KCET 2025 Mathematics Question Paper

Time Allowed :1 Hour 20 minutes	**Maximum Marks :**180	**Total Questions :**60

General Instructions

Read the following instructions very carefully and strictly follow them:

1. The test is of 1 hours 20 minutes duration.
2. The question paper consists of 60 questions. The maximum marks are 180.
3. There are in the question paper consisting of Physics, having 60 questions of equal weightage.

1. Consider the following statements:

Statement-I: The set of all solution of the linear inequalities 3x + 8 $<$ 17 and 2x + 8 $>$ = 12 are x $<$ 3 and x $>=$ 2 respectively.

Statement-II: The common set of solution of linear inequalities 3x + 8 $<$ 17 and 2x + 8 $>=$ 12 is (2,3).

Which of the following is true?

(1) Statement-I is false but Statement-II is true

(2) Both the statements are true

(3) Both the statements are false

(4) Statement-I is true but Statement-II is false

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2. The number of four digit even numbers that can be formed using the digits 0, 1, 2 and 3 without repetition is:

(1) 10

(2) 4

(3) 6

(4) 6

---

3. The number of diagonals that can be drawn in an octagon is:

(1) 20

(2) 28

(3) 30

(4) 15

---

4. If the number of terms in the binomial expansion of $(2x + 3)^n$ is 22, then the value of n is:

(1) 6

(2) 7

(3) 9

(4) 8

---

5. If the 4th, 10th, and 16th terms of a G.P. are x, y, and z respectively, then

(1) $y = \sqrt{xz}$

(2) $x = \sqrt{yz}$

(3) $y = \frac{x+z}{2}$

(4) $z = \sqrt{xy}$

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6. If A is a square matrix such that $A^2 = A$, then $(I - A)^3$ is:

(1) $I - A$

(2) $I + A$

(3) $I - A^3$

(4) $I - A$

---

7. If A and B are two matrices such that AB is an identity matrix and the order of matrix B is 3×4, then the order of matrix A is:

(1) 3×3

(2) 4×3

(3) 4×4

(4) 3×4

---

8. Which of the following statements is not correct?

(1) A diagonal matrix has all diagonal elements equal to zero.

(2) A symmetric matrix A is a square matrix satisfying $A' = A$.

(3) A skew symmetric matrix has all diagonal elements equal to zero.

(4) A row matrix has only one row.

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9. If a matrix $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ satisfies $A^6 = kA'$, then the value of k is:

(1) 1

(2) $\frac{1}{32}$

(3) 6

(4) 32

---

10. If $A = \begin{bmatrix} k & 2 \\ 2 & k \end{bmatrix}$ and $|A^3| = 125$, then the value of k is:

(1) ± 3

(2) -5

(3) -4

(4) ± 2

---

11. If A is a square matrix satisfying the equation $A^2 - 5A + 7I = 0$, where I is the identity matrix and 0 is the null matrix of the same order, then A^{-1} is:

(1) $\frac{1}{7}(A - 5I)$

(2) $7(5I - A)$

(3) $\frac{1}{5}(7I - A)$

(4) $\frac{1}{7}(5I - A)$

---

12. If A is a square matrix of order 3×3, $\det A = 3$, then the value of $\det(3A^{-1})$ is:

(1) 3

(2) 27

(3) 9

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

---

13. If $B = \begin{bmatrix} 1 & 3 \\ 2 & \alpha \end{bmatrix}$ is the adjoint of a matrix A and $|A| = 2$, then the value of α is:

(1) 5

(2) 2

(3) 3

(4) 4

---

14. The system of equations $4x + 6y = 5$ and $8x + 12y = 10$ has:

(1) Infinitely many solutions.

(2) A unique solution.

(3) Only two solutions.

(4) No solution.

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15. If $\vec{a} = \hat{i} + 2\hat{j} + \hat{k}$, $\vec{b} = \hat{i} - \hat{j} + 4\hat{k}$, and $\vec{c} = \hat{i} + \hat{j} + \hat{k}$ are such that $\vec{a} + \lambda\vec{b}$ is perpendicular to $\vec{c}$, then the value of λ is:

(1) ± 1

(2) 3

(3) 0

(4) -1

---

16. If $|\vec{a}| = 10, |\vec{b}| = 2$ and $\vec{a} \cdot \vec{b} = 12$, then the value of $|\vec{a} \times \vec{b}|$ is:

(1) 10

(2) 14

(3) 16

(4) 5

---

17. Consider the following statements:

Statement (I): If either $|\vec{a}| = 0$ or $|\vec{b}| = 0$, then $\vec{a} \cdot \vec{b} = 0$.

