MATHS

BOOKS - MODERN PUBLICATION MATHS (KANNADA ENGLISH)

UNIT TEST PAPER NO - 4

Select The Correct Answer

1. If $\sin^{-1}\left(x-\frac{x^2}{2}+\frac{x^3}{4}-\ldots.\right)+\cos^{-1}\left(x^2-\frac{x^4}{2}+\frac{x^6}{4}-\ldots.\right)=\frac{\pi}{2}$ for $0<|x|<\sqrt{2}$ then $x=$

A. $\frac{1}{2}$

B. 1

C. $-\frac{1}{2}$

D. -1

Answer: B

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2. If $\cot^{-1}\left(\sqrt{\cos\alpha}\right) - \tan^{-1}\left(\sqrt{\cos\alpha}\right) = x$, then $\sin x$ is $\frac{\tan^2\alpha}{2}$ (b) $\frac{\cot^2\alpha}{2}$ (c) $\tan^2\alpha$ (d) $\frac{\cot\alpha}{2}$

A. $\tan^2\frac{\alpha}{2}$

B. $\cot^2\frac{\alpha}{2}$

C. $\tan\alpha$

D. $\cot\frac{\alpha}{2}$

Answer: A

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3. If $\sin^{-1}\left(\frac{x}{5}\right) + \cos ec^{-1}\left(\frac{5}{4}\right) = \frac{\pi}{2}$ then a value of x is: (1) 1 (2) 3 (3) 4 (4) 5

A. 3

B. 4

C. 5

D. 1

Answer: A

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4. The value of $\cot\left(\cos ec^{-1}\frac{5}{3} + \tan^{-1}\frac{2}{3}\right)$ is

A. $\frac{5}{17}$

B. $\frac{6}{17}$

C. $\frac{3}{17}$

D. $\frac{4}{17}$

Answer: B

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5. If $0 < x < 1$, then $\sqrt{1+x^2}\left[\left\{x\cos\left(\cot^{-1}x\right)+\sin\left(\cot^{-1}x\right)\right\}^2-1\right]^{1/2}$ is equal to

A. $\frac{x}{\sqrt{(1+x^2)}}$

B. x

C. $x\sqrt{1+x^2}$

D. $\sqrt{1+x^2}$

Answer: C

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6. If $A = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & x \end{bmatrix}$ is an idempotent matrix, then x equals :

A. -5

B. -1

C. -3

D. -4

Answer: C

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7. The value of the determinant $\begin{vmatrix} \log_a\left(\frac{x}{y}\right) & \log_a\left(\frac{y}{z}\right) & \log_a\left(\frac{z}{x}\right) \\ \log_b\left(\frac{y}{z}\right) & \log_b\left(\frac{z}{x}\right) & \log_b\left(\frac{x}{y}\right) \\ \log_c\left(\frac{z}{x}\right) & \log_c\left(\frac{x}{y}\right) & \log_c\left(\frac{y}{z}\right) \end{vmatrix}$

A. 1

B. -1

C. 0

D. $\frac{1}{6}\log_a xyz.$

Answer: C

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8. If α, β, γ are the roots of $x^3 + px + q = 0$, then the value of the determine $\begin{vmatrix} \alpha & \beta & \gamma \\ \beta & \gamma & \alpha \\ \gamma & \alpha & \beta \end{vmatrix}$ is

A. p

B. q

C. $p^2 - 2q$

D. 0

Answer: B

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9. If α, β are the roots of the equation $ax^2 + bx + c = 0$ and $S_n = \alpha^n + \beta^n$ then evaluate $\begin{vmatrix} 3 & 1+s_1 & +s_2 \\ 1+s_1 & 1+s_2 & 1+s_3 \\ 1+s_2 & 1+s_3 & 1+s_4 \end{vmatrix}$

A. $\frac{s^2\left(b^2 - 4ac\right)}{a^4}$

B. $\frac{b^2 - 4ac}{a^4}$

C. $\frac{(a+b+c)^2\left(b^2 - 4ac\right)}{a^4}$

D. $\frac{(a+b+c)^2}{4}$

Answer: C

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10. if $A = \begin{bmatrix} \cos & \sin x & 0 \\ -\sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix} = f(x)$ then A^{-1}

A. $f(-x)$

B. $f(x)$

C. $-f(x)$

D. $-f(-x)$

Answer: A

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11. Consider the system of linear equations:

$x_1 + 2x_2 + x_3 = 3$

$2x_1 + 3x_2 + x_3 = 3$

$3x_1 + 5x_2 + 2x_3 = 1$

The system has

A. infinite number of solutions

B. exactly 3 solutions

C. a unique solution

D. no solution

Answer: D

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12. Let a,b and c be such that (b+c) $\neq$ 0 . If

$$\begin{vmatrix} a & a+1 & a-1 \\ -b & b+1 & b-1 \\ c & c-1 & c+1 \end{vmatrix} + \begin{vmatrix} a+1 & b+1 & c-1 \\ a-1 & b-1 & c+1 \\ (-1)^{n+2}a & (-1)^{n+1}b & (-1)^{n}c \end{vmatrix} = 0 \quad ,$$

then the value of 'n' is :

