



Padalsalai's Telegram Groups!

(தலைப்பிற்கு கீழே உள்ள லிங்கை கிளிக் செய்து குழுவில் இணையவும்!)

- Padalsalai's NEWS - Group
https://t.me/joinchat/NIfCqVRBNj9hhV4wu6_NqA
- Padalsalai's Channel - Group
<https://t.me/padasalaichannel>
- Lesson Plan - Group
<https://t.me/joinchat/NIfCqVWwo5iL-21gpzrXLw>
- 12th Standard - Group
https://t.me/Padalsalai_12th
- 11th Standard - Group
https://t.me/Padalsalai_11th
- 10th Standard - Group
https://t.me/Padalsalai_10th
- 9th Standard - Group
https://t.me/Padalsalai_9th
- 6th to 8th Standard - Group
https://t.me/Padalsalai_6to8
- 1st to 5th Standard - Group
https://t.me/Padalsalai_1to5
- TET - Group
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- PGTRB - Group
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- TNPSC - Group
https://t.me/Padalsalai_TNPSC

- Find the value of k for which the equations $kx - 2y + z = 1$, $x - 2ky + z = -2$, $x - 2y + kz = 1$
(i) no solutions (ii) unique solution (iii) infinitely many solutions
- If $z = x + iy$ and $\arg\left(\frac{z-i}{z+i}\right) = \frac{\pi}{4}$, show that $x^2 + y^2 + 3x - 3y + 2 = 0$.
- Solve $(2x - 17)(x + 3)(x - 2)(2x + 3) + 20 = 0$.
- If $\cos^{-1}x + \cos^{-1}y + \cos^{-1}z = \pi$ and $0 < x, y, z < 1$, show that $x^2 + y^2 + z^2 + 2xyz = 1$.
- Find the equations of tangent and normal to the ellipse $x^2 + 4y^2 = 32$, $\theta = \frac{\pi}{4}$.
- By vector method, prove that $\cos(\alpha + \beta) = \cos\alpha \cos\beta - \sin\alpha \sin\beta$.
- Find the points on the unit circle $x^2 + y^2 = 1$ nearest and farthest from $(1, 1)$.
- Let $f(x, y) = \sin(xy^2) + e^{x^2 + 5y}$ for all $(x, y) \in \mathbb{R}^2$ calculate $\frac{\partial f}{\partial x}, \frac{\partial f}{\partial y}, \frac{\partial^2 f}{\partial x^2}, \frac{\partial^2 f}{\partial x \partial y}, \frac{\partial^2 f}{\partial y^2}$.
- Find the area of the region bounded between the curves $y = \sin x$ and $y = \cos x$ and the lines $x = 0$ & $x = \pi$.
- A tank initially contains 50 litres of pure water. Starting at time $t = 0$ a brine containing with 2 grams of dissolved salt per litre flows into the tank at the rate of 3 litres per minute. The mixture is kept uniform by stirring and the well-stirred mixture simultaneously flows out of the tank at the same rate. Find the amount of salt present in the tank at any time $t > 0$.

5 marksXII

12 x 5 = 60

Maths

- ① Investigate for what values of λ and μ the system of linear equations $x + 2y + 3z = 7$, $x + y + \lambda z = \mu$, $x + 3y - 5z = 5$ has (i) no solution (ii) a unique solution (iii) an infinite number of solutions

② Find the cube roots of unity

③ Find all zeros of the polynomial $x^6 - 3x^5 - 5x^4 + 22x^3 + 22x^2 - 39x + 135$, if it is known that $1 + 2i$ and $\sqrt{3}$ are two of its zeros

④ If $\cos^{-1}x + \cos^{-1}y + \cos^{-1}z = \pi$ and $0 < x, y, z < 1$, show that $x^2 + y^2 + z^2 + 2xyz = 1$

⑤ For the ellipse $4x^2 + y^2 + 24x - 2y + 21 = 0$, Find the centre, vertices and the foci. Also p.t the length of latus rectum is 2.

⑥ Find the coordinates of the foot of the $\perp$ and length of the $\perp$ from the point $(4, 3, 2)$ to the plane $x + 2y + 3z = 2$

ALL CHAPTERS

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⑦ Find the angle b/w $y = x^2$ and $y = (x-3)^2$

⑧ Let $w(x, y) = xy + \frac{e^y}{y^2 + 1}$
 $\forall (x, y) \in \mathbb{R}^2$. calculate $\frac{\partial^2 w}{\partial x \partial y}$ and $\frac{\partial^2 w}{\partial y \partial x}$

⑨ Integrate: $\int_{\pi/8}^{3\pi/8} \frac{dx}{1 + \sqrt{\tan x}}$

⑩ Solve $\frac{dy}{dx} + \frac{3y}{x} = \frac{1}{x}$,
given that $y = 2$
When $x = 1$

⑪ A random variable x has the following probability mass function

x	1	2	3	4	5
f(x)	k^2	$2k^2$	$3k^2$	$2k$	$3k$

Find (i) the value of k
(ii) $P(2 \leq x < 5)$
(iii) $P(3 < x)$

⑫ prove that
 $P \rightarrow (Q \rightarrow R) \equiv (P \wedge Q) \rightarrow R$
Without using truth table

