

- 16) If $x^3 dy + xy dx = x^2 dy + 2y dx$; $y(2) = e$ and $x > 1$, then $y(4)$ is equal to : [Sep-2020]
- $\frac{3}{2} + \sqrt{e}$
 - $\frac{3}{2} \sqrt{e}$
 - $\frac{1}{2} + \sqrt{e}$
 - $\frac{\sqrt{e}}{2}$
- 17) Let e_1 and e_2 be eccentricities of the ellipse, $\frac{x^2}{25} + \frac{y^2}{b^2} = 1$ ($b < 5$) and the hyperbola, $\frac{x^2}{16} - \frac{y^2}{b^2} = 1$ respectively satisfying $e_1 e_2 = 1$. If α and β are the distances between the foci of the ellipse and the foci of the hyperbola respectively, then the ordered pair (α, β) is equal to : [Sep-2020]
- (8, 10)
 - (8, 12)
 - $(\frac{20}{3}, 12)$
 - $(\frac{24}{5}, 10)$
- 18) The set of all real values of λ for which the quadratic equations, $(\lambda^2 + 1)x^2 - 4\lambda x + 2 = 0$ always has exactly one root in the interval (0, 1) is : [Sep-2020]
- $(-3, -1)$
 - $(1, 3]$
 - $(0, 2)$
 - $(2, 4]$
- 19) If the term independent of x in the expansion of $(\frac{3}{2}x^2 - \frac{1}{3x})^9$ is k , then $18k$ is equal to : [Sep-2020]
- 9
 - 11
 - 5
 - 7
- 20) Let p, q, r be three statements such that the truth value of $(p \wedge q) \rightarrow (\sim p \vee r)$ is F . The truth values of p, q, r are respectively : [Sep-2020]
- F, T, F
 - T, F, T
 - T, T, F
 - T, T, T
- 21) If m arithmetic means (A.M.s) and three geometric means (G.M.s) are inserted between 3 and 243 such that the 4th A.M. is equal to 2nd G.M., then m is equal to... [Sep-2020]
- 22) Let a plane P contain two lines $\vec{r} = \hat{i} + \lambda(\hat{i} + \hat{j})$, $\lambda \in R$ and $\vec{r} = -\hat{j} + \mu(\hat{j} - \hat{k})$, $\mu \in R$. If $Q(\alpha, \beta, \gamma)$ is the foot of the perpendicular drawn from the point $M(1, 0, 1)$ to P ,

then $3(\alpha, \beta, \gamma)$ equals...

[Sep-2020]

- 23) Let S be set of all integer solutions (x, y, z) , of the system of equations

$$x - 2y + 5z = 0$$

$$-2x + 4y + z = 0$$

$$-7x + 14y + 9z = 0$$

such that $15 \leq x^2 + y^2 + z^2 \leq 150$. Then the number of elements in the set S is equal to ...

[Sep-2020]

- 24) The total number of 3-digit number numbers, whose sum of digits is 10, is... [Sep-2020]

- 25) If the tangent at the curve, $y = e^x$ at a point (c, e^c) and the normal to the parabola, $y^2 = 4x$ at the point $(1, 2)$ intersect at the same point on the x -axis, then the value of c is...

[Sep-2020]