A. zero

B. any even integer

C. any old integer

D. any integer

Answer: C

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13. Let a,b,c, be any real number. Suppose that there are real numbers x,y,z not all zero such that x=cy+bz,y=az+cx and z=bx+ay. Then $a^2+b^2+c^2$ +2abc is equal to

A. 1

B. 2

C. -1

D. 0

Answer: A

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14. If $D=\begin{vmatrix}1 & 1 & 1\\ 1 & 1+x & 1\\ 1 & 1 & 1+y\end{vmatrix}$ for $x\neq 0, y\neq 0$, then D is divisible by

A. divisible by both x and y

B. divisible by x but not y

C. divisible by y but not x

D. divisible by neither x nor y.

Answer: A

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15. The system of equations $\alpha x + y + z = \alpha - 1, x + \alpha y + z = \alpha - 1, x + y + \alpha z = \alpha - 1$ has no solution if alpha is (A) 1 (B) not -2 (C) either -2 or 1 (D) -2

A. either -2 or 1

B. -2

C. 1

D. not -2

Answer: B

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16. If $a^2 + b^2 + c^2$=-2 and

$$\begin{vmatrix} 1+a^2x & (1+b^2)x & (1+c^2)x \\ (1+a^2)x & 1+b^2x & (1+c^2)x \\ (1+a^2)x & (1+b^2)x & (1+c^2)x \end{vmatrix}$$ then f(x) is a polynomial of degree

A. 0

B. 1

C. 2

D. 3

Answer: C

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17. If $a_1, a_2, a_3, \ldots\ldots$ are in G.P. then the value of determinant $\begin{vmatrix} \log(a_n) & \log(a_{n+1}) & \log(a_{n+2}) \\ \log(a_{n+3}) & \log(a_{n+4}) & \log(a_{n+5}) \\ \log(a_{n+6}) & \log(a_{n+7}) & \log(a_{n+8}) \end{vmatrix}$ equals (A) 0 (B) 1 (C) 2 (D) 3

A. 0

B. 1

C. 2

D. -2

Answer: A

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18. Given , 2x-y+2z=2, x-2y+z=-4, x+y+λz=4, then the value of λ such that the given system of equations has no solution is :

A. 3

B. 1

C. 0

D. -3

Answer: B

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19. if $A = \begin{bmatrix} \alpha & 2 \\ 2 & \alpha \end{bmatrix}$ and $\left|A^3\right| = 125$ then the value of $\alpha$is

A. ± 1

B. ± 2

C. ± 3

D. ± 5

Answer: C

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20. If $1, \omega, \omega^2$ are the cube roots of unity , then $\Delta = \begin{vmatrix} 1 & \omega^n & \omega^2 n \\ \omega^n & \omega^{2n} & 1 \\ \omega^{2n} & 1 & \omega^n \end{vmatrix}$

is equal to :

A. 1

B. ω

C. ω^2

D. 0

Answer: D

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21. The number of values of k, for which the system of eauations:

$(k+1)x + 8y = 4k$

$kx + (k+3)y = 3k - 1$

has no solution is,

A. 0

B. 1

C. 2

D. infinite.

Answer: B

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22. Let $\omega = -\frac{1}{2} + i\frac{\sqrt{3}}{2}$, then the value of the determinant $\begin{vmatrix} 1 & 1 & 1 \\ 1 & -1-\omega^2 & \omega^2 \\ 1 & \omega^2 & \omega^4 \end{vmatrix}$, is

A. 3ω

B. $3\omega(\omega - 1)$

C. $3\omega^2$

D. $3\omega(1 - \omega)$

Answer: B

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23. If $a > 0$ and discriminant of $ax^2 + 2bx + c$ is negative, then

$$\Delta = \begin{vmatrix} a & b & ax+b \\ b & c & bx+c \\ ax+b & bx+c & 0 \end{vmatrix}, \text{ is}$$

A. $+ve$

B. $(ac-b)^2\left(ax^2+2bx+c\right)$

C. $-ve$

D. 0

Answer: C

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24. If l,m,n are the pth, qth, rth terms respectively of a G.P. $(l, m, n > 0) then$|(logl, p, 1),(logm,1,1),(logn,r,1)|=$(A) pqr (B)$l+m+n` (C) 0 (D) none of these

A. 3

B. 2

C. 1

D. zero

Answer: D

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25. 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 $-\frac{\pi}{4} \leq x \leq t\frac{\pi}{4}$ is

A. 0

B. 2

C. 1

D. 3

Answer: C

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