03/09/2020-Shift 2

EE24BTECH11021 - Eshan Ray

16) If $x^3dy + xydx = x^2dy + 2ydx; y(2) = e$ and $x>1$, then $y(4)$ is equal to : [Sep 2020]
   a) $\frac{3}{2} + \sqrt{e}$
   b) $\frac{3}{2}\sqrt{e}$
   c) $\frac{1}{2} + \sqrt{e}$
   d) $\frac{\sqrt{e}}{2}$

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 $e_1e_2 = 1$. 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]
   a) $(8, 10)$
   b) $(8, 12)$
   c) $\left(\frac{20}{3}, 12\right)$
   d) $\left(\frac{24}{5}, 10\right)$

18) The set of all real values of λ for which the quadratic equations, $\left(\lambda^2 + 1\right)x^2 - 4\lambda x + 2 = 0$ always has exactly one root in the interval $(0, 1)$ is : [Sep 2020]
   a) $(-3, -1)$
   b) $(1, 3]$
   c) $(0, 2)$
   d) $(2, 4]$

19) If the term independent of x in the expansion of $\left(\frac{3}{2}x^2 - \frac{1}{3x}\right)^9$ is k, then $18k$ is equal to : [Sep 2020]
   a) 9
   b) 11
   c) 5
   d) 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]
   a) F, T, F
   b) T, F, T
   c) T, T, F
   d) T, T, T

21) If m arithmetic means($A.Ms$) and three geometric means ($G.Ms$) are inserted between 3 and 243 such that the $4^{th}A.M.$ is equal to $2^{nd}G.M.$, then m is equal to... [Sep 2020]

22) Let a plane P contain two lines $\vec{r} = \hat{i} + \lambda\left(\hat{i} + \hat{j}\right), \lambda \in R$ and $\vec{r} = -\hat{j} + \mu\left(\hat{j} - \hat{k}\right), \mu \in R$. 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... [$Sep\,2020$]