# KCET 2026 Mathematics April 24

## Question Paper with Solutions

Conducted by KEA

### General Instructions

(i) **Duration:** The total duration of the examination is 80 minutes.

(ii) **Total Marks:** The complete paper carries a maximum of 60 marks.

(iii) **Structure:** The paper has 60 Questions from Mathematics.

(iv) **Compulsory Questions:** All 60 questions are compulsory.

(v) Each question has four options. Only **one** option is correct.

(vi) **Correct Answer:** +1 marks.

(vii) **Incorrect Answer:** (No Negative marking).

(viii) **Unanswered/Marked for Review:** 0 marks.

**1.** $\tan^{-1}\left(\frac{1}{1+1\cdot2}\right)+\tan^{-1}\left(\frac{1}{1+2\cdot3}\right)+\cdots+\tan^{-1}\left(\frac{1}{1+n\cdot(n+1)}\right)=$

(A) $\tan^{-1}\left(\frac{n}{n+2}\right)$
(B) $\tan^{-1}\left(\frac{n+1}{n}\right)$
(C) $\tan^{-1}\left(\frac{n}{n+1}\right)$
(D) $\tan^{-1}\left(\frac{n+2}{n}\right)$

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**2. The corner points of the feasible region determined by the system of linear constraints are (0, 10), (5, 5), (15, 15), (0, 20). Let $z=px+qy$, where $p,q>0$. The relation between $p$ and $q$, so that the maximum $z$ occurs at both points (15, 15) and (0, 20) is**

(A) $p=q$

(B) $p = 2q$

(C) $q = 2p$

(D) $q = 3p$

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**3. In Linear Programming Problem (LPP), the objective function $Z = ax + by$ has the same maximum value at two corner points. The number of points at which $Z_{max}$ occurs is**

(A) 1

(B) 2

(C) 0

(D) Infinity

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**4. Probability of obtaining an even prime number on each die when a pair of dice is rolled is**

(A) 0

(B) $\frac{1}{6}$

(C) $\frac{1}{12}$

(D) $\frac{1}{36}$

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**5. The probability that a man and his wife live after 20 years are $\frac{1}{4}$ and $\frac{1}{3}$ respectively. The probability that neither the man nor his wife live after 20 years is**

(A) $\frac{3}{4}$

(B) $\frac{5}{12}$

(C) $\frac{7}{12}$

(D) $\frac{1}{2}$

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**6. Integrating factor of the differential equation $(1-x^2)\frac{dy}{dx} - xy = 1$ is**

(1) $1-x^2$

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

(3) $\frac{x}{1-x^2}$

(4) $\sqrt{1-x^2}$

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**7. Recent studies suggest that 12% of the world population is left handed. Depending on parents hand usage, the chances of having left handed children are as follows:**

**A: Both parents are left handed, chances of having left handed children = 24%**

**B: Both parents are right handed, chances of having left handed children = 9%**

**C: Father left handed and mother right handed, chances of having left handed children = 17%**

**D: Father right handed and mother left handed, chances of having left handed children = 22%**

**Given $P(A) = P(B) = P(C) = P(D) = 1/4$ and L denotes child is left handed. What is the probability that $P(A|L)$?**

(1) $\frac{17}{80}$

(2) $\frac{24}{75}$

(3) $\frac{1}{3}$

(4) $\frac{1}{2}$

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**8. If $\alpha$ and $\beta$ are acute angles such that $\alpha+\beta$ and $\alpha-\beta$ satisfy the equation $\tan^2\theta - 4\tan\theta + 1 = 0$, then $\alpha$ and $\beta$ are respectively**

(1) $45°, 30°$

(2) $75°, 15°$

(3) $30°, 60°$

(4) $60°, 45°$

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**9. $\sum_{r=1}^{n}(r \cdot r!) =$ _____**

(1) 1

(2) $n$

(3) $(n+1)! - 1$

(4) 0

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**10. The solution of $3x - 5 < 2x - 4$ is**

(1) $x < 1$

(2) $x > -1$

(3) $x < 9$

(4) $x > 9$

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**11. 10 distinct points are taken on a circle. Then using these points**

**Statement I : The number of triangles that can be formed is 100**

**Statement II : The number of chords that can be formed is 45**

**Which of the following is correct?**

(1) Both Statement I and Statement II are true

(2) Both Statement I and Statement II are false

(3) Statement I is true and Statement II is false

(4) Statement I is false and Statement II is true

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**12. How many ways can you arrange all the letters and numbers in "KCET 2025" which start with K and end with 5?**

(1) 720

(2) 360

(3) 120

(4) 180

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**13. The value of $\lim_{x \to 2} \frac{x^3+3x^2-9x-2}{x^3-x^2-4x+4}$ is _____**

