MATHS

BOOKS - HIMALAYA MATHS (KANNADA ENGLISH)

COMMON ENTRANCE TEST - 2017

Question Bank

1. If A and B are finite sets and $A \subset B$, then

A. $n(A \cup B) = n(A)$

B. $n(A \cap B) = n(B)$

C. $n(A \cup B) = n(B)$

D. $n(A \cap B) = \phi$

Answer: C

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2. The value of $\cos^2 45^\circ - \sin^2 15^\circ$ is

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

B. $\frac{\sqrt{3}}{4}$

C. $\frac{\sqrt{3}+1}{2\sqrt{2}}$

D. $\frac{\sqrt{3}-1}{2\sqrt{2}}$

Answer: B

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3. 3 + 5 + 7 + ... to n terms is

A. n(n+2)

B. n(n-2)

C. n^2

D. $(n+1)^2$

Answer: A

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4. If $\left(\frac{1+i}{1-i}\right)^m = 1$, then the least positive integral value of m is

A. 2

B. 3

C. 4

D. 1

Answer: C

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5. If $|x-2| \leq 1$, then

A. $x \in [1, 3]$

B. $x \in (1, 3)$

C. $x \in [-1, 3)$

D. $x \in (-1, 3)$

Answer: A

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6. If ${}^{n}C_{12} = {}^{n}C_{8}$ then n is equal to

A. 26

B. 12

C. 6

D. 20

Answer: D

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7. The total number of terms in the expansion of $(x+a)^{47}-(x-a)^{47}$ after simplification is

A. 24

B. 47

C. 48

D. 96

Answer: A

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8. Equation of line passing through the point (1,2) and perpendicular to the line y = 3x - 1 is

A. x+3y-7 =0

B. x+3y+7 = 0

C. x+3y =0

D. x-3y = 0

Answer: A

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9. The eccentricity of the ellipse $\frac{x^2}{36} + \frac{y^2}{16} = 1$ is

A. $\frac{2\sqrt{5}}{6}$

B. $\frac{2\sqrt{5}}{4}$

C. $\frac{2\sqrt{13}}{6}$

D. $\frac{2\sqrt{13}}{4}$

Answer: A

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10. The perpendicular distance of the point P(6,7,8) from XY-plane is

A. 8

B. 7

C. 6

D. 5

Answer: A

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11. The value of $\lim_{\theta \to 0} \frac{1 - \cos 4\theta}{1 - \cos 6\theta}$ is

A. 44443

B. 44295

C. 44264

D. 44289

Answer: A

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12. Write the converse and contrapositive of the statement " If x is a prime number then x is odd "

A. If x is not a prime number, then x is not odd

B. If x is a prime number, then x is not odd

C. If x is not a prime number, then x is odd

D. If x is not odd, then x is not a prime number

Answer: D

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13. If coefficient of variation is 60 and standard deviation is 24, then arithmetic mean is

A. 40

B. 44013

C. 44397

D. 14611

Answer: A

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14. The range of the function $f(x) = \sqrt{9 - x^2}$

A. (0,3)

B. [0,3]

C. (0,3]

D. [0,3)

Answer: B

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15. Let $f: R \to R$ be defined by $f(x) = x^4$, then

A. f is one-one and onto

B. f may be one- one and onto

C. f is one-one but not onto

D. f is neither one-one nor onto

Answer: D

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16. The range of $\sec^{-1} x$ is

A. [-pi/2,pi/2]`

B. $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

C. $[0, \pi]$

D. $[0, \pi] - \left\{\frac{\pi}{2}\right\}$

Answer: D

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17. If $\tan^{-1} x + \tan^{-1} y = 4\pi/5$, then $\cot^{-1} x + \cot^{-1} y$ is equal to

A. π

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

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

D. $\frac{3\pi}{5}$

Answer: B

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18. If $f(x) = 8x^3$, $g(x) = x^{(1/3)}$, then fog(x) is

A. 8x

B. $8^3 x$

C. $(8x)^{\frac{1}{2}}$

D. $8x^3$

Answer: A

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19. If $A = \frac{1}{\pi}\begin{bmatrix} \sin^{-1}(x\pi) & \tan^{-1}\left(\frac{x}{\pi}\right) \\ \sin^{-1}\left(\frac{x}{\pi}\right) & \cot^{-1}(\pi x) \end{bmatrix}$

