MATHS

BOOKS - KCET PREVIOUS YEAR PAPERS

KARNATAKA CET 2006

Mathematics

1. If $p \rightarrow (q \vee r)$ is false, then the truth values of p,q,r are respectively

A. T, F and F

B. F, F and T

C. F, T and T

D. T, F and T

Answer: A

Watch Video Solution

2. If α, β and γ are the roots of the equation $x^3 - 8x + 8 = 0$, then $\sum \alpha^2$ and $\sum \frac{1}{\alpha\beta}$ are respectively

A. 0 and -16

B. 16 and 8

C. -16 and 0

D. 16 and 0

Answer: D

Watch Video Solution

3. The g.c.d. of 1080 and 675 is

A. 145

B. 135

C. 225

D. 125

Answer: B

Watch Video Solution

4. If $a|(b+c)\text{and}a|(b-c)$ where $a, b, c \in N$ then,

A. $b^2 \equiv c^2\left(\text{mod}a^2\right)$

B. $a^2 + c^2 = b^2$

C. $a^2 \equiv b^2 (\mathrm{mod} c^2)$

D. $c^2 \equiv a^2 (\mathrm{mod} b^2)$

Answer: A

Watch Video Solution

5. If a, b and $c \in$ N then which one of the following is not true ?

A. $a \mid b$ and $a | c \Rightarrow a | 3b + 2c$

B. $a \mid b$ and $b|c \Rightarrow a|c$

C. $a|b+c \Rightarrow a|b$ and $a \mid c$

D. $a \mid b$ and $a|c \Rightarrow a|b+c$

Answer: C

View Text Solution

6. $x = 4(1+\cos\theta)$ and $y = 3(1+\sin\theta)$ are the parametric equations of

A. $\frac{(x-3)^2}{9} + \frac{(y-4)^2}{16} = 1$

B. $\frac{(x+4)^2}{16} + \frac{(y+3)^2}{9} = 1$

C. $\frac{(x-4)^2}{16} - \frac{(y-3)^2}{9} = 1$

D. $\frac{(x-4)^2}{16} + \frac{(y-3)^2}{9} = 1$

Answer: D

Watch Video Solution

7. If the distance between the foci and the distance between the directrices of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ are in the ratio $3:2$ then $a:b$ is

A. $\sqrt{2}:1$

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

C. $1:2$

D. $2:1$

Answer: A

Watch Video Solution

8. The ellipse $\frac{x^2}{25}+\frac{y^2}{16}=1$ and the hyperbola $\frac{x^2}{25}-\frac{y^2}{16}=1$ have in common

A. centre only

B. centre, foci and directrices

C. centre, foci and vertices

D. centre and vertices only

Answer: C

Watch Video Solution

9. If $\sec\theta = m$ and $\tan\theta = n$, then $\frac{1}{m}\left[(m+n) + \frac{1}{(m+n)}\right] =$

A. 2

B. 2 m

C. 2 n

D. mn

Answer: A

Watch Video Solution

10. The value of $\frac{\sin 85^\circ - \sin 35^\circ}{\cos 65^\circ} =$

A. 2

B. -1

C. 1

D. 0

Answer: C

Watch Video Solution

11. If the length of the tangent from any point on the circle $(x-3)^2+(y+2)^2=5r^2$ to the circle $(x-3)^2+(y+2)^2=r^2$ is 4 units,

then the area between the two circles in sq. units is

A. 32π

B. 4π

C. 8π

D. 16π

Answer:

Watch Video Solution

12. The circles $ax^2 + ay^2 + 2g_1x + 2f_1y + c_1 = 0$ and $bx^2 + by^2 + 2g_2x + 2f_2y + c_2 = 0$ $(a \neq 0$ and $b \neq 0)$ cut orthogonally if

A. $g_1g_2 + f_1f_2 = ac_1 + bc_2$

B. $2(g_1g_2 + f_1f_2) = bc_1 + ac_2$

C. $bg_1g_2 + af_1f_2 = bc_1 + ac_2$

D. $g_1g_2 + f_1f_2 = c_1 + c_2$

Answer: B

Watch Video Solution

Watch Video Solution

13. The equation of the common tangent of the two touching circles, $y^2 + x^2 - 6x - 12y + 37 = 0$ and $x^2 + y^2 - 6y + 7 = 0$ is

