ASSIGNMENT 7

EE24BTECH11034 - K Teja Vardhan

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1) The sum of all those terms which are rational numbers in the expansion of $\left(2^{1/3}+3^{1/4}\right)^{12}$ is:

a) 89 b) 27 c) 35 d) 43

2) The first of the two samples in a group has 100 items with mean 15 and standard deviation 3. If the whole group has 250 items with mean 15.6 and standard deviation $\sqrt{13.44}$, then the standard deviation of the second sample is:

a) 8 b) 6 c) 4 d) 5

3) If $f(x)=\begin{cases}\int_0^1 (5+|1-t|)\,dt, & x>2\\ 5x+1, & x\le 2\end{cases}$, then

a) $f(x)$ is not continuous at $x=2$
b) $f(x)$ is everywhere differentiable
c) $f(x)$ is continuous but not differentiable at $x=2$
d) $f(x)$ is not differentiable at $x=1$

4) If the greatest value of the term independent of x in the expansion of $\left(x\sin\alpha+a+\frac{\cos\alpha}{x}\right)^{10}$ is $\frac{10!}{(5!)^2}$, then the value of a is equal to:

a) -1 b) 1 c) -2 d) 2

5) Consider the statement "The match will be played only if the weather is good and the ground is not wet". Select the correct negation from the following:

a) The match will not be played and the weather is not good and the ground is wet.
b) If the match will not be played, then either the weather is not good or the ground is wet.
c) The match will be played and the weather is not good or the ground is wet.
d) The match will not be played or the weather is good and the ground is not wet.

6) The value of $\cot\frac{\pi}{24}$ is:

a) $\sqrt{2}+\sqrt{3}+2-\sqrt{6}$
b) $\sqrt{2}+\sqrt{3}+2+\sqrt{6}$
c) $\sqrt{2}-\sqrt{3}-2+\sqrt{6}$
d) $3\sqrt{2}-\sqrt{3}-\sqrt{6}$

7) The lowest integer which is greater than $\left(1+\frac{1}{10^{100}}\right)^{10^{100}}$ is:

a) 3 b) 4 c) 2 d) 1

8) The value of the integral $\int_{-1}^{1} \log\left(x+\sqrt{x^2+1}\right) dx$ is:

a) 2 b) 0 c) -1 d) 1

9) Let a, b, and c be distinct positive numbers. If the vectors $\hat{a}i+\hat{a}j+\hat{c}k$, $\hat{i}+\hat{k}$, and $\hat{c}i+\hat{c}j+\hat{b}k$ are co-planar, then c is equal to:

a) $\frac{2}{\frac{1}{a}+\frac{1}{b}}$ b) $\frac{a+b}{2}$ c) $\frac{1}{a}+\frac{1}{b}$ d) $\sqrt{ab}$

10) If $[x]$ be the greatest integer less than or equal to x, then $\sum_{n=8}^{100} \frac{(-1)^n[n]}{2}$ is equal to:

a) 0 b) 4 c) -2 d) 2

11) The number of distinct real roots of $\begin{vmatrix} \sin x & \cos x & \cos x \\ \cos x & \sin x & \cos x \\ \cos x & \cos x & \sin x \end{vmatrix} = 0$ in the interval $\frac{\pi}{4} \leq x \leq \frac{\pi}{4}$ is:

a) 4 b) 1 c) 2 d) 3

12) If $|a|=2$, $|b|=5$ and $|a\times b|=8$, then $|a\cdot b|$ is equal to:

a) 6 b) 4 c) 3 d) 5

13) The number of real solutions of the equation, $x^2-|x|-12=0$ is:

a) 2 b) 3 c) 1 d) 4

14) Consider functions $f: A\to B$ and $g: B\to C$ $(A,B,C\subseteq\mathbb{R})$ such that $(gof)^{-1}$ exists, then:

a) f and g both are one-one
b) f and g both are onto
c) f is one-one and g is onto
d) f is onto and g is one-one

15) If $P=\begin{bmatrix} 1 & 0 \\ \frac{1}{2} & 1 \end{bmatrix}$, then P^{50} is:

a) $\begin{bmatrix} 1 & 0 \\ 25 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 50 \\ 0 & 1 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 25 \\ 0 & 1 \end{bmatrix}$ d) $\begin{bmatrix} 1 & 0 \\ 50 & 1 \end{bmatrix}$