MATHS

BOOKS - SUNSTAR MATHS (KANNADA ENGLISH)

K-CET-MATHEMATICS-2016

Multiple Choice Questions

1. The set A has 4 element and the set B has 5 elements then the number of injective

mappings that can be deifned from A to B is

A. 144

B. 72

C. 60

D. 120

Answer: D

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2. Let $f: R \to R$ be defined by $f(x) = 2x + 6$ which is bijective mapping then $f^{-1}(x)$ is given by

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

B. $2x + 6$

C. $x - 3$

D. $6x + 2$

Answer: A

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3. Let $*$ be a binary defined on R by $a * b = \frac{a+b}{4} \forall a, b \in R$ then the operation $*$ is

A. a.Commutative and Associative

B. b.Commutative but not Associative

C. c.Associative but not commutative

D. d.Neither Associative nor Commutative

Answer: B

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4. The value of $\sin^{-1}\left(\cos\frac{53\pi}{5}\right)$ is

A. a. $\frac{3\pi}{5}$

B. b. $\frac{-3\pi}{5}$

C. c $\frac{\pi}{10}$

D. d. $\frac{-\pi}{10}$

Answer: D

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5. If 3 $\tan^{-1} x + \cot^{-1} x \equiv \pi$ then x equal to

A. a.0

B. b.1

C. c.-1

D. d.$1/2$

Answer: B

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6. $\tan^{-1}\left(\frac{x}{y}\right) - \tan^{-1}\left(\frac{x-y}{x+y}\right)$ is

A. a.0

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

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

D. d.π

Answer: B

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7. If x, y, z are all different and not equal to zero and

$$\begin{vmatrix} 1+x & 1 & 1 \\ 1 & 1+y & 1 \\ 1 & 1 & 1+z \end{vmatrix} = 0$$ then the value of $x^{-1}+y^{-1}+z^{-1}$ is equal to

A. a.xyz

B. b.$x^{-1}y^{-1}z^{-1}$

C. c.$-x-y-z$

D. d.-1

Answer: D

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8. If A is any aquare matrix of order 3×3 then $|3A|$ is equal to

A. a. $3|A|$

B. b. $\frac{1}{3}|A|$

C. c. $27|A|$

D. d. $9|A|$

Answer: C

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9. If $y = e^{\sin^{-1}(t^2-1)}$ & $x = e^{\sec -1\left(\frac{1}{t^2-1}\right)}$ then $\frac{dy}{dx}$ is equal to

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

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

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

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

Answer: B

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10. 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. I

B. O

C. 2I

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

Answer: D

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11. If $x^y = e^{x-y}$ then $\frac{dy}{dx}$ is equal to

A. $\frac{\log x}{\log(x-y)}$

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

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

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

Answer: C

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12. If A is matrix of order $m \times n$ and B is a matrix such that AB' and B'A are both defined, the order of the matrix B is

A. $m \times m$

B. $n \times n$

C. $n \times m$

D. $m \times n$

Answer: D

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13. Evaluate $\int \frac{e^x(1+x)}{\cos^2(xe^x)}dx$

A. $-\cot(ex^x)+c$

B. $\tan(e^x.\,x)=c$

C. $\tan(e^x)+c$

D. $\cot(e^x)+c$

Answer: B

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14. IF x yz are not equal to $\neq 0, \neq 1$ the value of $\begin{vmatrix} \log x & \log y & \log z \\ \log 2x & \log 2y & \log 2z \\ \log 3x & \log 3y & \log 3z \end{vmatrix}$ is equal to

A. a.$\log(xyz)$

B. b.$\log(6xyz)$

C. c.0

D. d.$\log(x+y+z)$

Answer: C

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15. The function $f(x) = [x]$, where [x] denotes greatest integer function is continuous at _____

A. 5

B. 4

C. 1

D. -2

Answer: A

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16. The value of $\int \frac{e^x\left(\left(1+x^2\right)\tan^{-1}x+1\right)}{x^2+1}dx$ is equal to