A. $x - y - 5 = 0$

B. $x - y + 5 = 0$

C. $x + y - 5 = 0$

D. $x + y + 5 = 0$

Answer: C

Watch Video Solution

14. The equation of the parabola with vertex at $(-1, 1)$ and focus (2, 1) is

A. $y^2 - 2y - 12x - 11 = 0$

B. $x^2 + 2x - 12y + 13 = 0$

C. $y^2 - 2y + 12x + 11 = 0$

D. $y^2 - 2y - 12x + 13 = 0$

Answer: A

Watch Video Solution

15. The equation of the line which is tangent to both the circle $x^2 + y^2 = 50$ and the parabola $y^2 = 40x$ is

A. $2x - y \pm 5 = 0$

B. $2x - y + 5 = 0$

C. $2x - y - 5 = 0$

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

Answer: A

Watch Video Solution

16. If $2A + 3B = \begin{bmatrix} 2 & -1 & 4 \\ 3 & 2 & 5 \end{bmatrix}$ and $A + 2B = \begin{bmatrix} 5 & 0 & 3 \\ 1 & 6 & 2 \end{bmatrix}$, then B =

A. $\begin{bmatrix} 8 & -1 & 2 \\ -1 & 10 & -1 \end{bmatrix}$

B. $\begin{bmatrix} 8 & 1 & 2 \\ -1 & 10 & -1 \end{bmatrix}$

C. $\begin{bmatrix} 8 & 1 & -2 \\ -1 & 10 & -1 \end{bmatrix}$

D. $\begin{bmatrix} 8 & 1 & 2 \\ 1 & 10 & 1 \end{bmatrix}$

Answer: B

Watch Video Solution

17. If $O(A) = 2 \times 3, O(B) = 3 \times 2,$ and $O(C) = 3 \times 3$ which one of the following is not defined ?

A. $CB + A'$

B. BAC

C. $C(A + B')'$

D. $C(A + B')$

Answer: D

Watch Video Solution

18. If $A = \begin{bmatrix} 1 & -3 \\ 2 & k \end{bmatrix}$ and $A^2 - 4A + 10I = A$, then k =

A. 0

B. -4

C. 4 and not 1

D. 1 or 4

Answer: D

Watch Video Solution

19. The value of $\begin{vmatrix} x+y & y+z & z+x \\ x & y & z \\ x-y & y-z & z-x \end{vmatrix} =$

A. $2(x+y+z)^2$

B. $2(x+y+z)^3$

C. $(x+y+z)^3$

D. 0

Answer: D

Watch Video Solution

20. On the set Q of all rational numbers the operation * which is both associative and commutative is given by $a \cdot b =$

A. $a + b + ab$

B. $a^2 + b^2$

C. $ab + 1$

D. $2a + 3b$

Answer: A

Watch Video Solution

21. From an aeroplane flying, vertically above a horizontal road, the angels of depression of two consecutive stones on the same side of the aeroplane are observed to be 30° and 60° respectively. The height at which the aeroplane is flying in km is

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

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

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

D. 2

Answer: B

Watch Video Solution

22. If the angles of a triangle are in the ratio $3:4:5$, then the sides are in the ratio

A. $2:\sqrt{6}:\sqrt{3}+1$

B. $\sqrt{2}:\sqrt{6}:\sqrt{3}+1$

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

D. $3:4:5$

Answer: A

Watch Video Solution

23. If $\cos^{-1}x=\alpha,(0<x<1)$ and $\sin^{-1}\left(2x\sqrt{1-x^2}\right)+\sec^{-1}\left(\frac{1}{2x^2-1}\right)=\frac{2\pi}{3}$, then $\tan^{-1}(2x)$ equals

A. $\pi/6$

B. $\pi/4$

C. $\pi/3$

D. $\pi/2$

Answer: C

Watch Video Solution

24. If $a > b > 0$, then the value of $\tan^{-1}\left(\frac{a}{b}\right) + \tan^{-1}\left(\frac{a+b}{a-b}\right)$ depends on