(1) 3

(2) $\frac{15}{4}$

(3) $\frac{15}{2}$

(4) $\frac{15}{13}$

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**14. If we insert two numbers between $\sqrt{2}$ and $4$ so that the resulting sequence is in G.P., then the inserted numbers in the order are**

(1) $4, \sqrt{2}$

(2) $2, 2\sqrt{2}$

(3) $\sqrt{8}, 2$

(4) $2\sqrt{2}, 4$

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**15. Match List-I with List-II**

**List-I**

a) A matrix which is not a square matrix

b) A square matrix $A' = A$

c) The diagonal elements of a diagonal matrix are same

d) A matrix which is both symmetric and skew symmetric

**List-II**

i) Symmetric matrix

ii) Null matrix

iii) Rectangular matrix

iv) Scalar matrix

**Codes:**

(1) a - iii, b - i, c - iv, d - ii

(2) a - iii, b - ii, c - iv, d - i

(3) a - i, b - ii, c - iv, d - iii

(4) a - iii, b - iv, c - i, d - ii

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**16. Consider the following statements:**

**Statement I : If $A$ is a non-singular matrix, then $A^{-1}$ exists.**

**Statement II : If $A$ and $B$ are symmetric matrices of same order, then $(AB - BA)$ is a skew symmetric matrix.**

**Choose the correct option.**

(1) Statement I is true and Statement II is false

(2) Statement I is false and Statement II is false

(3) Statement I is true and Statement II is true

(4) Statement I is false and Statement II is true

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**17. A row matrix has only**

(1) One element

(2) One row with one or more columns

(3) One column with one or more rows

(4) One row and one column

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**18. Let $X$ be a matrix of order $2 \times n$ and $Z$ be a matrix of order $2 \times p$. If $n = p$, then the order of the matrix $7X - 5Z$ is:**

(1) $2 \times n$

(2) $n \times 3$

(3) $p \times 2$

(4) $p \times n$

---

**19. Which of the following is correct?**

(1) Determinant is a square matrix.

(2) Determinant is a number associated to a matrix.

(3) Determinant is a unique number associated to a square matrix.

(4) Determinant is not defined for a square matrix.

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**20. If $A$ and $B$ are invertible matrices of same order, then which of the following is <u>not</u> correct?**

(1) $A \cdot (\text{adj } A) = (\text{adj } A) \cdot A = |A|I$

(2) $A \cdot \text{adj } A = \text{adj } A \cdot A = |A|$

(3) $(AB)^{-1} = B^{-1}A^{-1}$

(4) $|A| \neq 0, |B| \neq 0$

**21. If $A$ and $B$ are invertible square matrices of order $n$, then which of the following is not correct?**

(1) $\det(AB) = \det(A) \cdot \det(B)$

(2) $\det(kA) = k^n \det(A)$

(3) $\det(A+B) = \det(A) + \det(B)$

(4) $\det(A^{-1}) = \frac{1}{\det(A)}$

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**22. The area of the triangle with vertices $(3,8), (-4,2)$ and $(5,1)$ is $\frac{P}{4}$, then the value of $P$ is**

(1) $\frac{61}{2}$

(2) $\frac{2}{61}$

(3) 122

(4) $\frac{1}{122}$

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**23. The system of equations $x + 2y = 3$ and $2x + 3y = 3$ has**

(1) No solution

(2) Unique solution

(3) Infinite solutions

(4) Only two solutions

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**24. If $\vec{a} = 2\hat{i} + 2\hat{j} - \hat{k}$, $\vec{b} = \alpha\hat{i} + \beta\hat{j} + 2\hat{k}$ and $|\vec{a} + \vec{b}| = |\vec{a} - \vec{b}|$, then $\alpha + \beta$ is equal to**

(1) 2

(2) -1

(3) 0

(4) 1

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**25. If $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{b} = \hat{j} - \hat{k}$ and $\vec{a} \times \vec{c} = \vec{b}$, $\vec{a} \cdot \vec{c} = 3$, then $\vec{c}$ is**

(1) $\frac{5}{3}\hat{i}+\frac{2}{3}\hat{j}-\frac{2}{3}\hat{k}$

(2) $\frac{5}{3}\hat{i}-\frac{2}{3}\hat{j}+\frac{2}{3}\hat{k}$

(3) $\frac{5}{3}\hat{i}+\frac{2}{3}\hat{j}+\frac{2}{3}\hat{k}$

(4) $\frac{5}{3}\hat{i}-\frac{2}{3}\hat{j}-\frac{2}{3}\hat{k}$

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**26. The value of $\lambda$ for which the vectors $\vec{a}=2\hat{i}+\lambda\hat{j}+\hat{k}$ and $\vec{b}=\hat{i}+2\hat{j}+3\hat{k}$ are orthogonal is**