$B = \frac{1}{\pi}\begin{bmatrix} -\cos^{-1}(x\pi) & \tan^{-1}\left(\frac{x}{\pi}\right) \\ \sin^{-1}\left(\frac{x}{\pi}\right) & -\tan^{-1}(\pi x) \end{bmatrix}$

then $A - B$ is equal to :

A. 1

B. 0

C. 2I

D. 1/2 I

Answer:

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20. If a matrix A is both symmetric and skew symmetric, then

A. A is diagonal matrix

B. A is zero matrix

C. A is scalar matrix

D. A is square matrix

Answer: B

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21. If $2\begin{bmatrix}1 & 3\\ 0 & x\end{bmatrix}+\begin{bmatrix}y & 0\\ 1 & 2\end{bmatrix}=\begin{bmatrix}5 & 6\\ 1 & 8\end{bmatrix}$, then the value of x and y are

A. x=3, y =3

B. x =-3, y =3

C. x =3, y =-3

D. x = -3, y =-3

Answer: A

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22. Binary operation * on R $-\{-1\}$ defined by $a * b = \frac{a}{b+1}$ is

A. * is associative and commutative

B. * is associative but not commutative

C. * is neither associative nor commutative

D. * is commutative but not associative

Answer: C

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23. $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$ then x is equal to

A. 2

B. 4

C. 8

D. $\pm 2\sqrt{2}$

Answer: D

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24. If A is a square matrix of order 3×3, then |KA| is equal to

A. K|A|

B. $K^2|A|$

C. $K^3|A|$

D. 3K|A|

Answer: C

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25. The area of triangle with vertices (K, 0), (4,0), (0, 2) is 4 square units, then value of K is

A. 0 or 8

B. 0 or -8

C. 0

D. 8

Answer: A

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26. Let $\Delta = \begin{vmatrix} Ax & x^2 & 1 \\ By & y^2 & 1 \\ Cz & z^2 & 1 \end{vmatrix}$ and $\Delta_1 = \begin{vmatrix} A & B & C \\ x & y & z \\ zy & zx & xy \end{vmatrix}$ then

A. $\Delta_1 = -\Delta$

B. $\Delta_1 = \Delta$

C. $\Delta_1 \neq \Delta$

D. $\Delta_1 = 2\Delta$

Answer: B

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27. If $F(x) = \begin{cases} Kx^2 & \text{if } x \leq 2 \\ 3 & \text{if } x > 2 \end{cases}$ is continuous at x = 2, then the value of K is

A. 3

B. 4

C. 0/4

D. 44259

Answer: C

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28. The value of C in mean value theorem for the function $f(x) = x^2$ in [2, 4] is

A. 3

B. 2

C. 4

D. 44234

Answer: A

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29. The point on the curve $y^2 = x$ where the tangent makes an angle $\frac{\pi}{4}$ with X-axis is

A. (1/2,1/4)

B. (1/4,1/2)

C. (4,2)

D. (1,1)

Answer: B

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30. The function $f(x) = x^2 + 2x - 5$ is strictly increasing in the interval

A. $(-1, \infty)$

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

C. $[-1, \infty)$

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

Answer: A

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31. The rate of change of volume of a sphere with respect to its surface area when the radius is 4 cm is

A. $\frac{4cm^3}{cm^2}$

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

C. $\frac{6cm^3}{cm^2}$

D. $\frac{8cm^3}{cm^2}$

Answer: B

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32. If $y = \tan^{-1}\left(\frac{\sin x + \cos x}{\cos x - \sin x}\right)$, then $\frac{dy}{dx}$ is equal to

A. 44228

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

C. 0

D. 1

Answer: D

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33. If $y = \begin{vmatrix} f(x) & g(x) & h(x) \\ 1 & m & n \\ a & b & c \end{vmatrix}$, then $\frac{dy}{dx}$ is equal to

A. $\begin{vmatrix} f(x) & g'(x) & h'(x) \\ l & m & n \\ a & b & c \end{vmatrix}$

B. $\begin{vmatrix} l & m & n \\ f(x) & g'(x) & h'(x) \\ a & b & c \end{vmatrix}$

C. $\begin{vmatrix} f'(x) & l & a \\ g'(x) & m & b \\ h'(x) & n & c \end{vmatrix}$

D. $\begin{vmatrix} l & m & n \\ a & b & c \\ f(x) & g'(x) & h'(x) \end{vmatrix}$

Answer: A::C::D

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34. If $\sin x = \frac{2t}{1+t^2}, \tan y = \frac{2t}{1-t^2}$, then $\frac{dy}{dx}$ is equal to

