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Q.18 From 6 different navels. Dictionary arrangements is -
(4) 6 3

$$\text{selection } {}^6C_4 \times {}^3C_1 \Rightarrow 15 \times 3 = 45.$$

$N_1 \quad N_2 \quad (D) \quad N_3 \quad N_4 \rightarrow \text{dance.}$
so total $45 \times 4 = 180$
so (4) is correct.

Q.19 If the system of Linear eqⁿ has non zero solⁿ

$$\begin{aligned} (3) \quad & \begin{cases} x + ky + 3z = 0 \\ 3x + ky - 2z = 0 \\ 2x + 4y - 3z = 0 \end{cases} \end{aligned}$$

$$K = 11$$

$$\begin{aligned} & \begin{cases} x + 11y + 3z = 0 \\ 3x + 11y - 2z = 0 \\ 2x + 4y - 3z = 0 \end{cases} \end{aligned}$$

$$\text{eliminating } z \text{ from (i) \& (ii)} \\ +18y + 9z = 0 \\ \text{Put in (i)} \\ x + 11y + 3(-2y) = 0 \quad x + 11y - 6y = 0$$

$$\text{so } \frac{xz}{y^2} = \frac{(-5y)(-2y)}{y^2} = 10$$

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Q-20
(4)

$$\begin{vmatrix} x-4 & 2x & 2x \\ 2x & x-4 & 2x \\ 2x & 2x & x-4 \end{vmatrix} = (A+Bx)(x-A)^2$$

put $x=0$.

$$\begin{vmatrix} -4 & 0 & 0 \\ 0 & -4 & 0 \\ 0 & 0 & -4 \end{vmatrix} = (A)(A)^2.$$

$-64 = A^3 \rightarrow A = -4$

put $x=1$.

$$\begin{vmatrix} -3 & 2 & 2 \\ 2 & -3 & 2 \\ 2 & 2 & -3 \end{vmatrix} \Rightarrow \begin{vmatrix} -3 & 2 & 2 \\ 2 & -3 & 2 \\ 0 & 5 & -5 \end{vmatrix} \Rightarrow \begin{vmatrix} -3 & 4 & 2 \\ 2 & -1 & 2 \\ 0 & 0 & -5 \end{vmatrix}$$

$$= -5(3-8) = 25 = (-4+B)(5)^2.$$

$$25 = (-4+B)(25)$$

$$1 = -4+B. \quad B=5.$$

$A = -4, B = 5$

$(-4+5x)(4)$

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Q.4 If L_1 is the line of intersection - - -
- - - $L_1 \& L_2$ is .

(3) L_1 is \perp to $P_1 \& P_2$. Let dir's of $L_1 \rightarrow a_1, b_1, c_1$.
 $2a_1 - 3b_1 + 2c_1 = 0$ & $a_1 - b_1 + c_1 = 0$.

$$\frac{a_1}{1} = \frac{b_1}{0} = \frac{c_1}{0} \rightarrow a_1 = 1, b_1 = 1, c_1 = 0$$

L_2 is \perp to $P_3 \& P_4$. Let dir's of $L_2 \rightarrow a_2, b_2, c_2$

$$a_2 + 2b_2 - c_2 = 0 \text{ & } 3a_2 - b_2 + 2c_2 = 0$$

$$\frac{a_2}{-7} = \frac{b_2}{7} = \frac{c_2}{-8} \rightarrow a_2 = -7, b_2 = 7, c_2 = -8$$

Let \star is a point on L_1 with $y = 0$.

$$2x + 3z - 2 = 0 \text{ & } x + 2z + 1 = 0$$

$$x = -5, y = 0, z = 4.$$

Plane $ax + by + cz = 0$.

$$P \perp L_1 \& L_2. \quad a + b = 0 \text{ & } -7a + 7b - 8c = 0.$$

$$\frac{a}{-7} = \frac{b}{7} = \frac{c}{-8}$$

$$P \rightarrow -7x + 7y - 8z = k \rightarrow x = -5, y = 0, z = 4.$$

$$35 - 8 - 32 = k \rightarrow k = -3$$

$$P \rightarrow -7x + 7y - 8z = -3$$

$$d = \frac{|-3|}{\sqrt{7^2 + 7^2 + 8^2}} = \frac{3}{\sqrt{162}} = \frac{3}{9\sqrt{2}} = \frac{1}{3\sqrt{2}}$$