A. both a and b

B. b and not a

C. a and not b

D. neither a nor b

Answer: D

Watch Video Solution

25. Which one of the following equations has no solution ?

A. $\cos ec\theta - \sec\theta = \cos ec\theta . \sec\theta$

B. $\cos ec\theta . \sec\theta = 1$

C. $\cos\theta + \sin\theta = \sqrt{2}$

D. $\sqrt{3}\sin\theta - \cos\theta = 2$

Answer: A

Watch Video Solution

26. If $A = \{a, b, c\}, B = \{b, c, d\}$ and $C = \{a, d, c\}$, then $(A - B) \times (B \cap C) =$

A. $\{(a, c), (a, d)\}$

B. $\{(a, b), (c, d)\}$

C. $\{(c, a), (d, a)\}$

D. $\{(a, c), (a, d), (b, d)\}$

Answer: A

Watch Video Solution

27. The function $f: X \to Y$ defined by $f(x) = \sin x$ is one - one but not onto if X and Y are respectively equal to

A. IR and IR

B. $[0, \pi]$ and $[0, 1]$

C. $\left[0, \frac{\pi}{2}\right]$ and $[-1, 1]$

D. $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$ and $[-1, 1]$

Answer: D

View Text Solution

28. If $\log_4 2 + \log_4 4 + \log_4 x + \log_4 16 = 6$

then x =

A. 64

B. 4

C. 8

D. 32

Answer: D

Watch Video Solution

29. If $S_n = \frac{1}{6.11} + \frac{1}{11.16} + \frac{1}{16.21} + \ldots\ldots$ to n terms, then $6S_n$ equals

A. $\frac{5n-4}{5n+6}$

B. $\frac{n}{(5n+6)}$

C. $\frac{2n-1}{5n+6}$

D. $\frac{1}{(5n+6)}$

Answer: B

Watch Video Solution

30. The remainder obtained when $(\underline{|1|})^2 + (\underline{|2|})^2 + (\underline{|3|})^2 + ... + (\underline{|100|})^2$ is divided by 10^2 is

A. 27

B. 28

C. 17

D. 14

Answer: C

Watch Video Solution

31. In the group $G = \{1, 5, 7, 11\}$ under multiplication modulo 12, the solution of $7^{-1} \otimes_{12} (x \otimes_{12} 11) = 5$ is x =

A. 5

B. 1

C. 7

D. 11

Answer: B

View Text Solution

32. A subset of the additive group of real numbers which is not a sub group is

A. $(\{0\}, +)$

B. $(Z, +)$

C. $(N, +)$

D. $(Q, +)$

Answer: C

View Text Solution

33. If $\overrightarrow{p} = \hat{i} + \hat{j}, \overrightarrow{q} = 4\hat{k} - \hat{j}$ and $\overrightarrow{r} = \hat{i} + \hat{k}$ then the unit vector in the direction of $3\overrightarrow{p} + \overrightarrow{q} - 2\overrightarrow{r}$ is

A. $\frac{1}{3}\left(\hat{i}+2\hat{j}+2\hat{k}\right)$

B. $\frac{1}{3}\left(\hat{i}-2\hat{j}-2\hat{k}\right)$

C. $\frac{1}{3}\left(\hat{i}-2\hat{j}+2\hat{k}\right)$

D. $\hat{i}+2\hat{j}+2\hat{k}$

Answer: A

Watch Video Solution

34. If $\vec{a}$ and $\vec{b}$ are the vectors such that $\left|\vec{a}\right|=3\sqrt{3}, \left|\vec{b}\right|=4$ and $\left|\vec{a}+\vec{b}\right|=\sqrt{7}$, then the angle between $\vec{a}$ and $\vec{b}$ is

A. 120°

B. 60°

C. 30°

D. 150°

Answer: A

Watch Video Solution

35. If $\vec{a}$ is vector perpendicular to both $\vec{b}$ and $\vec{c}$, then

A. $\vec{a} + \left(\vec{b} + \vec{c}\right) = \vec{0}$

B. $\vec{a} \times \left(\vec{b} + \vec{c}\right) = \vec{0}$

C. $\vec{a} \times \left(\vec{b} \times \vec{c}\right) = \vec{0}$

D. $\vec{a} . \left(\vec{b} \times \vec{c}\right) = \vec{0}$

Answer: C

View Text Solution

36. If the area of the parallelogram with $\vec{a}$ and $\vec{b}$ as two adjacent sides is 15 sq. units, then the area of the parallelogram having