(1) $\frac{5}{2}$

(2) $\frac{-5}{2}$

(3) $\frac{2}{5}$

(4) $\frac{-2}{5}$

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**27. The angle between the lines whose direction ratios are $a,b,c$ and $b-c,c-a,a-b$ is**

(1) 90°

(2) 45°

(3) 30°

(4) 0°

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**28. The measure of the angle between the lines $x=k-1,y=2k+1,z=2k+3,k\in\mathbb{R}$ and $\frac{x+1}{2}=\frac{y-2}{1}=\frac{z-1}{2}$ is**

(1) $\cos^{-1}\left(\frac{2}{3}\right)$

(2) $\cos^{-1}\left(\frac{8}{9}\right)$

(3) $\cos^{-1}\left(\frac{5}{12}\right)$

(4) $\sin^{-1}\left(\frac{8}{9}\right)$

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**29. The line $L_1$ joining the two points $(-1,2)$ and $(3,6)$ divides the line $L_2$ which passes through $(3,-1)$ in the ratio $1:3$ internally, then the equation of $L_2$ is**

(A) $4x-3y-9=0$

(B) $4x-3y+9=0$

(C) $4x+3y-9=0$

(D) $4x+3y+9=0$

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**30. In the figure**

**Statement I : When $\alpha > \beta \geq 0$, the section is hyperbola**

**Statement II : When $\beta = 90°$, the section is ellipse**

**Which of the following is correct?**

(1) Statement I is true, Statement II is false

(2) Statement I is false, Statement II is true

(3) Both the Statements are true

(4) Both the Statements are false

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**31. The three points $A(2,4,3)$, $B(4,a,9)$ and $C(10,-1,7)$ form a right-angled triangle with $\angle B = 90°$, then the value of 'a' is**

(1) 1 or 4

(2) -2 or 4

(3) 1 or -4

(4) -2 or -4

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**32. If $\lim_{x\to 3}\left(\frac{x^2-ax-3a}{x-3}\right)=5$, then $a+b=$**

(1) 1

(2) 2

(3) 3

(4) 4

---

**33. If $f(x)=\begin{cases} x^2-1 & \text{if } x\geq 2 \\ x+1 & \text{if } x<2 \end{cases}$, then $\lim_{x\to 2^+} f(x)+\lim_{x\to 2^-} f(x)=$**

(1) 7

(2) 5

(3) 6

(4) 9

---

**34. If $y = \sqrt{\tan x + y}$, then $\frac{dy}{dx} =$**

(1) $\frac{\sec x}{2y-1}$

(2) $\frac{\sec^2 x}{2y-1}$

(3) $\frac{\tan x}{2y-1}$

(4) $\frac{\sin^2 x}{2y-1}$

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**35. If $f(x) = \begin{cases} ax+7 & \text{if } x < 1 \\ 2x-3 & \text{if } x = 1 \\ \frac{x+b}{b} & \text{if } x > 1 \end{cases}$ is continuous at $x = 1$, then**

(1) $a = 3, b = 2$

(2) $a = -8, b = -2$

(3) $a = 8, b = -2$

(4) $a = -8, b = 2$

---

**36. The second order derivative of $\sec^{-1}\left(\frac{1}{2x^2-1}\right)$ with respect to $\cos^{-1}(2x^2-1)$, where $0 < x < \frac{1}{\sqrt{2}}$ is**

(1) 0

(2) 1

(3) $\frac{1}{2}$

(4) -1

---

**37. If $f(x) = \sin^{-1}\left(\frac{2x}{1+x^2}\right)$, then $f'\left(\frac{1}{2}\right) =$**

(1) $\frac{4}{5}$

(2) $\frac{8}{5}$

(3) $\frac{2}{5}$

(4) 0

---

**38. If $\sqrt{x}\sqrt[3]{y} = (x+y)^n$ and $x\frac{dy}{dx} - y = 0$, then $n =$**

(1) 1

(2) $\frac{6}{5}$

(3) $\frac{5}{6}$

(4) $\frac{4}{9}$

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**39. In a Mahakumbh, a drone camera is moving along $3y = x^3 - 3$. When y-coordinate changes 9 times as fast as x-coordinate, it captures good quality pictures. Then one of the precise positions of the drone at that instant is**

(1) $(-3, 8)$

(2) $(3, -8)$

(3) $(3, 8)$

(4) $(-3, -8)$

---

**40. A Youtube short video is getting viral according to $f(t) = -2t^3 + 3t^2 + 5$. At what time does the video get maximum number of shares? (t is in hours)**

(1) 1

(2) 2

(3) 3

(4) 4

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**41. $\int xf(x)dx + \frac{f(x)}{2} = 0$, then $f(x)$ is equal to**