A. a.$e^x \tan^{-1}x + c$

B. b.$\tan^{-1}(e^x) + c$

C. c.$\tan^{-1}(x^e) + c$

D. d.$e^{\tan^{-1}x} + c$

Answer: A

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17. If $2\vec{a} \cdot \vec{b} = \left|\vec{a}\right| \cdot \left|\vec{b}\right|$ then the angle between $\vec{a} \& \vec{b}$ is

A. a.30°

B. b.0°

C. c.90°

D. d.60°

Answer: D

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18. If $x^m y^n = (x+y)^{m+n}$, then $\frac{dy}{dx} =$

A. a. $\frac{x+y}{xy}$

B. b.xy

C. c.0

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

Answer: D

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19. The general solution of $\cot\theta + \tan\theta = 2$ is

A. a. $\theta = \frac{n\pi}{2} + (-1)^n \pi/8$

B. b. $\frac{n\pi}{2} + (-1)^n \pi/4$

C. c. $\theta = \frac{n\pi}{2} + (-1)^n \pi/6$

D. d. $\theta = n\pi + (-1)^n \pi/8$

Answer: B

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20. The value of $\int_{-\pi/4}^{\pi/4} \sin^{103} x \cdot \cos^{101} x dx$ is

A. $((\pi/4))^{103}$

B. $\left(\frac{\pi}{4}\right)^{101}$

C. 2

D. 0

Answer: D

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21. The length of latus rectum of parabola $4y^2 + 3x + 3y + 1 = 0$ is

A. 1)$4/3$

B. 2)7

C. 3)12

D. 4)$3/4$

Answer: D

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22. The value of $\int \frac{e^{6\log x} - e^{5\log x}}{e^{4\log x} - e^{3\log x}} dx$ is equal to

A. 1) 0

B. 2) $\frac{x^3}{3}$

C. 3) $\frac{3}{x^3}$

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

Answer: B

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23. The differential coefficient of $\log_{10} x$ with respect to $\log_x 10$ is

A. 1)1

B. 2)$-(\log_{10} x)^2$

C. 3)$(\log_x 10)^2$

D. 4)$\frac{x^2}{100}$

Answer: B

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24. The slope of the tangent to the curve $x = t^2 + 3t - 8, y = 2t^2 - 2t - 5$ at the point $(2, -1)$ is

A. 1) $\frac{22}{7}$

B. 2) $\frac{6}{7}$

C. 3)`(7)/(6)

D. 4) $\frac{-6}{7}$

Answer: B

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25. The real part of $(1 - \cos\theta + I\sin\theta)^{-1}$ is

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

B. $\frac{1}{1+\cos\theta}$

C. $\tan\frac{\theta}{2}$

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

Answer: A

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26. $\int_0^{\pi/2} \frac{\sin^{1000} x dx}{\sin^{1000} x + \cos^{1000} x}$ is equal to

A. 1)1000

B. 2)1

C. 3) $\frac{\pi}{2}$

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

Answer: D

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27. If $1 + \sin x + \sin^2 x + \ldots\ldots\ldots\ldots\ldots$ upto $\infty = 4 + 2\sqrt{3}, 0 < x < \pi$ and $x \neq \frac{\pi}{2}$, then x=

A. 1)$\pi / 6$

B. 2)$\pi / 4$

C. 3)$\pi / 3$

D. 4)$3\pi / 4$

Answer: C

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28. $\lim_{x \to 0} \frac{xe^x - \sin x}{x}$ is equal to

A. 1)3

B. 2)1

C. 3)0

D. 4)2

Answer: C

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29. If $\tan^{-1}\left(x^2+y^2\right)=\alpha$ then $\frac{dy}{dx}$ is equal to

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

B. xy

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

D. $-xy$

Answer: A

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30. The simplified form of $i^n + i^{n+1} + i^{n+2} + i^{n+3}$ is

A. 1)0

B. 2)1

C. 3)-1

D. 4)i

Answer: A

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31. The two curves $x^3 - 3xy^2 + 2 = 0$ and $3x^2y - y^3 - 2 = 0$:

A. 1)Touch each other

B. 2)Cut each other at right angle

C. 3)Cut at an angle $\pi/3$

D. 4)Cut at an angle $\pi/4$

Answer: B

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32. The equation of the normal to the curve $y(1+x^2) = 2 - x$ where the tangent crosses x - axis is

