MATHS

BOOKS - KCET PREVIOUS YEAR PAPERS

KARNATAKA CET 2007

Mathematics

1. If $\vec{a} = 2\hat{i} + 3\hat{j} - \hat{k}$, $\vec{b} = \hat{i} + 2\hat{j} - 5\hat{k}$, $\vec{c} = \hat{3}i + 5\hat{j} = \hat{k}$, then a vector perpendicular to $\vec{a}$ and in the plane containing $\vec{b}$ and $\vec{c}$ is

A. $-17\hat{i} + 21\hat{j} - 97\hat{k}$

B. $17\hat{i} + 21\hat{j} - 123\hat{k}$

C. $-17\hat{i} - 21\hat{j} + 97\hat{k}$

D. $-17\hat{i} - 21\hat{j} - 97\hat{k}$

Answer: D

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2. $\overrightarrow{O}A$ and $\overrightarrow{B}O$ are two vectors of magnitudes 5 and 6 respectively.If $\angle(BOA) = 60^\circ$, then $\overrightarrow{OA}.\overrightarrow{OB}$ is equal to

A. 0

B. 15

C. -15

D. $15\sqrt{3}$

Answer: B

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3. A vector perpendicular to the plane contianing the points $A(1, -1, 2), B(2, 0, -1), C(0, 2, 1)$ is

A. $4\hat{i} + 8\hat{j} - 4\hat{k}$

B. $8\hat{i}+4\hat{j}+4\hat{k}$

C. $3\hat{i}+\hat{j}+2\hat{k}$

D. $\hat{i}+\hat{j}-\hat{k}$

Answer: B

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4.

$$\frac{1}{2\cdot 5}+\frac{1}{5\cdot 8}+\frac{1}{8\cdot 11}+\ldots\ldots\ldots\frac{1}{(3n-1)(3n+2)}=\frac{n}{(6n+4)}\forall n\in N$$

A. $\frac{n}{6n-4}$

B. $\frac{n}{6n+3}$

C. $\frac{n}{6n+4}$

D. $\frac{n+1}{6n+4}$

Answer: C

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5. The ninth term of the expansion $\left((3x)\frac{-1}{2x}\right)^8$ is

A. $\frac{1}{512x^9}$

B. $\frac{-1}{512x^9}$

C. $\frac{-1}{256.\ x^8}$

D. $\frac{1}{256.\ x^8}$

Answer: D

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6. The solution of $\tan^{-1}x + 2\cot^{-1}x = \frac{2\pi}{3}$ is

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

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

C. $-\sqrt{3}$

D. $\sqrt{3}$

Answer: D

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7. $\sin^2 17.5^\circ + \sin^2 72.5^\circ$ is equal to

A. $\cos^2 90^\circ$

B. $\tan^2 45^\circ$

C. $\cos^2 30^\circ$

D. $\sin^2 45^\circ$

Answer: B

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8. The conjugate of the complex number $\frac{(1+i)^2}{1-i}$ is

A. $1 - i$

B. $1 + i$

C. $-1 + i$

D. $-1 - i$

Answer: B

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9. ABC is a trianlgle with $\angle A = 30^\circ$, BC = 10 cms. The area of the circum - circle of the triangle is

A. 100π sq. cms

B. $5sq.$cms

C. $25sq.$cms

D. $\frac{100\pi}{3}$ sq. cms

Answer: A

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10. If $\sin 3\theta = \sin\theta$, how many solutions exist such that $-2\pi < \theta < 2\pi$?

A. 8

B. 9

C. 5

D. 11

Answer: D

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11. A graph G has 'm' vertices of odd degree and 'n' vertices of even degree.Then which of the following statements is necessarily true?

A. $m + n$ is an odd number

B. $m + n$ is an even number

C. $n + 1$ is an even number

D. $m + 1$ is an odd number

Answer: B

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12. If P is any point on the ellipse $\frac{x^2}{36} + \frac{y^2}{16} = 1$, and S and S' are the foci, then `PS + PS' =

A. 4

B. 8

C. 10

D. 12

Answer: D

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13. The value of $\sin\left[\left(2\cos^{-1}\right)\frac{\sqrt{5}}{3}\right]$ is

A. $\frac{\sqrt{5}}{3}$

B. $\frac{2\sqrt{5}}{3}$

C. $\frac{4\sqrt{5}}{9}$

D. $\frac{2\sqrt{5}}{9}$

Answer: C

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14. If $\frac{x^2}{36}-\frac{y^2}{k^2}=1$ is a hyperbola, then which of the following statements can be true?