(1) $e^{-2x}$

(2) $e^{2x}$

(3) $e^{-x^2}$

(4) $e^{x^2}$

---

**42. One of the possible functions $f(x)$ which satisfies $\int_{-2}^{2} f(x)dx = 0$ is**

(1) $\log\left(\frac{2+x}{2-x}\right)$

(2) $\sin(2+x)$

(3) $2x^3 + 2x + 1$

(4) $2x \tan x$

---

**43. $\int_{a-6}^{b-6} f(x+6)dx$ is equal to**

(1) $\int_a^b f(x-6)dx$

(2) $\int_a^b f(x+6)dx$

(3) $\int_a^b f(x)dx$

(4) $\int_a^b f(-x)dx$

---

**44. If 'n' is a natural number, then $\int \frac{\sin^n x}{\cos^{n+2} x}dx =$**

(1) $\frac{\tan^{n-1} x}{n-1} + C$

(2) $\frac{\tan^n x}{n} + C$

(3) $\frac{\tan^{n+2} x}{n+2} + C$

(4) $\frac{\tan^{n+1} x}{n+1} + C$

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**45. $\int e^{-x \log 2} 2^x dx =$**

(1) $\log x + C$

(2) $x + C$

(3) $\frac{1}{x} + C$

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

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**46. The area of the region bounded by the curve $y^2 = x^3$, the y-axis and the lines $y = 1$ and $y = 8$ is**

(1) $\frac{155}{3}$ sq. units

(2) $\frac{93}{5}$ sq. units

(3) 93 sq. units

(4) 155 sq. units

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**47. The area enclosed by the curve $x = \sqrt{3}\cos\theta, y = \sqrt{3}\sin\theta$ is**

(1) $\sqrt{3}\pi$ sq. units

(2) $9\pi$ sq. units

(3) $6\pi$ sq. units

(4) $3\pi$ sq. units

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**48. Sum of the squares of the order and degree (if defined) of a differential equation $2y' + (y'')^2 = \sqrt{y'' - 3}$ is**

(1) 13

(2) 20

(3) 8

(4) 16

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**49. If A = {a, b, c, d, e, f}, then the number of subsets of A which contains at least 2 elements is**

(1) 64

(2) 65

(3) 57

(4) 59

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**50. If A = {1, 2, 3, 4, ..., 10}, then the number of non empty subsets of A containing only even number is**

(1) 31

(2) 82

(3) 30

(4) 29

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**51. The domain of the function $\sqrt{\frac{x-7}{9-x}}$ is**

(1) $(7,9)$

(2) $[7,9)$

(3) $[7,9]$

(4) $(7,9]$

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**52. If $n(A) = 2$ and the number of relations from set A to set B is 1024, then $n(B)$ is**

(1) 2

(2) 5

(3) $2^5$

(4) $5^2$

---

**53. Probability of at least one of the events A and B occur is 0.6. If A and B occur simultaneously with probability 0.2, then $P(\bar{A}) + P(\bar{B})$ is**

(1) 1

(2) 0.8

(3) 0.6

(4) 1.2

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**54. The maximum value of $\sin(x + \pi/6) + \cos(x + \pi/6)$ is attained at $x =$**

 

(1) $\pi/2$

(2) $\pi/4$

(3) $\pi/6$

(4) $\pi/12$

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**55. The angles of a triangle are in A.P and the greatest angle is double the least angle, then sine of the third angle is**

(1) $\frac{\sqrt{3}}{2}$

(2) $\frac{1}{\sqrt{2}}$

(3) $\frac{1}{2}$

(4) 0

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**56. The mean and standard deviation of 100 items are 50 and 4, respectively then the sum of all squares of the items is**

(1) 250000

(2) 251600

(3) 256100

(4) 265100

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**57. Probability of occurrence of an event A is 1/2 and that of B is 3/10. If A and B are mutually exclusive, then the probability of occurrence of neither A nor B is**

(1) $\frac{4}{5}$

(2) $\frac{3}{5}$

(3) $\frac{2}{5}$

(4) $\frac{1}{5}$

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**58. Let R be the relation in the set N given by $R = \{(a, b) : a = b - 2, b > 6\}$. Which of the following is the correct answer?**

(1) $(2,4) \in R$

(2) $(3,8) \in R$

(3) $(6,8) \in R$

(4) $(8,7) \in R$

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**59.** $f(x) = (x+1)^2$ **for** $x \geq 1$. $g(x)$ **is a function whose graph is the reflection of the graph of** $f(x)$ **in the line** $y = x$**, then** $g(x)$ **is**

(1) $-\sqrt{x} - 1$

(2) $\sqrt{x} + 1$

(3) $\sqrt{x} - 1$

(4) $\sqrt{-x} - 1$

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

(1) $1 - y^2$

(2) $1 + y^2$

(3) $\sqrt{1 - y^2}$

(4) $\sqrt{1 + y^2}$

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