



DINESH TUITION CENTER,
(Opposite Aanandh Jewellery)
19, Paalayam Bazzar, Woraiyur, Trichy

12th Standard Mathematics

**Quarterly Model Question Paper
2022-2023**

Classes in Youtube: Dinesh Centum Maths

Website: dineshcentummaths.blogspot.com

Quarterly Common Exam - Model Question Paper - 2022-23.

12th Standard

Part - I

Answer all the questions

1. If $A = \begin{bmatrix} 3 & 5 \\ 1 & 2 \end{bmatrix}$, $B = \text{adj } A$ and $C = 3A$, then $\frac{|\text{adj } B|}{|C|} =$ $20 \times 1 = 20$
 (1) $\frac{1}{3}$ (2) $\frac{1}{9}$ (3) $\frac{1}{4}$ (4) 1.
2. If $A = \begin{bmatrix} 7 & 3 \\ 4 & 2 \end{bmatrix}$, then $9I_2 - A =$
 (1) A^{-1} (2) $\frac{A^{-1}}{2}$ (3) $3A^{-1}$ (4) $2A^{-1}$
3. If $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$ be such that $\lambda A^{-1} = A$, then λ is
 (1) 17 (2) 14 (3) 19 (4) 21.
4. If $x^a y^b = e^m$, $x^c y^d = e^n$, $\Delta_1 = \begin{vmatrix} m & b \\ n & d \end{vmatrix}$, $\Delta_2 = \begin{vmatrix} a & m \\ c & n \end{vmatrix}$, $\Delta_3 = \begin{vmatrix} a & b \\ c & d \end{vmatrix}$,
 then the values of x and y are respectively.
 (1) $e^{(\Delta_2/\Delta_1)}$, $e^{(\Delta_3/\Delta_1)}$ (2) $\log(\Delta_1/\Delta_3)$, $\log(\Delta_2/\Delta_3)$
 (3) $\log(\Delta_2/\Delta_1)$, $\log(\Delta_3/\Delta_1)$ (4) $e^{(\Delta_1/\Delta_3)}$, $e^{(\Delta_2/\Delta_3)}$
5. $i^n + i^{n+1} + i^{n+2} + i^{n+3}$ is
 (1) 0 (2) 1 (3) -1 (4) i .
6. If $|z - \frac{3}{2}| = 2$, then the least value of $|z|$ is
 (1) 1 (2) 2 (3) 3 (4) 5.

Dinesh Tuition Center.

19, Paalayam Bazaar, Koloraiyur, Trichy

Youtube: Dinesh Centum maths, Website: dineshcentummaths.blogspot.com

Ph.No : 7418865975

7. The Value of $\left[\frac{1 + \sqrt{3}i}{1 - \sqrt{3}i} \right]^{10}$ is

- (1). $\cos \frac{2\pi}{3}$ (2). $\cos \frac{4\pi}{3}$ (3). $-\cos \frac{2\pi}{3}$ (4). $-\cos \frac{4\pi}{3}$

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

- (1). $-\frac{q}{r}$ (2). $-\frac{p}{r}$ (3). $\frac{q}{r}$ (4). $-\frac{p}{r}$

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

- (1). $a \geq 0$ (2). $a > 0$ (3). $a < 0$ (4). $a \leq 0$

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

- (1). 0 (2). n (3). $< n$ (4). r

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

- (1). $\frac{2\pi}{3}$ (2). $\frac{\pi}{3}$ (3). $\frac{\pi}{6}$ (4). π

12. The Value of $\sin^{-1}(\cos x)$, $0 \leq x \leq \pi$ is

- (1). $\pi - x$ (2). $x - \frac{\pi}{2}$ (3). $\frac{\pi}{2} - x$ (4). $x - \pi$

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

- (1). $-\frac{\pi}{10}$ (2). $\frac{\pi}{5}$ (3). $\frac{\pi}{10}$ (4). $-\frac{\pi}{5}$