A. 1

B. 0

C. minus 1

D. 2

Answer: A

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35. The derivative of $\cos^{-1}\left(2x^2-1\right)$ w.r.t $\cos^{-1}$ x is

A. 2

B. $\frac{-1}{2\sqrt{1-x^2}}$

C. 2/x

D. $1 - x^2$

Answer: A

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36. If y = log (log x) then $\frac{d^2y}{dx^2}$ is equal to

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

B. $\frac{-(1+\log x)}{(x^2\log x)}$

C. $(1+\log x)\frac{)}{(x\log x)^2}$

D. $(1+\log x)\frac{)}{(x^2\log x)}$

Answer: A

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37. $\int \frac{(x+3)e^x}{(x+4)^2} dx$ is equal to

A. $\frac{1}{(x+4)^2} + C$

B. $\frac{e^x}{(x+4)^2} + C$

C. $\frac{e^x}{x+4} + C$

D. $\frac{e^x}{x+3} + C$

Answer: C

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38. $\int \frac{\cos 2x - \cos 2\theta}{\cos x - \cos \theta} dx$ is equal to

A. $2(\sin x + x \cos \theta) + C$

B. $2(\sin x - x \cos \theta) + C$

C. $2(\sin x + 2x \cos \theta) + C$

D. $2(\sin x - 2x\cos\theta) + C$

Answer: A

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39. $\int\sqrt{x^2+2x+5}dx$ is equal to

A.

$$\frac{1}{2}(x+1)\sqrt{x^2+2x+5}+2\log\left|x+1+\sqrt{x^2+2x+5}\right|+C$$

B.

$$(x+1)\sqrt{x^2+2x+5}+2\log\left|x+1+\sqrt{x^2+2x+5}\right|+C$$

C.

$$(x+1)\sqrt{x^2+2x+5}-2\log\left|x+1+\sqrt{x^2+2x+5}\right|+C$$

D.

$$(x+1)\sqrt{x^2+2x+5}+\frac{1}{2}\log\left|x+1+\sqrt{x^2+2x+5}\right|+C$$

Answer: A

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40. $\int_0^{\pi/2} \frac{\tan^7 x}{\cot^7 x + \tan^7 x} dx$ is equal to

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

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

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

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

Answer: B

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41. $\int_{-5}^{5} |x+2| dx$ is equal to

A. 29

B. 28

C. 27

D. 30

Answer: A

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42. $\int_{-(\pi/2)}^{\pi/2} \frac{dx}{e^{\sin x}+1}$ is equal to

A. 0

B. 1

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

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

Answer: D

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43. $\int_0^{\pi/2} \frac{1}{a^2.\sin^2 x + b^2.\cos^2 x} dx$ is equal to

A. $\frac{\pi a}{4b}$

B. $\frac{\pi a}{2b}$

C. $\frac{\pi b}{4a}$

D. $\frac{\pi}{2ab}$

Answer: D

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44. The area of the region bounded by the curve $y = x^2$ and the line y = 16 is

A. 32/2 sq. units

B. 256/3 sq. units

C. 64/3 sq. units

D. 128 sq. units

Answer: B

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45. Area of the region bounded by the curve y = cos x, x = 0 and $x = \pi$ is

A. 2 sq. units

B. 4 sq. units

C. 3 sq. units

D. 1 sq. units

Answer: A

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46. The degree of the differential equation $\left[1+\left(\frac{dy}{dx}\right)^2\right]^2=\frac{d^2y}{dx^2}$

A. 1

B. 2

C. 3

D. 4

Answer: A

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47. General solution of differential equation $\frac{dy}{dx} + y = 1(y \neq 1)$ is

A. log |1/(1-y)| = x+C

B. log |1-y| = x+C

C. log |1+y| = x +C

D. |1/(1-y)| = -x+C

Answer: A

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48. The integrating factor of the differential equation $x.\frac{dy}{dx}+2y=x^2$ is $(x\neq 0)$

A. x^2

B. log|x|

C. $e^{\log x}$

D. x

Answer: A

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49. if $\overrightarrow{a}=2\hat{i}+\lambda\hat{j}+\hat{k}$ and $\overrightarrow{b}=\hat{i}+2\hat{j}+3\hat{k}$ are orthogonal then the value of λ

A. 0

B. 1

C. 44230

D. minus 5/2

Answer: D

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50. If $\vec{a}, \vec{b}, \vec{c}$ are unit vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$, then the value of $\vec{a} . \vec{b} + \vec{b} . \vec{c} + \vec{c} \vec{a}$ is equal to

