\frac{q}{r}$ (d) $-\frac{q}{p}$

5) According to the rational root theorem, which number is not possible rational zero of $4x^7 + 2x^4 - 10x^3 - 5$?

(a) -1 (b) $\frac{5}{4}$ (c) $\frac{4}{5}$ (d) 5

6) The polynomial $x^3 - kx^2 + 9x$ has three real zeros if and only if, k satisfies

(a) $|k| \leq 6$ (b) $k = 0$ (c) $|k| > 6$ (d) $|k| \geq 6$

7) The number of real numbers in [0, 2π] satisfying $\sin^4 x - 2\sin^2 x + 1$ is

(a) 2 (b) 4 (c) 1 (d) ∞

8) If $x^3+12x^2+10ax+1999$ definitely has a positive zero, if and only if

(a) $a \geq 0$ (b) $a > 0$ (c) $a < 0$ (d) $a \leq 0$

9) The polynomial $x^3 + 2x + 3$ has

(a) one negative and two imaginary zeros (b) one positive and two imaginary zeros (c) three real zeros

(d) no zeros

10) The number of positive zeros of the polynomial $\sum_{j=0}^{n} {}_nC_r(-1)^r x^r$ is

(a) 0 (b) n (c) < n (d) r

11) If a, b, c ∈ Q and $p + \sqrt{q}$ (p, q ∈ Q) is an irrational root of $ax^2+bx+c = 0$ then the other root is _____

(a) $-p+\sqrt{q}$ (b) p-iq (c) $p-\sqrt{q}$ (d) $-p-\sqrt{q}$

12) The quadratic equation whose roots are ∝ and β is _____

(a) $(x - \alpha)(x - \beta) = 0$ (b) $(x - \alpha)(x + \beta) = 0$ (c) $\alpha + \beta = \frac{b}{a}$ (d) $\alpha\beta = \frac{-c}{a}$

13) If f(x) = 0 has n roots, then f'(x) = 0 has _____ roots

(a) n (b) n -1 (c) n+1 (d) (n-r)

14) If x is real and $\frac{x^2-x+1}{x^2+x+1}$ then _____

(a) $\frac{1}{3} \leq k \leq$ (b) $k \geq 5$ (c) $k \leq 0$ (d) none

15) Let a > 0, b > 0, c > 0. Theh n both the root of the equation $ax^2+bx+c = 0$ are _____

(a) real and negative (b) real and positive (c) rational numbers (d) none

16) The equation $\sqrt{x+1} - \sqrt{x-1} = \sqrt{4x-1}$ has _____

(a) no solution (b) one solution (c) two solution (d) more than one solution

17) lf the root of the equation $x^3 + bx^2 + cx - 1 = 0$ form an lncreasing G.P, then _____

(a) one of the roots is 2 (b) one of the roots is 1 (c) one of the roots is -1 (d) one of the roots is -2

18) For real x, the equation $\left|\frac{x}{x-1}\right| + |x| = \frac{x^2}{|x-1|}$ has _____

(a) one solution (b) two solution (c) at least two solution (d) no solution

19) If the equation $ax^2 + bx+c = 0 (a > 0)$ has two roots $\propto$ and β such that $\propto < -2$ and $\beta > 2$, then _____

(a) $b^2-4ac = 0$ (b) $b^2 - 4ac < 0$ (c) $b^2 - 4ac > 0$ (d) $b^2 - 4ac \geq 0$

20) If $(2+\sqrt{3})^{x^2-2x+1} + (2-\sqrt{3})^{x^2-2x-1} = \frac{2}{2-\sqrt{3}}$ then x = _____

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

21) If $\propto, \beta, \gamma$ are the roots of the equation $x^3-3x+11 = 0$, then $\propto+\beta+\gamma$ is _____.