14. If $\cot^{-1} 2$ and $\cot^{-1} 3$ are two angles of a triangle, then the third angle is
- (1) $\frac{\pi}{4}$ (2) $\frac{3\pi}{4}$ (3) $\frac{\pi}{6}$ (4) $\frac{\pi}{3}$
15. The eccentricity of the hyperbola whose latus rectum is 8 and conjugate axis is equal to half the distance between the foci is
- (1) $\frac{4}{3}$ (2) $\frac{4}{\sqrt{3}}$ (3) $\frac{2}{\sqrt{3}}$ (4) $\frac{2}{3}$
16. The radius of the circle passing through the point (6, 2) two of whose diameter are $x+y=6$ and $x+2y=4$ is
- (1) 10 (2) $2\sqrt{5}$ (3) 6 (4) 4
17. The eccentricity of the ellipse $(x-3)^2 + (y-4)^2 = \frac{y^2}{9}$ is
- (1) $\frac{\sqrt{3}}{2}$ (2) $\frac{1}{3}$ (3) $\frac{1}{3\sqrt{2}}$ (4) $\frac{1}{\sqrt{3}}$
18. If a vector $\vec{\alpha}$ lies in the plane of $\vec{\beta}$ and $\vec{\gamma}$, then
- (1) $[\vec{\alpha}, \vec{\beta}, \vec{\gamma}] = 1$ (2) $[\vec{\alpha}, \vec{\beta}, \vec{\gamma}] = -1$ (3) $[\vec{\alpha}, \vec{\beta}, \vec{\gamma}] = 0$ (4) $[\vec{\alpha}, \vec{\beta}, \vec{\gamma}] = 2$
19. 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
- (1) 81 (2) 9 (3) 27 (4) 18
20. If the direction cosines of a line are $\frac{1}{c}, \frac{1}{c}, \frac{1}{c}$, then
- (1) $c = \pm 3$ (2) $c = \pm \sqrt{3}$ (3) $c > 0$ (4) $0 < c < 1$

Dinesh Tuition Center

19, Palayam Bazaar, Uraiyur, Trichy.

Youtube : Dinesh Centum maths, Website : dineshcentummaths.blogspot.com

Ph. No : 7418865975

Part - II

Answer any SEVEN Questions.

7x2 = 14

Q.No. 30 is compulsory

21. If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ is non-singular, find A^{-1} .

22. Simplify the following.

$$i^{59} + \frac{1}{i^{59}}.$$

23. Find z^{-1} , if $z = (2+3i)(1-i)$ 24. Show that, if p, q, r are rational, the roots of the equation $x^2 - 2px + p^2 - q^2 + 2qr - r^2 = 0$ are rational.25. For What Value of x does $\sin x = \sin^{-1} x$?26. Find the general equation of a circle with centre $(-3, -4)$ and radius 3 units.

27. Identify the type of conic section for the equation.

$$3x^2 + 2y^2 = 14.$$

28. If $\vec{a}, \vec{b}, \vec{c}$ are three vectors. Prove that $[\vec{a}+\vec{c}, \vec{a}+\vec{b}, \vec{a}+\vec{b}+\vec{c}] = [\vec{a}, \vec{b}, \vec{c}]$.29. If $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$, $\vec{b} = 2\hat{i} + \hat{j} - 2\hat{k}$, $\vec{c} = 3\hat{i} + 2\hat{j} + \hat{k}$. find $\vec{a} \times (\vec{b} \times \vec{c})$

30. State Rouché-Capelli Theorem.

Dinesh Tuition Center

19, Palayam Bazaar, Uraiyur, Trichy.

YouTube: Dinesh centum maths, website: dineshcentummaths.blogspot.com

PhNo: 97418865975

Part - III

Answer any SEVEN Questions.

 $7 \times 3 = 21$

Q.No. 40 is compulsory.

31. Find the inverse of the non-singular matrix $A = \begin{bmatrix} 0 & 5 \\ -1 & 6 \end{bmatrix}$, by Gauss-Jordan method.

32. Find the inverse (if it exists) of the following

$$\begin{bmatrix} 2 & 3 & 1 \\ 3 & 4 & 1 \\ 3 & 7 & 2 \end{bmatrix}$$

33. Find the value of the real numbers x and y , if the complex number $(2+i)x + (1-i)y + 2i - 3$ and $x + (-1+2i)y + 1+i$ are equal.34. If $z_1 = 2-i$ and $z_2 = -4+3i$, find the inverse of $z_1 z_2$ and $\frac{z_1}{z_2}$.35. Solve the equation $3x^3 - 16x^2 + 23x - 6 = 0$ if the product of two roots is 1.36. Find the Principal Value of $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$.37. Find the equation of the Parabola with focus $(-\sqrt{2}, 0)$ and directrix $x = \sqrt{2}$.38. Find the equation of the ellipse foci $(\pm 3, 0)$, $e = \frac{1}{2}$.39. Show that the lines $\frac{x-1}{4} = \frac{2-y}{6} = \frac{z-4}{12}$ and $\frac{x-3}{-2} = \frac{y-3}{3} = \frac{5-z}{6}$ are Parallel.40. Write: 1) Jacobi's identity
2) Lagrange's identity.

Dinash Tuition Center.

19, Palayam Bazar, Madurai, Trichy.

