04/09/2020-Shift 1

EE24BTECH11021 - Eshan Ray

16) If $1+\left(1-2^2\cdot 1\right)+\left(1-4^2\cdot 3\right)+\left(1-6^2\cdot 5\right)+\cdots+\left(1-20^2\cdot 19\right)=\alpha-220\beta$, then the ordered pair (α,β) is equal to :
   a) $(10,97)$
   b) $(11,103)$
   c) $(10,103)$
   d) $(11,97)$

17) Let $y = y(x)$ be the solution of the differential equation, $xy' - y = x^2(x\cos x+\sin x)$, $x>0$. If $y(\pi)=\pi$, then $y''\left(\frac{\pi}{2}\right)+y\left(\frac{\pi}{2}\right)$ is equal to :
   a) $2+\frac{\pi}{2}$
   b) $1+\frac{\pi}{2}$
   c) $1+\frac{\pi}{2}+\frac{\pi^2}{4}$
   d) $2+\frac{\pi}{2}+\frac{\pi^2}{4}$

18) The value of $\sum_{r=0}^{20}\binom{50-r}{6}$ is equal to :
   a) $\binom{51}{7}+\binom{30}{7}$
   b) $\binom{51}{7}-\binom{30}{7}$
   c) $\binom{50}{7}-\binom{30}{7}$
   d) $\binom{50}{6}-\binom{30}{6}$

19) TLet f be a twice differential function on $(1,6)$. If $f(2)=8, f'(2)=5, f'(x)\geq 1$ and $f''(x)\geq 4$, for all $x\in(1,6)$, then :
   a) $f(5)\leq 10$
   b) $f'(5)+f''(5)\leq 20$
   c) $f(5)+f'(5)\geq 28$
   d) $f(5)+f'(5)\leq 26$

20) If $\left(a+\sqrt{2}b\cos x\right)\left(a-\sqrt{2}b\cos y\right)=a^2-b^2$, where $a>b>0$, then $\frac{dx}{dy}$ at $\left(\frac{\pi}{4},\frac{\pi}{4}\right)$ is:
   a) $\frac{a+b}{a-b}$
   b) $\frac{a-2b}{a+2b}$
   c) $\frac{a-b}{a+b}$
   d) $\frac{2a+b}{2a-b}$

21) Suppose a differentiable function $f(x)$ satisfies the identity $f(x+y)=f(x)+f(y)+xy^2+x^2y$,for all real x and y.If $\lim_{x\to 0}\frac{f(x)}{x}=1$, then $f'(3)$ is equal to...

22) If the equation of a plane P, passing through the intersection of the planes, $x+4y-z+7=0$ and $3x+y+5z=8$ is $ax+by+6z=15$ for some $a,b\in R$, then the distance of the point $(3,2,-1)$ from the plane P is...units

23) If the system of equations
$x-2y+3z=9$

$2x + y + z = b$

$x - 7y + az = 24$, has infinitely many solutions, then $a - b$ is equal to ...

24) Let $\left(2x^2 + 3x + 4\right)^{10} = \sum_{r=0}^{20} a_r x^r$. Then $\frac{a_7}{a_{13}}$ is equal to...

25) The probability of a man hitting a target is $\frac{1}{10}$.The least number of shots required, so that the probability of his hitting the target at least once is greater than $\frac{1}{4}$, is...