(a) 0 (b) 3 (c) -11 (d) -3

22) If $\propto, \beta, \gamma$ are the roots of $9x^3-7x+6 = 0$, then $\propto \beta \gamma$ is _____

(a) $\frac{-7}{9}$ (b) $\frac{7}{9}$ (c) 0 (d) $\frac{-2}{3}$

23) If $x^2 - hx - 21 = 0$ and $x^2 - 3hx + 35 = 0$ (h > 0) have a common root, then h = _____

(a) 0 (b) 1 (c) 4 (d) 3

24) If $ax^2 + bx + c = 0$, a, b, c $\in$ R has no real zeros, and if a + b + c < 0, then _____

(a) c > 0 (b) c< 0 (c) c=0 (d) c≥0

25) If $p(x) = ax^2 + bx + c$ and $Q(x) = -ax^2 + dx + c$ where $ac \neq 0$ then p(x). Q(x) = 0 has at least _____ real roots.

(a) no (b) 1 (c) 2 (d) infinite

26) For all x, $x^2 + 2ax + (10 - 3a) > 0$, then the interval in which a lies is _____

(a) a < -5 (b) -5 < a < 2 (c) a > 5 (d) 2 < a < 5

27) The set of all real numbers of x for which $x^2 - |x + 2| + x > 0$ _____

(a) $(-\infty, -2) \cup (2, \infty)$ (b) $(-\infty, -\sqrt{2}) \cup (\sqrt{2}, \infty)$ (c) $(-\infty, -1) \cup (1, \infty)$ (d) $(\sqrt{2}, \infty)$

28) The number of real zeros of the polynomial function $x^2 + 1$ is _____

(a) 1 (b) 0 (c) 2 (d) None of these

29) A zero of the polynomial $x^3 + 2x - i$ equals _____

(a) -i (b) 1 (c) 1 - i (d) None of these

30) If α and β are the roots of $ax^2 - bx - c = 0$, then $\alpha + \beta$ equals _____

(a) $\frac{-b}{a}$ (b) $\frac{-c}{a}$ (c) $\frac{a}{b}$ (d) $\frac{b}{a}$

31) If α, β, γ are the roots of $x^3 + px^2 + qx + r = 0$ then $\alpha\beta + \beta\gamma + \gamma\alpha$ equals _____

(a) $\frac{-p}{q}$ (b) -p (c) q (d) -q

32) A polynomial equation whose roots are 3 times those of the equation $2x^3 + 5x^2 + 7 = 0$ is _____

(a) $3x^3 - 15x^2 + 21 = 0$ (b) $2x^3 - 15x^2 - 189 = 0$ (c) $2x^3 + 15x^2 - 189 = 0$ (d) None of these

33) If α is a root of a reciprocal equation f(x) = 0 then another root of f(x) = 0 is _____

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

34) The equation $x^3 + 2x + 3 = 0$ has _____

(a) One positive real root (b) One negative real root (c) Three real roots (d) None of these

35) Greatest possible number of real roots of $x^{10} - 10x^6 - 5x^3 + x + 4 = 0$ is _____

(a) 6 (b) 5 (c) 10 (d) None of these

36) The equation with rational co-efficients one of whose roots is $\sqrt{5} + \sqrt{2}$ given by _____

(a) $x^4 - 14x^2 + 9 = 0$ (b) $x^4 + 14x^2 + 9 = 0$ (c) $x^4 - 14x + 9 = 0$ (d) $x^4 + 14x^2 - 9 = 0$

37) If 3 is a double root of the equation $8x^3 - 47x^2 + 66x + 9 = 0$ then the third root is _____

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

38) The roots of the equation $x + \frac{1}{x} = 1$ are _____

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

39) If α, β, γ are roots of $x^3+2x-6 = 0$ then the value of $\alpha\beta\gamma$ is _____

(a) 0 (b) 2 (c) 6 (d) -4

40) If the product of the roots of $3x^4 - 4x^3 + 2x^2 + x + a = 0$ is 21, then the value of a is _____

(a) 7 (b) -7 (c) -63 (d) 63

41) If α, β, γ and δ are the roots of the equation $x^4 + px^3 + qx^2 + rx + s = 0$ then the value of $\sum \frac{1}{\alpha}$ is _____

(a) $\frac{s}{r}$ (b) $-\frac{S}{r}$ (c) $\frac{r}{s}$ (d) $-\frac{r}{s}$

42) If α, β, γ are the roots of the equation $x^3 + ax - b = 0$ then the value of $\sum \left(\frac{\alpha}{\beta\gamma}\right)$ _____