A. (-3, 1) lies on the hyperbola

B. (3, 1) lies on the hyperbola

C. (10, 4) lies on the hyperbola

D. (5, 2) lies on the hyperbola

Answer: C

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15. If $A=\begin{bmatrix}1 & -1 & 1\\ 2 & 1 & -3\\ 1 & 1 & 1\end{bmatrix}$, $10B=\begin{bmatrix}4 & 2 & 2\\ -5 & 0 & \alpha\\ 1 & -2 & 3\end{bmatrix}$ and B is the inverse of A, then the value of α is

A. 2

B. 0

C. 5

D. 4

Answer: C

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16. If $A = \begin{bmatrix} 0 & x & 16 \\ x & 5 & 7 \\ 0 & 9 & x \end{bmatrix}$ is singular, then the possible values of x are

A. $0, +12, -12$

B. $0, 1, -1$

C. $0, 4, -4$

D. $0, 5, -5$

Answer: A

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17. If $A = \begin{bmatrix} 1 & -2 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}$, then $A.\ adjA =$

A. $\begin{bmatrix} 5 & 1 & 1 \\ 1 & 5 & 1 \\ 1 & 1 & 5 \end{bmatrix}$

B. $\begin{bmatrix} 5 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{bmatrix}$

C. $\begin{bmatrix} 8 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & 8 \end{bmatrix}$

D. $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

Answer: C

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18. If $f = R \to R$ is defined by $f(x) = |x|$, then,

A. $f^{-1}(x) = -x$

B. $f^{-1}(x) = \frac{1}{|x|}$

C. the function $f^{-1}(x)$ does not exist

D. $f^{-1}(x) = \frac{1}{x}$

Answer: C

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19. The value of $\begin{bmatrix} x & p & q \\ p & x & q \\ p & q & x \end{bmatrix}$ is

A. $x(x-p)(x-q)$

B. $(x-p)(x-q)(x+p+q)$

C. $(p-q)(x-q)(x-p)$

D. $pq(x-p)(x-q)$

Answer: B

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20. The imaginary part of i' is

A. 0

B. 1

C. 2

D. -1

Answer: A

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21. The amplitude of $(1+i)^5$ is

A. $\frac{3\pi}{4}$

B. $\frac{-3\pi}{4}$

C. $\frac{-5\pi}{4}$

D. $\frac{5\pi}{4}$

Answer: D

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22. ABC is a triangle.G is the centroid.D is the mid point of BC.If A =(2,3) and G =(7,5), then the point D is

A. $\left(\frac{9}{2}, 4\right)$

B. $\left(\frac{19}{2}, 6\right)$

C. $\left(\frac{11}{2}, \frac{11}{2}\right)$

D. $\left(8, \frac{13}{2}\right)$

Answer: B

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23. $\lim_{x-1} \frac{\tan\left(x^2-1\right)}{x-1}$ is equal to

A. 2

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

C. -2

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

Answer: A

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24. If $y = 2^{\log x}$, then $\frac{dy}{dx}$ is

A. $\frac{2^{\log x}}{\log 2}$

B. $2^{\log x} . \log 2$

C. $\frac{2^{\log x}}{x}$

D. $\frac{2^{\log x} . \log 2}{x}$

Answer: D

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25. $7^{2\log_7^5}$ is equal to

A. $\log_7 35$

B. 5

C. 25

D. $\log_7 25$

Answer: C

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26. In the group $(G, \oplus_{15})$ where G={3,6,9,12}, $\oplus_{15}$ is multiplication modulo 15, the identity element is

A. 3

B. 6

C. 12

D. 9

Answer: B

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27. A group (G,*) has 10 elements. The minimum number of elements of G, which are their own inverses is

A. 2

B. 1

C. 9

D. 0

Answer:

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28. If $\vec{a}$ and $\vec{b}$ are vectors such that $\left|\vec{a}+\vec{b}\right|=\left|\vec{a}-\vec{b}\right|$, then the angle between $\vec{a}$ and $\vec{b}$ is

A. 120°

B. 60°

C. 90°

D. 30°

Answer: C

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29. $\frac{3x^2+1}{x^2-6x+8}$ is equal to

A. $3+\frac{49}{2(x-4)}-\frac{13}{2(x-2)}$

B. $\frac{49}{2(x-4)}-\frac{13}{2(x-2)}$

C. $\frac{-49}{2(x-4)}+\frac{13}{2(x-2)}$

D. $\frac{49}{2(x-4)}+\frac{13}{2(x-2)}$

Answer: A

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30. The number of common tangents to the circles $x^2 + y^2 = 4$ and $x^2 + y^2 - 6x - 8y - 24 = 0$ is,