ALL THE BEST
BY B.SUGADEV.M.Sc.BED

XII

5-Mark test

$$12 \times 5 = 60.$$

1. A boy is walking along the path $y = ax^2 + bx + c$ through the points $(-6, 8)$, $(-2, -12)$, and $(3, 8)$. He wants to meet his friend at $P(7, 60)$. Will he meet his friend? (use Gaussian elimination method.)
2. If $z = x + iy$ and $\arg\left(\frac{z-i}{z+2}\right) = \frac{\pi}{4}$, show that $x^2 + y^2 + 3x - 3y + 2 = 0$.
3. Solve the following equation:

$$x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$$
4. Solve $\tan^{-1}\left(\frac{n-1}{n-2}\right) + \tan^{-1}\left(\frac{n+1}{n+2}\right) = \frac{\pi}{4}$
5. On lighting a rocket cracker, it gets projected in a parabolic path and reaches a maximum height of 4m when it is 6m away from the point of projection. Finally it reaches the ground 12m away from the starting point. Find the angle of projection.
6. If $\vec{a} = 2\hat{i} + 3\hat{j} - \hat{k}$, $\vec{b} = 3\hat{i} + 5\hat{j} + 2\hat{k}$, $\vec{c} = -\hat{i} - 2\hat{j} + 3\hat{k}$, verify that

$$(\vec{a} \times \vec{b}) \times \vec{c} = (\vec{a} \cdot \vec{c})\vec{b} - (\vec{b} \cdot \vec{c})\vec{a}$$
7. A Hollow cone with base radius a cm and height b cm is placed on a table. Show that the volume of the largest cylinder that can be hidden underneath is $\frac{4}{9}$ times volume of cone.

8. If $u = \sin^{-1} \left(\frac{x+y}{\sqrt{x+y}} \right)$, show that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \frac{1}{2} \tan u$
9. Evaluate : $\int_{-4}^4 |x+3| dx$
10. $\left(1 + 3e^{\frac{y}{x}}\right) dy + 3e^{\frac{y}{x}} \left(1 - \frac{y}{x}\right) dx = 0$,
given that $y=0$ when $x=1$.
11. On the average, 20% of the products manufactured by ABC company are found to be defective. If we select 6 of these products at random and X denotes the number of defective products find the probability that
- (i) two products are defective
 - (ii) at most one product is defective
 - (iii) at least two products are defective
12. Using the equivalence property, show that $P \leftrightarrow Q \equiv (P \wedge Q) \vee (\neg P \wedge \neg Q)$

ALL THE BEST

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5 mark Test

12 x 5 = 60

1. Find the value of k for which the equations $kx - 2y + z = 1$, $x - 2ky + z = -2$, $x - 2y + kz = 1$ (i) no solution (ii) unique solution (iii) infinitely many solution
2. Let z_1, z_2 and z_3 be complex numbers such that $|z_1| = |z_2| = |z_3| = r > 0$ and $z_1 + z_2 + z_3 \neq 0$ prove that $\left| \frac{z_1 z_2 + z_2 z_3 + z_3 z_1}{z_1 + z_2 + z_3} \right| = r$
3. Solve $(x-4)(x-7)(x-2)(x+1) = 16$
4. If $a_1, a_2, a_3, \dots, a_n$ is an arithmetic progression with common difference d , prove that
$$\tan \left[\tan^{-1} \left(\frac{d}{1+a_1} \right) + \tan^{-1} \left(\frac{d}{1+a_2} \right) + \dots + \tan^{-1} \left(\frac{d}{1+a_n} \right) \right] = \frac{a_n - a_1}{1 + a_1 a_n}$$
5. Find the centre, foci, and eccentricity of the hyperbola $11x^2 - 25y^2 - 44x + 50y - 256 = 0$.
6. Find the points where the straight line passes through $(6, 7, 4)$ and $(8, 4, 9)$ cuts the xz and yz planes.
7. A hollow cone with base radius a cm and height b cm is placed on a table. Show that the volume of the largest cylinder that can be hidden underneath is $\frac{4}{9}$ times volume of the cone.

8. If $V(x, y) = e^x (x \cos y - y \sin y)$,

Then prove that $\frac{\partial^2 V}{\partial x^2} + \frac{\partial^2 V}{\partial y^2} = 0$

9. Evaluate $\int_1^4 (2x^2 + 3) dx$, as the limit of a sum.

10. A tank contains 1000 litres of water in which 100 grams of salt is dissolved. Brine runs in a rate of 10 litres per minute, and each litre contain 5 grams of dissolved salt. The mixture of the tank is kept uniform by stirring. Brine runs out at 10 litres per minute. Find the amount of salt at any time t .

11. Suppose that $f(x)$ given below representing a probability mass function.

x	1	2	3	4	5	6
$f(x)$	c^2	$2c^2$	$3c^2$	$4c^2$	c	$2c$

Find (i) the value of c

(ii) Mean and variance.

12. Verify (i) closure property, (ii) commutative property, (iii) associative property, (iv) existence of identity, and (v) existence of inverse for following operation on the given set.

$$m * n = m + n - mn; m, n \in \mathbb{Z}$$

by $\quad \quad \quad x \quad$

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