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Ques 8 Let $f(x) = x^2 + \frac{1}{x^2}$ --- Value of $f'(x)$ is

Solⁿ: $f(x) / g(x) \Rightarrow \frac{x^2 + \frac{1}{x^2}}{x - \frac{1}{x}} = \frac{x^2 + \frac{1}{x^2}}{x - \frac{1}{x}}$

(4)

$$= \frac{(x - \frac{1}{x})^2 + 2}{x - \frac{1}{x}} \Rightarrow \frac{(x - \frac{1}{x}) + \frac{2}{(x - \frac{1}{x})}}{1} = t + \frac{2}{t}$$

where $t \rightarrow x - \frac{1}{x}$

$f(t) = t + \frac{2}{t}$ $f'(t) = 1 - \frac{2}{t^2} = 0$ $t^2 = 2$
 $t = \pm \sqrt{2}$

$f(t) = -\sqrt{2} - \frac{2}{\sqrt{2}} = -2\sqrt{2}$ (4)

Q-9
(3)

Solⁿ $\int \frac{\sin^2 x \cos^2 x dx}{(\sin^2 x + \cos^2 x \sin^2 x + \sin^2 x \cos^2 x + \cos^2 x)^2} = ?$

$$\Rightarrow \int \frac{s^2 c^2 dx}{(s^2(s^2+c^2) + c^2(s^2+c^2))^2} = \int \frac{s^2 c^2 dx}{(s^2+c^2)^2}$$

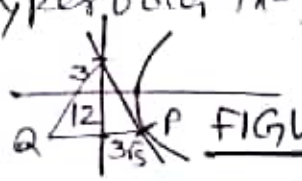
$\Rightarrow \int \frac{s^2 c^2 dx}{c^4 (1 + \tan^2 x)^2} = \int \frac{3 \tan^2 x \sec^2 x dx}{3(1 + \tan^2 x)^2} \Rightarrow \int \frac{1}{3t^2} dt$

$= -\frac{1}{3(1 + \tan^2 x)} + C$ (3)

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8th Set D

Q.17. Tangents are drawn to the hyperbola $4x^2 - y^2 = 36$ (B) at the points - - - -

Sol.: $4x^2 - y^2 = 36 \rightarrow \frac{x^2}{9} - \frac{y^2}{36} = 1$ a  FIGURE

eq of T $y = mx \pm \sqrt{a^2 m^2 - 36} = mx \pm \sqrt{9m^2 - 36}$

passing (0,3) passing (put) $3 = m \cdot 0 \pm \sqrt{9m^2 - 36}$

$3 = \pm \sqrt{9m^2 - 36}$

Sq
 $9 = 9m^2 - 36$

by 9
 $1 = m^2 - 4$

$m^2 = 5$

$m = \pm\sqrt{5}$

$y = \pm\sqrt{5}x \pm \sqrt{9m^2 - 36}$

Use Slope -ve & c = +

$y = -\sqrt{5}x + \sqrt{9m^2 - 36}$

$m = -\sqrt{5}; m^2 = 5$

$y = -x\sqrt{5} + \sqrt{9 \cdot 5 - 36} \rightarrow -x\sqrt{5} + 3\sqrt{5-4} \rightarrow -x\sqrt{5} + 3$

① $y = -x\sqrt{5} + 3$ } diff of curve $8x^2 - 2x \cdot y' = 0$

$4x^2 = y \cdot m$

$4x_1 = y_1 \cdot (-\sqrt{5})$

Put tangent ①

$y_1 = -\left(\frac{-y_1\sqrt{5}}{4}\right)\sqrt{5} + 3$

$4y_1 = 5y_1 + 12$

$y_1 = -12$ & $x_1 = +3\sqrt{5}$

See above fig Area $\frac{1}{2} \cdot 2(3\sqrt{5})(12+3) = 45\sqrt{5}$ Ans.