A. 1

B. 3

C. minus 3/2

D. 44230

Answer: C

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51. If $\vec{a}$ and $\vec{b}$ are unit vectors, then angle between $\vec{a}$ and $\vec{b}$ for $\sqrt{3}\vec{a} - \vec{b}$ to be unit vector is

A. 30^o

B. 45^o

C. 60^o

D. 90^o

Answer: A

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52. Reflection of the point (α, β, γ) in XY plane is

A. $(\alpha, \beta, 0)$

B. $(0, 0, \gamma)$

C. $(-\alpha, -\beta, \gamma)$

D. $(\alpha, \beta, -\gamma)$

Answer: D

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53. The plane $2x - 3y + 6z - 11 = 0$ makes an angle $\sin^{-1}(\alpha)$ with X - axis. The value of α is equal to

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

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

C. 44379

D. 44380

Answer: C

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54. The distance of the point (-2, 4, -5) from the line $\frac{x+3}{3} = \frac{y-4}{5} = \frac{z+8}{6}$ is

A. $\frac{\sqrt{37}}{10}$

B. $\sqrt{\frac{37}{10}}$

C. $\frac{37}{\sqrt{10}}$

D. 37/10

Answer: B

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55. A box has 100 pens of which 10 are defective. The probability that out of a sample of 5 pens drawn one by one with replacement and atmost one is defective is

A. 44478

B. $\frac{1}{2}\left(\frac{9}{10}\right)^4$

C. $\left(\frac{9}{10}\right)^5 + \frac{1}{2}\left(\frac{9}{10}\right)^4$

D. $\frac{1}{2}\left(\frac{9}{10}\right)^5$

Answer: C

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56. Two events A and B will be independent if

A. A and B are mutually exclusive

B. $P(A' \cap B') = (1 - P(A))(1 - P(B))$

C. P(A) = P(B)

D. P(A)+P(B) =1

Answer: B

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57. The probability distribution of X is The value of k is

x	0	1	2	3
$P(X)$	0.3	k	$2k$	$2k$

A. 0.14

B. 0.3

C. 0.7

D. 1

Answer: A

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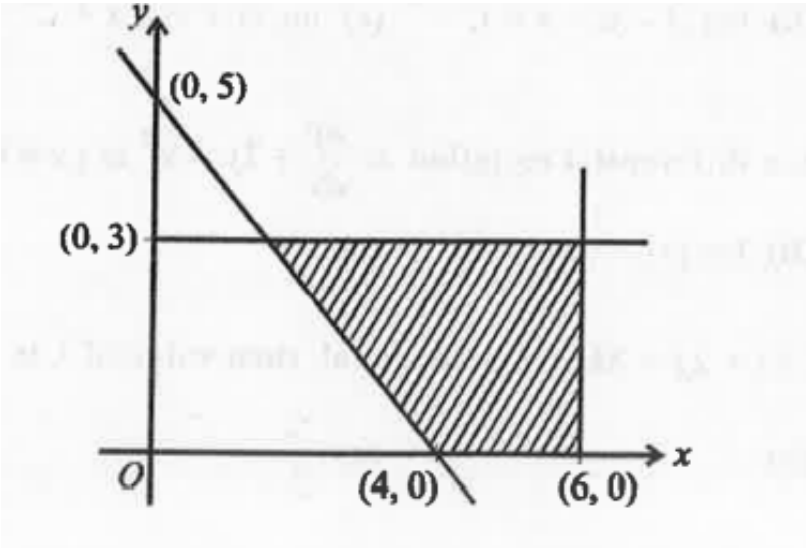
58. The shaded region in the figure is the solution set of the inequations



A. $5x + 4y \geq 20, x \leq 6, y \geq 3, x \geq 0, y \geq 0$

B. $5x + 4y \leq 20, x \leq 6, y \leq 3, x \geq 0, y \geq 0$

C. $5x + 4y \geq 20, x \leq 6, y \leq 3, x \geq 0, y \geq 0$

D. $5x + 4y \geq 20, x \geq 6, y \leq 3, x \geq 0, y \geq 0$

Answer: C

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59. If an LPP admits optimal solution at two consecutive vertices of a feasible region, then

A. the required optimal solution is at the midpoint of the line joining two points.

B. the optimal solution occurs at every point on the line joining these two points.

C. the LPP under consideration is not solvable

D. the LPP under consideration must be reconstructed

Answer: B

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60. $\int_{0.2}^{3.5} [x]dx$ is equal to

A. 4

B. 4.5

C. 3.5

D. 3

Answer: B

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