Youtube: Dinash centum maths, Website: dineshcentummaths.blogspot.com

Ph No: 97118865975

Part - IV

7x5 = 35.

41. (a). Find the value of k for which the equations $kx - 2y + z = 1$, $x - 2ky + z = -2$, $x - 2y + kz = 1$ have.

(i) no solution (ii) unique solution (iii) infinitely many solution.

OR

- (b). Determine the value of λ for which the following system of equations. $(3\lambda - 8)x + 3y + 3z = 0$, $3x + (3\lambda - 8)y + 3z = 0$, $3x + 3y + (3\lambda - 8)z = 0$

42. (a). Find the value of $\sum_{k=1}^8 \cos\left(\frac{2k\pi}{9}\right) + i \sin\left(\frac{2k\pi}{9}\right)$

OR.

- (b). If $z = x + iy$ and $\arg\left(\frac{z-1}{z+1}\right) = \frac{\pi}{2}$, show that $x^2 + y^2 = 1$.

43. (a). Solve the equation $x^4 - 9x^2 + 20 = 0$.

OR.

- (b). Find the exact number of real zeros and imaginary of the Polynomial $x^9 + 9x^7 + 7x^5 + 5x^3 + 3x$.

44. (a). Prove that $\tan(\sin^{-1}x) = \frac{x}{\sqrt{1-x^2}}$, $-1 < x < 1$.

OR.

- (b). Find the number of solutions of the equation $\tan^{-1}(x-1) + \tan^{-1}x + \tan^{-1}(x+1) = \tan^{-1}(3x)$.

Dinesh Tuition Center

19, Paalayam Bazaar, Idaraiyur, Trichy.

Youtube : Dinesh Centum maths Website : dineshcentummaths.blogspot.com

Ph.No : 7418865975

45. a). Find the equations of tangent and normal to the parabola $x^2 + 6x + 4y + 5 = 0$ at $(1, -3)$.

OR

b). A rod of length 1.2m moves with its ends always touching the coordinate axis. The locus of a point P on the rod, which is 0.3m from the end in contact with x axis is an ellipse. Find the eccentricity.

46. a). Find the Vector equation in Parametric form and Cartesian equations of a straight line passing through the points $(-5, 7, -4)$ and $(13, -5, 2)$. Find the point where the straight line crosses the xy-plane.

OR.

- b). If the straight line $\frac{x-5}{5m+2} = \frac{y-4}{5} = \frac{z-1}{-1}$ and $x = \frac{2y+1}{4m} = \frac{z-1}{-3}$

are perpendicular to each other, find the value of m.

47. a). By using Gaussian elimination method, balance the chemical reaction equation: $C_2H_6 + O_2 \rightarrow H_2O + CO_2$.

OR

- b). Determine whether the pair of straight lines $\vec{r} = 2\hat{i} + 6\hat{j} + 3\hat{k} + t(2\hat{i} + 3\hat{j} + 4\hat{k})$ and $\vec{r} = 2\hat{j} - 3\hat{k} + s(\hat{i} + 2\hat{j} + 3\hat{k})$ are parallel. Find the shortest distance between them.

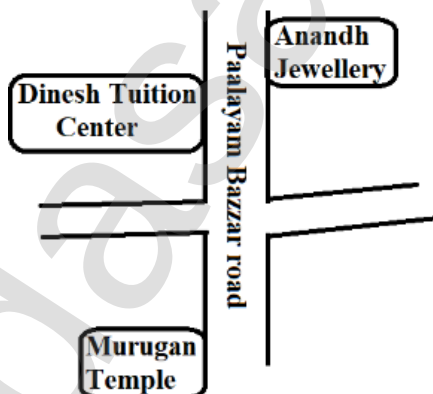


DINESH TUITION CENTER,

(Opposite Aanandh Jewellery)

19, Paalayam Bazzar, Woraiyur, Trichy

- CBSE, State board - 10, 11, 12 ஆம் வகுப்புகளுக்கு கணக்கு பாடம் சிறந்த முறையில் கற்பிக்கப்படும்.
- ஒரு **Batch**க்கு 15 மாணவர்கள் மட்டுமே சேர்க்கப்படுவர்
- வாரந்திர, மாதத்தேர்வுகள் மூலம் சிறந்த பயிற்சி அளிக்கப்படும்.
- **Slow Learners** மீது தனிகவனம் செலுத்தப்படும்.



தொடர்புக்கு: 74188 65975

Dr. K. DINESH, M.Sc., M.Phil., PGDCA, Ph.D

Assitant Professor in Mathematics

Classes in Youtube: Dinesh Centum Maths

Website: dineshcentummaths.blogspot.com