A. 1)$5x - y - 10 = 0$

B. 2)$x - 5y - 10 = 0$

C. 3)$5x + y + 10 = 0$

D. 4)$x + 5y + 10 = 0$

Answer: A

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33. The maximum value of $\left(\frac{1}{x}\right)^x$ is

A. e

B. e^e

C. $e^{1/e}$

D. $\left(\frac{1}{e}\right)^e$

Answer: C

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34. The solution for the differential equation $\frac{dy}{y} + \frac{dx}{x} = 0$ is

A. 1) $\frac{1}{y} + \frac{1}{x} = c$

B. 2) $\log x . \log y = c$

C. 3) $xy = c$

D. 4) $x + y = c$

Answer: C

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35. The order and degree of the differential equation

$$\left[1+\left(\frac{dy}{dx}\right)^2+\sin\left(\frac{dy}{dx}\right)\right]^{3/4}=\frac{d^2y}{dx^2}$$

A. $\begin{matrix}\text{order}=2\\ \text{degree}=3\end{matrix}$

B. $\begin{matrix}\text{order}=2\\ \text{degree}=4\end{matrix}$

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

D. $\begin{matrix}\text{order}=2\\ \text{degree}=\text{not defined}\end{matrix}$

Answer: D

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36. If $\vec{a}$ and $\vec{b}$ are unit vectors, then what is the angle between $\vec{a}$ and $\vec{b}$ for $\sqrt{3}veva - \vec{b}$ to be a unit vectors ?

A. 30°

B. 45°

C. 60°

D. 90°

Answer: A

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37. The sum of 1^{st} n terms of the series

$$\frac{1^2}{1}+\frac{1^2+2^2}{1+2}+\frac{1^2+2^2+3^2}{1+2+3}+..$$

A. 1) $\frac{n+2}{3}$

B. 2) $\frac{n(n+2)}{3}$

C. 3)(n(n-2))/(3)`

D. 4) $\frac{n(n-2)}{6}$

Answer: B

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38. The 11^{th} term in the expansion of $\left(x+\frac{1}{\sqrt{x}}\right)^{14}$ is

A. 1) $\frac{999}{x}$

B. 2) $\frac{1001}{x}$

C. 3)i

D. 4) $\frac{x}{1001}$

Answer: B

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39. Suppose $\vec{a} + \vec{b} + \vec{c} = 0, \left|\vec{a}\right| = 3, \left|\vec{b}\right| = 5, \left|\vec{c}\right| = 7$, then the angle between $\vec{a}$ & $\vec{b}$ is

A. a.π

B. b.$\pi/2$

C. c.$\pi/3$

D. d.$\pi/4$

Answer: C

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40. If $\vec{a}$, $\vec{b}$, $\vec{c}$ are three non-zero vector such that each one of then is perpendicular to the sum of the other two vectors, then the value of $\left|\vec{a}+\vec{b}+\vec{c}\right|^2$ is :

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

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

C. $5\sqrt{2}$

D. $\sqrt{5}$

Answer: C

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41. If the straight lines $2x + 3y - 3 = 0$ and $x + ky + 7 = 0$ are perpendicular, then the value of k is

A. 1)$2/3$

B. 2)$3/2$

C. 3)$-2/3$

D. 4)$-3/2$

Answer: C

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42. The rate of change of area of a circle with respect to its radius at r=2cm is of

A. 1)4

B. 2)2π

C. 3)2

D. 4)4π

Answer: D

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43. Find the value of $\tan \frac{\pi}{8}$.

