MATHS

BOOKS - NIKITA MATHS (HINGLISH)

MHT-CET 2018

Mcq

1. If $\int_0^k \frac{dx}{2+18x^2} = \frac{\pi}{24}$, then the value of k is

A. 3

B. 4

C. $\frac{1}{3}$

D. $\frac{1}{4}$

Answer: C

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2. The cartesian co - ordinates of the point on the parabola $y^2 = -16x$, whose parameter is $\frac{1}{2}$, are

A. $(-2, 4)$

B. $(4, -1)$

C. $(-1, -4)$

D. $(-1, 4)$

Answer: D

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3. Evaluate : $\int \frac{1}{\sin x . \cos^2 x} dx$

A. $\sec x + \log|\sec x + \tan x| + c$

B. $\sec x . \tan x + c$

C. $\sec x + \log|\sec x - \tan x| + c$

D. $\sec x + \log|\text{cosec}\ \ x - \cot x| + c$

Answer: D

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4. If $\log_{10}\left(\frac{x^3 - y^3}{x^3 + y^3}\right) = 2$, then $\frac{dy}{dx} =$

A. $\frac{x}{y}$

B. $-\frac{y}{x}$

C. $-\frac{x}{y}$

D. $\frac{y}{x}$

Answer: D

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5. If $f: R - \{2\} \to R$ is a function defined by $f(x) = \dfrac{x^2 - 4}{x - 2}$, then its range is

A. R

B. R-{2}

C. R-{4}

D. $R - \{-2, 2\}$

Answer: C

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6. IF $f(x) = x^2 + \alpha$ for $x \geq 0$

$= \sqrt{x^2 + 1} + \beta$ for $x < 0$

is continuous at $x = 0$ and $f\left(\dfrac{1}{2}\right) = 2$, then $\alpha^2 + \beta^2$ is

A. 3

B. $\dfrac{8}{25}$

C. $\frac{25}{8}$

D. $\frac{1}{3}$

Answer: C

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7. IF $y = \left(\tan^{-1} x\right)^2$ then $\left(x^2+1\right)^2 \frac{d^2y}{dx^2} + 2x\left(x^2+1\right)\frac{dy}{dx} =$

A. 4

B. 2

C. 1

D. 0

Answer: B

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8. The line $5x + y - 1 = 0$ coincides with one of the lines given by $5x^2 + xy - kx - 2y + 2 = 0$ then the value of k is

A. -11

B. 31

C. 11

D. -31

Answer: C

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9. IF $A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 1 & 2 \\ 1 & 2 & 4 \end{bmatrix}$ then $\left(A^2 - 5A\right)A^{-1} =$

A. $\begin{bmatrix} 4 & 2 & 3 \\ -1 & 4 & 2 \\ 1 & 2 & 1 \end{bmatrix}$

B. $\begin{bmatrix} -4 & 2 & 3 \\ -1 & -4 & 2 \\ 1 & 2 & -1 \end{bmatrix}$

C. $\begin{bmatrix} -4 & -1 & 1 \\ 2 & -4 & 2 \\ 3 & 2 & -1 \end{bmatrix}$

D. $\begin{bmatrix} -1 & -2 & 1 \\ 4 & -2 & -3 \\ 1 & 4 & -2 \end{bmatrix}$

Answer: B

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10. The equation of line passing through (3,-1,2) and perpendicular to the lines

$\vec{r} = \left(\hat{i} + \hat{j} - \hat{k}\right) + \lambda\left(2\hat{i} - 2\hat{j} + \hat{k}\right)$

and $\vec{r} = \left(2\hat{i} + \hat{j} - 3\hat{k}\right) + \mu\left(\hat{i} - 2\hat{j} + 2\hat{k}\right)$ is

A. $\frac{x+3}{2} = \frac{y+1}{3} = \frac{z-2}{2}$

B. $\frac{x-3}{3} = \frac{y+1}{2} = \frac{z-2}{2}$

C. $\frac{x-3}{2} = \frac{y+1}{3} = \frac{z-2}{2}$

D. $\frac{x-3}{2} = \frac{y+1}{2} = \frac{z-2}{3}$

Answer: C

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11. Letters in the word HULULULU are rearranged. The probability of all three L being together is

A. $\frac{3}{20}$

B. $\frac{2}{5}$

C. $\frac{3}{28}$

D. $\frac{5}{23}$

Answer: C

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12. The sum of the first 10 terms of the series $9 + 99 + 999 + \ldots\ldots,$ is

A. $\frac{9}{8}\left(9^{10} - 1\right)$

B. $\frac{100}{9}\left(10^{9} - 1\right)$

C. $10^9 - 1$

D. $\frac{100}{9}(10^{10} - 1)$

Answer: B

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13. If A,B,C are the angles off ΔABC, then $\cot A \cdot \cot B + \cot B \cdot \cot C + \cot C \cdot \cot A$=

A. 0

B. 1

C. 2

D. -1

Answer: B

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14. if $\int \frac{dx}{\sqrt{16-9x^2}} = A\sin^{-1}(Bx) + C$, then A+B=

