2020-Jan-9 Shift-1

AI24BTECH11003 - B. Vijaya Sreyas

16) If for all real triplets (a, b, c), $f(x) = a + bx + cx^2$; then $\int_0^1 f(x)\,dx$ is equal to

a) $2\left(3f(1) + 2f\left(\frac{1}{2}\right)\right)$
b) $\left(\frac{1}{3}\right)\left(f(0) + f\left(\frac{1}{2}\right)\right)$
c) $\left(\frac{1}{2}\right)\left(f(1) + 3f\left(\frac{1}{2}\right)\right)$
d) $\frac{1}{6}\left(f(0) + f(1) + 4f\left(\frac{1}{2}\right)\right)$

17) If the number of five digit numbers with distinct digits and 2 at the 10^{th} place is $336k$, then k is equal to:

a) 8 b) 7 c) 4 d) 6

18) Let the observations $x_i\,(1 \le i \le 10)$ satisfy the equations,
$\sum_{i=1}^{10}(x_i - 5) = 10$ and $\sum_{i=1}^{10}(x_i - 5)^2 = 40$. If μ and λ are the mean and variance of observations, $(x_1 - 3), (x_2 - 3) \ldots\ldots (x_10 - 3)$, then the ordered pair (μ, λ) is equal to:

a) $(6, 3)$ b) $(3, 6)$ c) $(3, 3)$ d) $(6, 6)$

19) The integral $\int \frac{dx}{(x+4)^{\frac{8}{7}}(x-3)^{\frac{6}{7}}}$ is equal to

a) $-\left(\frac{x-3}{x-4}\right)^{-\frac{1}{7}} + C$
b) $\frac{1}{2}\left(\frac{x-3}{x-4}\right)^{\frac{3}{7}} + C$
c) $\left(\frac{x-3}{x-4}\right)^{\frac{1}{7}} + C$
d) $-\frac{1}{13}\left(\frac{x-3}{x-4}\right)^{-\frac{13}{7}} + C$

20) In a box, there are 20 cards out of which 10 are labelled as A and remaining 10 are labelled as B. Cards are drawn at random, one after the other and with replacement, till a second A-card is obtained. The probability that the second A-card appears before the third B-card is:

a) $\frac{15}{16}$ b) $\frac{9}{16}$ c) $\frac{13}{16}$ d) $\frac{11}{16}$

21) If the vectors $\overrightarrow{p} = (a+1)\hat{i} + a\hat{j} + a\hat{k}$, $\overrightarrow{q} = a\hat{i} + (a+1)\hat{j} + a\hat{k}$, and $\overrightarrow{r} = a\hat{i} + a\hat{j} + (a+1)\hat{k}\ (a \in R)$ are coplanar and $3\left(\overrightarrow{p} \cdot \overrightarrow{q}\right)^2 - \lambda\left|\overrightarrow{r} \times \overrightarrow{q}\right|^2 = 0$, then the value of λ is

22) The projection of the line segment joining the points $(1, -1, 3)$ and $(2, -4, 11)$ on the line joining the points $(-1, 2, 3)$ and $(3, -2, 10)$ is

23) The number of distinct solutions of the equation $\log_{\frac{1}{2}}|\sin x| = 2 - \log_{\frac{1}{2}}|\cos x|$ in the interval $[0, 2]$ is:

24) If for $x \ge 0$, $y = y(x)$ is the solution of the differential equation $(1+x)\,dy = \left[(1+x)^2 + y - 3\right]dx$, $y(2) = 0$, then $y(3)$ is equal to:

25) The coefficient of x^4 in the expansion of $(1 + x + x)^{10}$ is