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

B. $\sqrt{2}+1$

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

D. $1-\sqrt{2}$

Answer: C

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44. Area lying between the curves $y^2 = 2x$ and $y = x$ is

A. 1) $\frac{2}{3}$ sq.units

B. 2) $\frac{1}{3}$ sq.units

C. 3) $\frac{1}{4}$ sq.units

D. 4) $\frac{3}{4}$ sq.units

Answer: A

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45. If $P(A \cap B) = 7/10$ and $P(B) = 17/20$, where P stands for probability then $P(A \mid B)$ is equal to

A. 1)$7/8$

B. 2)$17/20$

C. 3)$14/17$

D. 4)$1/8$

Answer: C

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46. The coefficient of variation of two distribution are 60 and 70. The standard deviations are 21 and 16 respectively, then their mean is

A. 1)35

B. 2)23

C. 3)28.25

D. 4)22.85

Answer: A::C::D

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47. Two cards are drawn at randrom from a pack of 52 cards. The probability of these two being "Aces" is

A. 1) $\frac{1}{26}$

B. 2) $\frac{1}{221}$

C. 3) $\frac{1}{2}$

D. 4) $\frac{1}{13}$

Answer: B

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48. If $\sin^{-1} x + \sin^{-1} y = \frac{\pi}{2}$, then x^2 is equal to

A. 1) $1 - y^2$

B. 2) y^2

C. 3) 0

D. 4) $\sqrt{1 - y}$

Answer: A

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49. The value of $\int_2^8 \frac{\sqrt{10-x}}{\sqrt{x}+\sqrt{10-x}}dx$ is

A. 1)10

B. 2)0

C. 3)8

D. 4)3

Answer: D

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50. Write the contrapositive and converse of the following statements.

If x is a prime number, then x is odd.

A. 1)If x is not a number then x is odd

B. 2)If x is not an odd number then x is not a prime number

C. 3)If x is a prime number then it is not odd

D. 4)If x is not a prime number then x is not an odd

Answer: D

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51. Two dice are thrown simultaneously. The probability of obtaining a total score of 5 is

A. $\frac{1}{18}$

B. $\frac{1}{12}$

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

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

Answer: C

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52. If

$$A = \begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}, \text{ and } A + A' = I,$$

then the value of α is

A. $\pi/6$

B. $\pi/3$

C. π

D. $3\pi/2$

Answer: A

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53. IF $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then $A^2 - 5A$ is equal to

A. I

B. $-I$

C. 7I

D. $-7I$

Answer: D

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54. Find a value of "x"for which $x\left(\hat{i}+\hat{j}+\hat{k}\right)$ is a unit vector .

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

B. $\pm\sqrt{3}$

C. ± 3

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

Answer: A

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55. If $x = 2 + 3\cos\theta$ and $y = 1 - 3\sin\theta$ represent a circle then the centre and radius is

A. 1)$(2, 1), 9$

B. 2)$(2, 1), 3$

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

D. 4)$(-2, -1), 3$

Answer: B

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56. The vector equation of the plane which is at a distance of $3/\sqrt{14}$ from the origin and the normal from the origin is $2\hat{i} - 3\hat{j} + \hat{k}$ is

A. 1) $\vec{r} \cdot \left(2\hat{i} - 3\hat{j} + \hat{k}\right) = 3$

B. 2} $\vec{r} \cdot \left(\hat{i} + \hat{j} + \hat{k}\right) = 9$

C. 3) $\vec{r} \cdot \left(\hat{i} + 2\hat{j}\right) = 3$

D. 4) $\vec{r} \cdot \left(2\hat{i} + \hat{k}\right) = 3$

Answer: A

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57. Find the co-ordinates of the foot of the perpendicular drawn from the origin to the plane $5y + 8 = 0$

A. 1) $\left(0, -\frac{18}{5}, 2\right)$

B. 2) $\left(0, \frac{8}{5}, 0\right)$

C. 3) $\left(\frac{8}{25}, 0, 0\right)$

D. 4) $\left(0, -\frac{8}{5}, 0\right)$

Answer: D

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58. If $\cos\alpha, \cos\beta, \cos\gamma$ are the direction cosines fo a vector $\vec{a}$, then $\cos 2\alpha + \cos 2\beta + \cos 2\gamma$ is equal to

A. a.2

B. b.3

C. c.-1

D. d.0

Answer: C

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59. The value of the $\sin 1^\circ + \sin 2^\circ + \ldots + \sin 359^\circ$ is equal to

A. a.0

B. b.1

C. c.-1

D. d.180

Answer: A

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60. Integrating factor of $x\frac{dy}{dx} - y = x^4 - 3x$ is

A. a.x

B. b.$\log x$

C. c.$\frac{1}{x}$

D. d.$-x$

Answer: C

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