A. 3

B. 4

C. 2

D. 1

Answer: D

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31. If $3x + y + k = 0$ is a tangent to the circle $x^2 + y^2 = 10$, the values of k are,

A. ± 7

B. ± 5

C. ± 10

D. ± 9

Answer: C

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32. The negation of the proposition "If2 is prime, then 3 is odd" is

A. if 2 is not prime then 3 is not odd

B. 2 is prime and 3 is not odd

C. 2 is not prime and 3 is odd

D. if 2 is not prime then 3 is odd

Answer: B

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33. The equation of two circles which touch the Y-axis at (0, 3) and make an intercept of 8 units on X-axis are

A. $x^2 + y^2 \pm 10x - 6y + 9 = 0$

B. $x^2 + y^2 \pm 6x - 10y + 9 = 0$

C. $x^2 + y^2 - 8x \pm 10y + 9 = 0$

D. $x^2 + y^2 + 10x \pm 6y + 9 = 0$

Answer: A

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34. The orthocentre of the triangle with vertices A(0,0), B $\left(0, \frac{3}{2}\right), C(-5, 0)$ is

A. $\left(\frac{5}{2}, \frac{3}{4}\right)$

B. $\left(\frac{-5}{2}, \frac{3}{4}\right)$

C. $\left(-5, \frac{3}{2}\right)$

D. $(0, 0)$

Answer: D

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35. $x^2 + y^2 - 6x - 6y + 4 = 0, x^2 + y^2 - 2x - 4y + 3 = 0,$ $x^2 + y^2 + 2kx + 2y + 1 = 0.$ If the radical centre of the above three circles exists, then which of the following cannot be the value of k?

A. 2

B. 1

C. 5

D. 4

Answer: C

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36. If the circles $x^2 + y^2 - 2x - 2y - 7 = 0$ and $x^2 + y^2 + 4x + 2y + k = 0$ cut orthogonally, then the length of the common chord of the circle is

A. $\frac{12}{\sqrt{13}}$

B. 2

C. 5

D. 8

Answer: B

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37. The co-ordinates of the foot of the perpendicular drawn from the point (3, 4) on the line $2x + y - 7 = 0$ is

A. $\left(\frac{9}{5}, \frac{17}{5}\right)$

B. $(1, 5)$

C. $(-5, 1)$

D. $(1, -5)$

Answer: A

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38. The area enclosed by the pair of lines $xy = 0$, the line $x - 4 = 0$ and $y + 5 = 0$ is

A. 20 sq. Units

B. 10 sq. Units

C. $\frac{5}{4}$ sq. Units

D. 0 sq.units

Answer: A

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39. If the area of the auxillary circle of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1(a>b)$ is twice the area of the ellipse, then the eccentricity of the ellipse is

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

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

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

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

Answer: B

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40. The range in which $y=-x^2+6x-3$ is increasing is

A. $x<3$

B. $x>3$

C. $7<x<8$

D. $5<x<6$

Answer: B

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41. The value of the integral $\int_0^{\frac{\pi}{2}} \left(\sin^{100} x - \cos^{100} x\right) dx$ is

A. $\frac{1}{100}$

B. $\frac{100!}{(100)^{100}}$

C. $\frac{\pi}{100}$

D. 0

Answer: D

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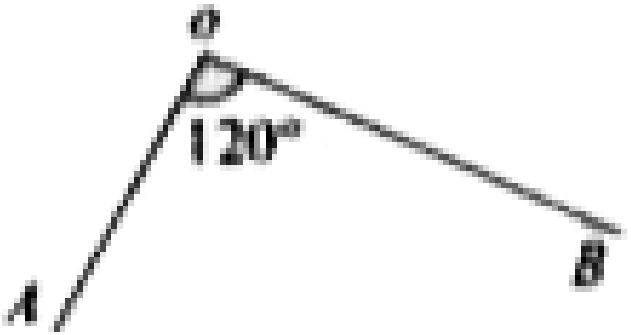
42. OA and OB are two roads enclosing an angle of 120°.X and y start from 'O' at the same time. X travels along OA with a speed of $\frac{4km}{hour}$ and Y travels along OB with a speed of $\frac{3km}{hour}$.The rate at which the shortest

distance between X and Y is increasing after 1 hour is



A. $\frac{\sqrt{37km}}{h}$

B. $\frac{37km}{h}$

C. $\frac{13km}{h}$

D. $\frac{\sqrt{13km}}{h}$

Answer: A

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43. If $k\int_0^1 x.\, f(3x)dx = \int_0^3 t.\, f(t)dt$, then the value of k is