A. $\frac{9}{4}$

B. $\frac{19}{4}$

C. $\frac{3}{4}$

D. $\frac{13}{12}$

Answer: D

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15. Evaluate: $\int e^x \left(\frac{2+\sin 2x}{1+\cos 2x}\right) dx$

A. $e^x \tan x + c$

B. $e^x + \tan x + c$

C. $2e^x + \tan x + c$

D. $e^x + \tan 2x + c$

Answer: A

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16. A coin is tossed three times. If X denotes the absolute difference between the number of heads and the number of tails, then P(X=1)=

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

B. $\frac{2}{3}$

C. $\frac{1}{6}$

D. $\frac{3}{4}$

Answer: D

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17. If $2\sin\left(\theta+\frac{\pi}{3}\right)=\cos\left(\theta-\frac{\pi}{6}\right)$ then $\tan\theta$=

A. $\sqrt{3}$

B. $\frac{-1}{\sqrt{3}}$

C. $\frac{1}{\sqrt{3}}$

D. $-\sqrt{3}$

Answer: D

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18. The area of the region bounded by $x^2 = 4y, y = 1, y = 4$ and the y-axis lying in the quadrant is _____ square units .

A. $\frac{22}{3}$

B. $\frac{28}{3}$

C. 30

D. $\frac{21}{4}$

Answer: B

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19. if $f(x) = \frac{e^{x^2} - \cos x}{x^2}$, for $x \neq 0$ is continuous at $x = 0$, then value of f(0) is

A. $\frac{2}{3}$

B. $\frac{5}{2}$

C. 1

D. $\frac{3}{2}$

Answer: D

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20. The maximum value of $2x + y$ subject to $3x + 5y \leq 26$ and $5x + 3y \leq 30, x \geq 0, y \geq 0$ is

A. 12

B. 11.5

C. 10

D. 17.33

Answer: A

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21. If $\bar{a}, \bar{b}, \bar{c}$ are mutually perpendicular vectors having magnitudes 1, 2, 3 respecively then $\left[\bar{a}+\bar{b}+\bar{c} \quad \bar{b}-\bar{a} \quad \bar{c}\right]$=

A. 0

B. 6

C. 12

D. 18

Answer: C

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22. IF points $p(4, 5, x), Q(3, y, 4)$ and $R(5, 8, 0)$ are collinear , then the value of $x + y$ is

A. -4

B. 3

C. 5

D. 4

Answer: D

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23. If the slope of one of the lines given by $ax^2 + 2hxy + by^2 = 0$ is two times the other, then

A. $8h^2 = 9 \text{ ab}$

B. $8h^2 = 9 \text{ ab}^2$

C. $8h = 9 \text{ ab}$

D. $8h = 9 \text{ ab}^2$

Answer: A

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24. The equation of the line passing through the point $(-3, 1)$ and bisecting the angle between co - ordinate axes is

A. $x + y + 2 = 0$

B. $-x + y + 2 = 0$

C. $x - y + 4 = 0$

D. $2x + y + 5 = 0$

Answer:

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25. The negation of the statement: "Getting above 95% marks is necessary condition for Hema to get the admission in good college".

A. Hema gets above 95% marks but she does not get the admission in good college.

B. Hema does not get above 95% marks and she gets admission in good college.

C. It Hema does not get above 95% marks then she will not get the admission in good college.

D. Hema does not get above 95% marks or she gets the admission in good college.

Answer: B

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26. $\cos 1^\circ . \cos 2^\circ . \cos 3^\circ \ldots\ldots\ldots \cos 179^\circ$ is equal to :

A. 0

B. 1

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

D. -1

Answer: A

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27. If planes $x - cy - bz = 0, cx - y + az = 0$ and $bx + ay - z = 0$ pass through a straight line then $a^2 + b^2 + c^2 =$

A. $1 - abc$

B. $abc - 1$

C. $1 - 2abc$

D. $2abc - 1$

Answer: C

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28. The point of intersection of lines represented by $x^2 - y^2 + x + 3y - 2 = 0$ is

A. $(1, 0)$

B. $(0, 2)$

C. $\left(\frac{-1}{2}, \frac{3}{2}\right)$

D. $\left(\frac{1}{2}, \frac{1}{2}\right)$

Answer: C

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29. A die is rolled. If X denotes the number of positive divisors of the outcome o the outcome, then the range of the random variable X is

A. $\{1, 2, 3\}$

B. $\{1, 2, 3, 4\}$

C. $\{1, 2, 3, 4, 5, 6\}$

D. $\{1, 3, 5\}$

Answer: B

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30. A die is thrown four times. The probality of getting perfect square in at least one throw is

A. $\frac{16}{81}$

B. $\frac{65}{81}$

C. $\frac{23}{81}$

D. $\frac{58}{81}$

Answer: B

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31. $\int_0^{\pi/4} x \sec^2 x dx =$

A. $\frac{\pi}{4} + \log \sqrt{2}$

B. $\frac{\pi}{4} - \log \sqrt{2}$

C. $1 + \log \sqrt{2}$

D. $1 - \frac{1}{2}\log 2$

Answer: B

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32. In ΔABC, with usual notations, if a,b,c are in AP then $a \cos^2\left(\frac{C}{2}\right) + \cos^2\left(\frac{A}{2}\right) =$