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

43) The sum of the squares of the roots of $x^3 + ax^2 - bx + c = 0$ is _____

(a) $a^2 + 2b$ (b) $a^2 + 2b$ (c) $b^2 - 2c$ (d) $a^2 + 2c$

44) If the roots of the equation $4x^3 - 24x^2 + 23x + 18 = 0$ are a-d, a and a+d then the value of a is _____

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

45) If the roots of the equation $x^3 - 7x^2 + 14x - 8 = 0$ are $\frac{a}{r}$, a and ar then the value of a is _____

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

46) If a is a root of $x^4 - 2x^3 + 6x^2 + 2x - 1 = 0$, then _____

(a) -a is also a root 1 (b) $\frac{1}{a}$ is also a root (c) 1 is a also a root (d) None of these

47) If the roots of the equation $x^3 - x^2 - 4x + 4 = 0$ are 1, -2, 2 then the roots of $4x^3 - 4x^2 - x + 1 = 0$ are _____

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

48) A reciprocal equation a of $a_0x^n + a_1x^{n-1} + \ldots + a^n = 0$ is said to be of second type if _____

(a) $a_{n-r} = a_{r-1}$ (b) $a_{n-r} = a_{r+1}$ (c) $a_{n-r} = -a_r$ (d) $a_{n-r} = a_r$

49) If α, β, γ are the roots $x^3 + 3x^2 + x - 4 = 0$, then the equation whose roots are $10\alpha, 10\beta, 10\gamma$ is _____

(a) $x^3 + 30x^2 + 10x - 40 = 0$ (b) $x^3 + 30x^2 + 100x - 4000 = 0$ (c) $4x^3 + 12x^2 + 4x - 1 = 0$

(d) $10x^3 + 30x^2 + 10x - 1 = 0$

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Sri Raghavendra Tuition Center

unit - 12 annual creative one mark

12th Standard

Maths

Date : 07-Feb-24

Reg.No. : | | | | | | |

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Place: Kattuputhur, Trichy (Dt)

Exam Time : 00:45:00 Hrs

Total Marks : 47

I. ANSWER ALL QUESTION 47 x 1 = 47

1) A binary operation on a set S is a function from

(a) $S \to S$ (b) $(S \times S) \to S$ (c) $S \to (S \times S)$ (d) $(S \times S) \to (S \times S)$

2) Subtraction is not a binary operation in

(a) R (b) Z (c) N (d) Q

3) Which one of the following is a binary operation on N?

(a) Subtraction (b) Multiplication (c) Division (d) All the above

4) In the set R of real numbers '*' is defined as follows. Which one of the following is not a binary operation on R?

(a) a*b = min (a.b) (b) a*b = max (a, b) (c) a*b = a (d) $a*b = a^b$

5) The operation * defined by $a * b = \frac{ab}{7}$ is not a binary operation on

(a) Q^+ (b) Z (c) R (d) C

6) In the set Q define $a \odot b = a+b+ab$. For what value of y, $3 \odot (y \odot 5) = 7$?

(a) $y = \frac{2}{3}$ (b) $y = \frac{-2}{3}$ (c) $y = \frac{-3}{2}$ (d) y = 4

7) If $a * b = \sqrt{a^2 + b^2}$ on the real numbers then * is

(a) commutative but not associative (b) associative but not commutative

(c) both commutative and associative (d) neither commutative nor associative

8) Which one of the following statements has the truth value T?

(a) sin x is an even function (b) Every square matrix is non-singular

(c) The product of complex number and its conjugate is purely imaginary (d) $\sqrt{5}$ is an irrational number

9) Which one of the following statements has truth value F?

(a) Chennai is in India or $\sqrt{2}$ is an integer (b) Chennai is in India or $\sqrt{2}$ is an irrational number

(c) Chennai is in China or $\sqrt{2}$ is an integer (d) Chennai is in China or $\sqrt{2}$ is an irrational number

10) If a compound statement involves 3 simple statements, then the number of rows in the truth table is

(a) 9 (b) 8 (c) 6 (d) 3

11) Which one is the inverse of the statement $(pVq) \to (p \wedge q)$?