$3\vec{a} + 2\vec{b}$ and $\vec{a} + 3\vec{b}$ as two adjacent sides

in sq. units is

A. 120

B. 105

C. 75

D. 45

Answer: B

Watch Video Solution

37. The locus of the point which moves such that the ratio of its distance from two fixed point in the plane is always a constant $K(<1)$ is

A. hyperbola

B. ellipse

C. straight line

D. circle

Answer: D

Watch Video Solution

Watch video solution

38. If the lines $x + 3y - 9 = 0, 4x + by - 2 = 0$ and $2x - y - 4 = 0$ are concurrent, then b equals

A. -5

B. 5

C. 1

D. 0

Answer: A

Watch Video Solution

39. The lines represented by $ax^2 + 2hxy + by^2 = 0$ are perpendicular to each other if

A. $h^2 = a + b$

B. $a + b = 0$

C. $h^2 = ab$

D. $h = 0$

Answer: B

Watch Video Solution

40. The equation of the circle having $x - y - 2 = 0$ and $x - y + 2 = 0$ as two tangents and $x - y = 0$ as a diameter is

A. $x^2 + y^2 + 2x - 2y + 1 = 0$

B. $x^2 + y^2 - 2x + 2y - 1 = 0$

C. $x^2 + y^2 = 2$

D. $x^2 + y^2 = 1$

Answer: C

Watch Video Solution

41. If the curve $y = 2x^3 + ax^2 + bx + c$ passes through the origin and the tangents drawn to it at $x = -1$ and x = 2 are parallel to the X - axis, then the values a, b and c are respectively

A. $12, -3$ and 0

B. $-3, -12$ and 0

C. $-3, 12$ and 0

D. $3, -12$ and 0

Answer: B

Watch Video Solution

42. A circular sector of perimeter 60 metre with maximum area is to be constructed. The radius of the circular are in metre musy be

A. 20

B. 5

C. 15

D. 10

Answer: C

Watch Video Solution

43. The tangent and the normal drawn to the curve $y = x^2 - x + 4$ at $P(1, 4)$ cut the X-axis at A and B respectively. If the length of the substangent drawn to the curve at P is equal

to the length of the subnormal, then the area of the triangle PAB in sq. units is

A. 4

B. 32

C. 8

D. 16

Answer: D

Watch Video Solution

44. $\int \frac{\left(x^3+3x^2+3x+1\right)}{(x+1)^5} dx =$

A. $-\frac{1}{(x+1)}+c$

B. $\frac{1}{5}\log(x+1)+c$

C. $\log(x+1)+c$

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

Answer: A

Watch Video Solution

45. $\int \frac{\cos ecx}{\cos^2\left(1+\log\tan\frac{x}{2}\right)}dx =$

A. $\sin^2\left[1+\log\tan\frac{x}{2}\right]+c$

B. $\tan\left[1+\log\tan\frac{x}{2}\right]+c$

C. $\sec^2\left[1+\log\tan\frac{x}{2}\right]+c$

D. $-\tan\left[1+\log\tan\frac{x}{2}\right]+c$

Answer: B

Watch Video Solution

46. The complex number $\frac{\left(-\sqrt{3}+3i\right)(1-i)}{\left(3+\sqrt{3}i\right)(i)\left(\sqrt{3}+\sqrt{3}i\right)}$ when represented in the Argand diagram is