A. $\frac{3a}{2}$

B. $\frac{3c}{2}$

C. $\frac{3b}{2}$

D. $\frac{3abc}{2}$

Answer: C

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33. If $x = e^{\theta}(\sin\theta - \cos\theta), y = e^{\theta}(\sin\theta + \cos\theta)$, then $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$ is

A. 1

B. 0

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

D. $\sqrt{2}$

Answer: A

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34. The number of solution of $\sin x + \sin 3x + \sin 5x = 0$ in the interval $\left[\frac{\pi}{2}, 3\frac{\pi}{2}\right]$ is

A. 2

B. 3

C. 4

D. 5

Answer: B

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35. IF $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$, then x=

A. -1

B. $\frac{1}{3}$

C. $\frac{1}{6}$

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

Answer: C

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36. Matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 5 \\ 2 & 4 & 7 \end{bmatrix}$ then the value of $A_{31}A_{31} + a_{32}A_{32} + a_{33}A_{33}$ is

A. 1

B. 13

C. -1

D. -13

Answer: C

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37. The contrapositive of the statement: "If the weather is fine then my friends will come and we go for a picnic".

A. The weather is fine but my friends will not come or we do not go for a picnic.

B. If my friends do not come or we donot go for picnic then weather will not be fine.

C. If the weather is not fine then my friends will not come or we do not go for a picnic.

D. The weather is not fine but my friends will come and we go for a picnic.

Answer: B

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38. If $= \frac{x}{x^2+1}$ is increasing function, then the value of x lies in

A. R

B. $(-\infty, -1)$

C. $(1, \infty)$

D. $(-1, 1)$

Answer: D

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39. If

$X = \{4^n - 3n - 1, n \in N\}$ and $Y = \{9(n-1) : n \in N\}$, then $X \cap Y =$

A. X

B. Y

C. ϕ

D. {0}

Answer: A

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40. The statement pattern $p \wedge (\sim p \wedge q)$is

A. a tautolog y

B. a contradiction

C. equivalent to $p \wedge q$

D. equivalent to $p \vee q$

Answer: B

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41. If the line y=4x-5 touches the curve $y^2 = ax^3 + b$ at the point (2,3), then 7a+2b=0

A. 0

B. 1

C. -1

D. 2

Answer: A

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42. The sides of a rectangle are given by $x = \pm a$ and $y = \pm b$. The equation of the circle passing through the vertices of the rectangle is

A. $x^2 + y^2 = a^2$

B. $x^2 + y^2 = a^2 + b^2$

C. $x^2 + y^2 = a^2 - b^2$

D. $\left(x - (A)^2 + \left(y - (B)^2 = a^2 + b^2\right.\right.$

Answer: B

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43. The minimum value of the function $f(x) = x \log x$ is

A. $\frac{-1}{e}$

B. $-e$

C. $\frac{1}{e}$

D. e

Answer: A

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44. If $X \sim B(n, p)$ with $n = 10, p = 0.4$, then $E(X^2) =$

A. 4

B. 2.4

C. 3.6

D. 18.4

Answer: D

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45. The general solution of differential equation

$\frac{dx}{dy} = \cos(x+y)$ is

A. $\tan\left(\frac{x+y}{2}\right) = y + c$

B. $\tan\left(\frac{x+y}{2}\right) = x + c$

C. $\cot\left(\frac{x+y}{2}\right) = y + c$

D. $\cot\left(\frac{x+y}{2}\right) = x + c$

Answer: A

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46. Find the value of p, if the planes $\bar{r} \cdot \left(p\hat{i} - \hat{j} + 2\hat{k}\right) + 3 = 0$ and $\bar{r} \cdot \left(2\hat{i} - p\hat{j} - \hat{k}\right) - 5 = 0$ include an angle of $\frac{\pi}{3}$.

A. $1, \ -3$

B. $-1, 3$

C. -3

D. 3

Answer: D

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47. The order of the differential equation of all parabolas , whose latus rectum is 4a and axis parallel to the x- axis is

A. one

B. Four

C. three

D. two

Answer: D

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48. IF lines $\frac{x-1}{2}=\frac{y+1}{3}=\frac{z-1}{4}$ and $x-3=\frac{y-k}{2}=z$ intersect then the value of k is

A. $\frac{9}{2}$

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

C. $\frac{5}{2}$

D. $\frac{7}{2}$

Answer: A

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49. If a line makes angle 120° and 60° with the positive directions of X and Z-axes respectively, then the angle made by theline with positive Y-axis is

A. 150°

B. 60°

C. 135°

D. 120°

Answer: C

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50. L and M are two points with position vectors $2\vec{a} - \vec{b}$ and $\vec{a} + 2\vec{b}$, respectively. The position vector of the pont N which divides the line segment LM in the ratio 2:1 externally is

A. $3\bar{b}$

B. $4\bar{b}$

C. $5\bar{b}$

D. $3\bar{a} + 4\bar{b}$

Answer: C

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