(a) $(p \wedge q) \to (pVq)$ (b) $\neg(pvq) \to (p \wedge q)$ (c) $(\neg pv \neg q) \to (\neg p \wedge \neg q)$ (d) $(\neg p \wedge \neg q) \to (\neg pV \neg q)$

12) Which one is the contrapositive of the statement (pVq)⟶r?

(a) ¬r→(¬p∧¬q) (b) ¬r⟶(pVq) (c) r⟶(p∧q) (d) p⟶(q∨r)

13) The truth table for (p ∧ q) ∨ ¬q is given below

p	q	(p ∧ q) ∨ (¬q)
T	T	(a)
T	F	(b)
F	T	(c)
F	F	(d)

Which one of the following is true?

(a)

(a)	(b)	(c)	(d)
T	T	T	T

(b)

(a)	(b)	(c)	(d)
T	F	T	T

(c)

(a)	(b)	(c)	(d)
T	T	F	T

(d)

(a)	(b)	(c)	(d)
T	F	F	F

14) In the last column of the truth table for ¬(p ∨ ¬q) the number of final outcomes of the truth value 'F' are

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

15) Which one of the following is incorrect? For any two propositions p and q, we have

(a) ¬ (pVq) ≡ ¬ p ∧ ¬q (b) ¬ (p∧ q)≡¬p ∨ ¬q (c) ¬ (p ∨ q)≡¬p∨¬q (d) ¬(¬p)≡ p

16)

p	q	(p ∧ q) ⟶ ¬q
T	T	(a)
T	F	(b)
F	T	(c)
F	F	(d)

Which one of the following is correct for the truth value of (p ∧ q)⟶ ¬p?

(a)

(a)	(b)	(c)	(d)
T	T	T	T

(b)

(a)	(b)	(c)	(d)
F	T	T	T

(c)

(a)	(b)	(c)	(d)
F	F	T	T

(d)

(a)	(b)	(c)	(d)
T	T	T	F

17) The dual of ¬(p V q) V [p V (p ∧ ¬r)] is

(a) ¬(p ∧ q) ∧ [p V (p ∧ ¬r)] (b) (p ∧ q) ∧ [p ∧ (p V ¬r)] (c) ¬(p ∧ q) ∧ [p ∧ (p ∧ r)]

(d) ¬(p ∧ q) ∧ [p ∧ (pV ¬r)]

18) The proposition p ∧ (¬p ∨ q) is

(a) a tautology (b) a contradiction (c) logically equivalent to p ∧ q (d) logically equivalent to p ∨ q

19) Determine the truth value of each of the following statements:

(a) 4 + 2 = 5 and 6 + 3 = 9

(b) 3 + 2 = 5 and 6 + 1 = 7

(c) 4 + 5 = 9 and 1 + 2 = 4

(d) 3 + 2 = 5 and 4 + 7 = 11

(a)

(a)	(b)	(c)	(d)
F	T	F	T

(b)

(a)	(b)	(c)	(d)
T	F	T	F

(c)

(a)	(b)	(c)	(d)
T	T	F	F

(d)

(a)	(b)	(c)	(d)
F	F	T	T

20) Which one of the following is not true?

(a) Negation of a negation of a statement is the statement itself

(b) If the last column of the truth table contains only T then it is a tautology.

(c) If the last column of its truth table contains only F then it is a contradiction

(d) If p and q are any two statements then p↔q is a tautology.

21) The binary operation * defined on a set s is said to be commutative if _____

(a) a*b ∈ S ∀ a, b ∈ S (b) a*b = b*a ∀ a, b ∈ S (c) (a*b) * c = a*(b*c) ∀ a, b ∈ S (d) a*b = e ∀ a, b ∈ S

22) If * is defined by a * b = $a^2 + b^2 + ab + 1$, then (2 * 3) * 2 is _____

(a) 20 (b) 40 (c) 400 (d) 445

23) The number of binary operations that can be defined on a set of 3 elements is _____

