31,August,2021 Shift-2 1-15

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1) If $\alpha+\beta+\gamma=2\pi$,Then the system of equations
$x+(\cos\gamma)y+(\cos\beta)z$=0
$(\cos\gamma)x+y+(\cos\alpha)z$=0
$(\cos\beta)x+(\cos\alpha)y+z$=0
has :
   a) no solution
   b) infinitely many solutions
   c) exactly two solutions
   d) a unique solution

2) let $\overrightarrow{a},\overrightarrow{b},\overrightarrow{c}$ be three vectors mutually perpendicular to each other and have same magnitude. If a vector $\overrightarrow{r}$ satisfies
$\overrightarrow{a}\times\{\left(\overrightarrow{r}-\overrightarrow{b}\right)\times\overrightarrow{a}\}+\overrightarrow{b}\times\{\left(\overrightarrow{r}-\overrightarrow{c}\right)\times\overrightarrow{b}\}+\overrightarrow{c}\times\{\left(\overrightarrow{r}-\overrightarrow{a}\right)\times\overrightarrow{c}\}=\overrightarrow{o}$
Then $\overrightarrow{r}$ is equal to :
   a) $\frac{1}{3}\left(\overrightarrow{a}+\overrightarrow{b}+\overrightarrow{c}\right)$
   b) $\frac{1}{3}\left(2\overrightarrow{a}+\overrightarrow{b}-\overrightarrow{c}\right)$
   a) $\frac{1}{2}\left(\overrightarrow{a}+\overrightarrow{b}+\overrightarrow{c}\right)$
   b) $\frac{1}{2}\left(\overrightarrow{a}+\overrightarrow{b}+2\overrightarrow{c}\right)$

3) The domian of the function
f(x)= $\sin^{-}\left(\frac{3x^2+x-1}{(x-1)^2}\right)+\cos^{-}\left(\frac{x-1}{x+1}\right)$ is:
   a) $\left[0,\frac{1}{4}\right]$
   b) $[-2,0]\cup\left[\frac{1}{4},\frac{1}{2}\right]$
   a) $\left[\frac{1}{4},\frac{1}{2}\right]\cup\{0\}$
   b) $\left[0,\frac{1}{2}\right]$

4) Let S= {1,2,3,4,5,6}. Then the probability that a randomly chosen onto function g from S to S satisfies $g(3)=2g(1)$ is :
   a) $\frac{1}{10}$
   b) $\frac{1}{15}$
   a) $\frac{1}{5}$
   b) $\frac{1}{30}$

5) Let f :$N\mapsto N$ be a function such that $f(m+n)=f(m)+f(n)$ for every $m,n\in N$. If $f(6)=18$ then $f(2).f(3)$ is equal to :
   a) 6
   b) 54
   a) 18
   b) 36

6) The distance of the point $(-1,2,-2)$ from the line of intersection of the planes 2x+3y+2z=0 and x-2y+z=0 is:
   a) $\frac{1}{\sqrt{2}}$
   b) $\frac{5}{2}$
   a) $\frac{\sqrt{42}}{2}$
   b) $\frac{\sqrt{34}}{2}$

7) Negation of the statement $(p\vee r)\implies(q\vee r)$ is :
   a) $p\wedge\sim q\wedge\sim r$
   b) $\sim p\wedge q\wedge r\sim$
   a) $\sim p\wedge q\wedge r$
   b) $p\wedge q\wedge r$

8) If $\alpha=\lim_{x\to\frac{\pi}{4}}\frac{\tan^3x-\tan x}{\cos\left(x+\frac{\pi}{4}\right)}$ and $\beta=\lim_{x\to 0}(\cos x)^{\cot x}$ are the roots of the equation $ax^2+bx-4=0$, then the ordered pair (a,b) is :
   a) $(1,-3)$
   b) $(-1,3)$
   a) $(-1,-3)$
   b) $(1,3)$

9) The locus of the midpoints of the line segments joining $(-3,-5)$ and the points on the ellipse $\frac{x^2}{4}+\frac{y^2}{4}=1$ is :
   a) $9x^2+4y^2+18x+8y+145=0$
   b) $36x^2+16y^2+90x+56y+145=0$
   c) $36x^2+16y^2+108x+80y+145=0$
   d) $36x^2+16y^2+72x+32y+145=0$

10) If $\frac{dy}{dx}=\frac{2^xy+2^y.2^x}{2^x+2^{x+y}\log_e 2}$,$y(0)=0$, then for $y=1$, the value of x lies in the interval
   a) $(1,2)$
   b) $\left(\frac{1}{2},1\right]$
   a) $(2,3)$
   b) $\left(0,\frac{1}{2}\right]$

11) An angle of intersection of the curves $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and $x^2+y^2=ab$, $a>b$ is :

a) $\tan^{-}\left(\frac{a+b}{\sqrt{ab}}\right)$ b) $\tan^{-}\left(\frac{a-b}{2\sqrt{ab}}\right)$

a) $\tan^{-}\left(\frac{a-b}{\sqrt{ab}}\right)$ b) $\tan^{-}\left(2\sqrt{ab}\right)$

12) If $y\frac{dy}{dx} = x\left[\frac{y^2}{x^2}+\frac{\phi\left(\frac{y^2}{x^2}\right)}{\phi'\left(\frac{y^2}{x^2}\right)}\right]$, $x>0$, $\phi>0$, and $y(1)=-1$, then $\phi\left(\frac{y^2}{4}\right)$ is equal to :

a) $4\phi(2)$ b) $4\phi(1)$

a) $2\phi(1)$ b) $\phi(1)$

13) The sum of the roots of the equation $x+1-2\log_4(3+2^x)+2\log_4(10-2^{-x})=0$,is:

a) $log_2 14$ b) $log_2 11$

a) $log_2 12$ b) $log_2 13$

14) If z is a complex number such that $\frac{z-i}{z-1}$ is purely imaginary the the minimum value of $|z-(3+3i)|$ is :

a) $2\sqrt{2}-1$ b) $3\sqrt{2}$

a) $6\sqrt{2}$ b) $2\sqrt{2}$

15) Let $a_1, a_2, a_3, ...$ be an AP. If $\frac{a_1+a_2+...+a_10}{a_1+a_2+...+a_p}=\frac{100}{p^2}$, $p\neq 10$, then $\frac{a_11}{a_10}$ is equal to :

a) $\frac{19}{21}$ b) $\frac{100}{121}$

a) $\frac{21}{19}$ b) $\frac{121}{100}$