A. 9

B. 3

C. $\frac{1}{9}$

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

Answer: A

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44. The value of $\int \frac{1}{1+\cos 8x} dx$ is

A. $\frac{\tan 2x}{8} + C$

B. $\frac{\tan 8x}{8} + C$

C. $\frac{\tan 4x}{4} + C$

D. $\frac{\tan 4x}{8} + C$

Answer: D

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45. If $\sec^{-1}\left(\frac{1+x}{1+y}\right) = a$, then $\frac{dy}{dx}$ is

A. $\frac{y-1}{x+1}$

B. $\frac{y+1}{x-1}$

C. $\frac{x-1}{y-1}$

D. $\frac{x-1}{y+1}$

Answer: A

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46. If $y = \left(\cos^2\right)\frac{3x}{2} - \left(\sin^2\right)\frac{3x}{2}$, then $\frac{d^2y}{dx^2}$ is

A. $-3\sqrt{1-y^2}$

B. $9y$

C. $-9y$

D. $3\sqrt{1-y^2}$

Answer: C

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47. If the function $f(x) = \begin{cases} \frac{1-\cos x}{x^2} & \text{for } x \neq 0 \\ \text{k} & \text{for} x = 0 \end{cases}$ continuous at x = 0, then the value of k is

A. 1

B. 0

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

D. -1

Answer: C

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48. If 1, ω, ω^2 are the cube roots of unity then $(1+\omega)\left(1+\omega^2\right)\left(1+\omega^4\right)\left(1+\omega^8\right)$ is equal to

A. 1

B. 0

C. ω^2

D. ω

Answer: A

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49. If $x^x = y^y$, then $\frac{dy}{dx}$ is

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

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

C. $1 + \log\left(\frac{x}{y}\right)$

D. $\frac{1 + \log x}{1 + \log y}$

Answer: D

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50. The value of $\int e^x \left(x^5 + 5x^4 + 1\right).\, dx$ is

A. $e^x . X^5$

B. $e^x . x^5 + e^x + C$

C. $e^{x+1} . x^5 + C$

D. $5x^4 . e^x$

Answer: B

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51. The value of $\int \left(\frac{x^2+1}{x^2-1}\right) dx$ is

A. $\log\left(\frac{x-1}{x+1}\right) + C$

B. $\log\left(\frac{x+1}{x-1}\right) + C$

C. $x + \log\left(\frac{x-1}{x+1}\right) + C$

D. $\log\left(x^2-1\right)+C$

Answer: C

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52. The area bounded by the curve $x=4-y^2$ and the Y-axis is

A. 16 sq. Units

B. 32 sq. Units

C. $\frac{32}{3} sq.\ units$

D. $\frac{16}{3} sq.\ units$

Answer: C

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53. The differential equation of the family of straight lines whose slope is equal to y - intercept is

A. $(x+1)\frac{dy}{dx} - y = 0$

B. $(x+1)\frac{dy}{dx} + y = 0$

C. $\frac{dy}{dx} = \frac{x-1}{y-1}$

D. $\frac{dy}{dx} = \frac{x+1}{y+1}$

Answer: A

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54. The order and degree of the differential equation $\left[1 + \left(\frac{dy}{dx}\right)^5\right]^{\frac{1}{3}} = \frac{d^2y}{dx^2}$ are respectively

A. 1,5

B. 2, 1

C. 2, 5

D. 2, 3

Answer: D

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

A. $\left(\frac{1}{4}, \frac{1}{2}\right)$

B. $\left(\frac{1}{2}, \frac{1}{4}\right)$

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

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

Answer: A

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56. The length of the subtangent to the curve $x^2 + y^2 = a^4$ at the point $(-a, a)$ is

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

B. $2a$

C. a

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

Answer: C

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57. The number of positive divisors of 252 is

A. 9

B. 5

C. 18

D. 10

Answer: C

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58. The remainder obtained when 5^{124} is divide by 124 is

A. 5

B. 0

C. 2

D. 1

Answer: A

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59. Which of the following is not a group with respect to the given operation?

A. the set of even integers under addition

B. the set of odd integers under addition

C. $\{0\}$ under addition

D. $\{1, -1\}$ under multiplication

Answer: B

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