(a) 3^2 (b) 3^3 (c) 3^9 (d) 3^1

24) The identity element of $\left\{\begin{pmatrix} x & x \\ x & x \end{pmatrix}\right\}$ $|x \in R, x \neq 0\}$ under matrix multiplication is _____

(a) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} \frac{1}{4x} & \frac{1}{4x} \\ \frac{1}{4x} & \frac{1}{4x} \end{pmatrix}$ (c) $\begin{pmatrix} \frac{1}{2} & \frac{1}{2} \\ \frac{1}{2} & \frac{1}{2} \end{pmatrix}$ (d) $\begin{pmatrix} \frac{1}{2x} & \frac{1}{2x} \\ \frac{1}{2x} & \frac{1}{2x} \end{pmatrix}$

25) Which one of the following is not a statement?

(a) 2 + 3 =5 (b) How beautiful is this flower? (c) Delhi is the capital of Tamil Nadu

(d) A triangle has found angles.

26) Which of the following is a tautology?

(a) p ∨ q (b) p ∧ q (c) q ∨ ~ q (d) q ∧ ~ q

27) Which of the following is a contradiction?

(a) p ∨ q (b) p ∧ q (c) q ∨ ~ q (d) q ∧ ~ q

28) The identity element in the group {R - {1},x} where a * b = a + b - ab is _____

(a) 0 (b) 1 (c) $\frac{1}{a-1}$ (d) $\frac{a}{a-1}$

29) Define * on Z by a * b = a + b + 1 ∀ a,b ∈ Z. Then the identity element of z is _____

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

30) A binary operation * is defined on the set of positive rational numbers Q^+ by a*b = $\frac{ab}{4}$. Then 3 * $\left(\frac{1}{5} * \frac{1}{2}\right)$ is _____

(a) $\frac{3}{160}$ (b) $\frac{5}{160}$ (c) $\frac{3}{10}$ (d) $\frac{3}{40}$

31) If a * b = a^2b^2 - ab then 3 * (1 * 1)

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

32) The number whose multiplication universe does not exist in C.

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

33) Let p: Kamala is going to school

q: There are 20 students in the class. Then Kamala is not going to school or there are 20 students in the class is represented by

(a) p ∨ q (b) p ∧ q (c) ~ p (d) ~ p ∨ q

34) If p is true and q is unknown, then _____

(a) ~ p is true (b) p ∨ (~p) is false (c) p ∧ (~p) is true (d) p ∨ q is true

35) '+' is not a binary operation on _____

(a) ~ (b) z (c) c (d) Q- {0}

36) '-' is a binary operation on _____

(a) ~ (b) Q-{0} (c) R-{0} (d) Z

37) Which of the following is a statement?

(a) 7+2< 10 (b) Wish you all success (c) All the best (d) How old are you?

38) In (N, *), x * y = max(x, y), x, y ∈ N then 7 * (-7)

(a) 7 (b) -7 (c) 0 (d) -49

39) In (S, *), is defined by x * y = x where x, y ∈ S, then

(a) associative (b) Commutative (c) associative and commutative

(d) neither associative nor commutative

40) The number of commutative binary operations which can be defined on a set containing n elements is _____

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

41) On the set R of real numbers, the operation * is defined by a * b = a^2 - b^2 Then (3 * 5) * 4 is _____

(a) -240 (b) 240 (c) -72 (d) 72

42) ln Z, we define a * b = a + b + 1. The identity element with respect to * is _____

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

43) Which of the following are logically equivalent?

(a) $p \to q, q \to p$ (b) $q \to p, \neg q \vee p$ (c) $p \to q, \neg p \wedge q$ (d) $q \to p,\ q \vee \neg p$

44) The number of rows and columns for (p V q) V r will be _____

(a) 3, 8 (b) 8, 4 (c) 8, 5 (d) 5, 8

45) If P V q is false (F), then _____

(a) p is false (b) q is false (c) p and q are false (d) p or q is false

46) The value of $[3] +_8 [7]$ is

(a) a) [10] (b) a) [8] (c) a) [5] (d) a) [2]

47) In the set Q define a × b = a + b + ab. For what values of y, $3 \times (y \times 5) = 7$

(a) a)

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