A. in the second quadrant

B. in the first quadrant

C. on the Y-axis (imaginary axis)

D. on the X-axis (real axis)

Answer: C

Watch Video Solution

47. If $2x = -1 + \sqrt{3}i$, then the value of $\left(1 - x^2 + x\right)^6 - \left(1 - x + x^2\right)^6 =$

A. 32

B. -64

C. 64

D. 0

Answer: D

Watch Video Solution

48. The modulus of amplitude of $\left(1+i\sqrt{3}\right)^8$ are respectively

A. 256 and $\pi/3$

B. 256 and $2\pi/3$

C. 2 and $2\pi/3$

D. 256 and $8\pi/3$

Answer: B

Watch Video Solution

49. The value of $\lim_{x \to 0} \frac{5^x - 5^{-x}}{2x} =$

A. log 5

B. 0

C. 1

D. 2 log 5

Answer: A

Watch Video Solution

50. Which one of the following is not true always?

A. if f (x) is not continuous at x = a, then it is

B. if f (x) is continuous at x = a, then it is differentiable at x = a

C. if f (x) and g (x) are differentiable at x = a, then $f(x) + g(x)$ is also differentiable at x = a

D. if a function f (x) is continuous at x = a,

then $\lim_{x \to a} f(x)$ exists

Answer: B

Watch Video Solution

51. $\int \frac{dx}{x\sqrt{x^6 - 16}} =$

A. $\frac{1}{3}\sec^{-1}\left(\frac{x^3}{4}\right) + c$

B. $\cos h^{-1}\left(\frac{x^3}{4}\right) + c$

C. $\frac{1}{12}\sec^{-1}\left(\frac{x^3}{4}\right) + c$

D. $\sec^{-1}\left(\frac{x^3}{4}\right)+c$

Answer: A

Watch Video Solution

52. If $I_1=\int_0^{\pi/2}$ x sin x dx and $I_2=\int_0^{\pi/2}$ x cos x dx, then which one of the following is true ?

A. $I_1+I_2=\frac{\pi}{2}$

B. $I_1=\frac{\pi}{2}I_2$

C. $I_1 + I_2 = 0$

D. $I_1 = I_2$

Answer: A

Watch Video Solution

53. If f (x) is defined $[-2, 2]$ by $f(x) = 4x^2 - 3x + 1$ and $g(x) = \frac{f(-x) - f(x)}{(x^2 + 3)}$, then $\int_{-2}^{2} g(x)dx =$

A. 64

B. -48

C. 0

D. 24

Answer: C

 Watch Video Solution

54. The area enclosed between the parabola $y = x^2 - x + 2$ and the line $y = x + 2$ in sq. units equals

A. $8/3$

B. $1/3$

C. $2/3$

D. $4/3$

Answer: D

Watch Video Solution

55. The solution of the differential equation

$e^{-x}(y+1)dy + \left(\cos^2 x - \sin 2x\right)y(dx) = 0$

subjected to the condition that y = 1 when x = 0 is

A. $y + \log y + e^x \cos^2 x = 2$

B. $\log(y+1) + e^x \cos^2 x = 1$

C. $y + \log y = e^x \cos^2 x$

D. $(y+1) + e^x \cos^2 x = 2$

Answer: A

Watch Video Solution

56. If $y = 1 + \frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3} + \ldots$ to ∞ with $|x| > 1$ then $\frac{dy}{dx} =$

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

B. x^2y^2

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

D. $\frac{-y^2}{x^2}$

Answer: C

Watch Video Solution

57. If f (x) and g (x) are two functions with $g(x) = x - \frac{1}{x}$ and $fog(x) = x^3 - \frac{1}{x^3}$, then $f'(x) =$

A. $3x^2 + 3$

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

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

D. $3x^2 + \frac{3}{x^4}$

Answer: A

Watch Video Solution

58. The derivative of $a^{\sec x}$ w.r.t. $a^{\tan x}(a > 0)$ is

A. $\sec x a^{\sec x - \tan x}$

B. $\sin x a^{\tan x - \sec x}$

C. $\sin x a^{\sec x - \tan x}$

D. $a^{\sec x - \tan x}$

Answer: B

Watch Video Solution

59. If $\sin(x+y)+\cos(x+y)=\log(x+y)$, then $\frac{d^2y}{dx^2}=$

A. $-y/x$

B. 0

C. -1

D. 1

Answer: B

Watch Video Solution

60. If f (x) is a function such that $f''(x) + f(x) = 0$ and $g(x) = [f(x)]^2 + [f'(x)]^2$ and $g(3) = 3$ then $g(8) =$

A. 5

B. 0

C. 3

D. 8

Answer: C

Watch Video Solution