Statement (II): If $\vec{a} \times \vec{b} = 0$, then $\vec{a}$ is perpendicular to $\vec{b}$.

Which of the following is correct?

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

(2) Both Statement (I) and Statement (II) are true

(3) Both Statement (I) and Statement (II) are false

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

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18. If a line makes angles $90°, 60°$ and θ with x, y and z axes respectively, where θ is acute, then the value of θ is:

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

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

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

(4) $\frac{\pi}{6}$

---

19. The equation of the line through the point $(0, 1, 2)$ and perpendicular to the line

$$\frac{x-1}{2} = \frac{y+1}{3} = \frac{z-1}{-2}$$

is:

(1) $\frac{x}{-3} = \frac{y-1}{4} = \frac{z-2}{-4}$

(2) $\frac{x}{-3} = \frac{y-1}{4} = \frac{z-2}{3}$

(3) $\frac{x}{-4} = \frac{y-1}{-4} = \frac{z-2}{-3}$

(4) $\frac{x}{3} = \frac{y-1}{4} = \frac{z-2}{-3}$

---

20. A line passes through $(-1, -3)$ and is perpendicular to $x + 6y = 5$. Its x-intercept is:

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

(2) -2

(3) 2

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

---

21. The length of the latus rectum of $x^2 + 3y^2 = 12$ is:

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

(2) $\frac{4}{\sqrt{3}}$ units

(3) 24 units

(4) $\frac{2}{3}$ units

---

22. The value of

$$\lim_{x \to 1} \frac{x^4 - \sqrt{x}}{\sqrt{x} - 1}$$

is:

(1) 7

(2) does not exist

(3) 1

(4) 0

---

23. If

$$y = \frac{\cos x}{1 + \sin x}$$

then:

(a) $\frac{dy}{dx} = \frac{-1}{1+\sin x}$

(b) $\frac{dy}{dx} = \frac{1}{1+\sin x}$

(c) $\frac{dy}{dx} = -\frac{1}{2}\sec^2\left(\frac{\pi}{4} - \frac{x}{2}\right)$

(d) $\frac{dy}{dx} = -\frac{1}{2}\sec^2\left(\frac{\pi}{4} - \frac{x}{2}\right)$

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24. Match the following:

In the following, $[x]$ denotes the greatest integer less than or equal to x.

	Column – I		Column - II
(a)	$x\|x\|$	(i)	continuous in $(-1,1)$
(b)	$\sqrt{\|x\|}$	(ii)	differentiable in $(-1,1)$
(c)	$x+[x]$	(iii)	strictly increasing in $(-1,1)$
(d)	$\|x-1\|+\|x+1\|$	(iv)	not differentiable at, at least one point in $(-1,1)$

Choose the correct answer from the options given below: (1) a - iv, b - iii, c - i, d - ii

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

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

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

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25. The function $f(x) = \begin{cases} e^x + ax, & x < 0 \\ b(x-1)^2, & x \geq 0 \end{cases}$ **is differentiable at** $x = 0$. **Then,**

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

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

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

(4) $a = -3, b = -1$

---

26. A function $f(x) = \begin{cases} \frac{1}{e^x - 1}, & \text{if } x \neq 0 \\ \frac{1}{e^x + 1}, & \text{if } x = 0 \end{cases}$ **is given. Then, which of the following is true?**

(1) not continuous at x = 0

(2) differentiable at x = 0

(3) differentiable at x = 0, but not continuous at x = 0

(4) continuous at x = 0

---

27. If $y = a\sin^3 t$, $x = a\cos^3 t$, then $\frac{dy}{dx}$ at $t = \frac{3\pi}{4}$ is:

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

(2) $-\sqrt{3}$

(3) 1

(4) -1

---

28. The derivative of $\sin x$ with respect to $\log x$ is:

(1) $x\cos x$

(2) $\cos x \log x$

(3) $\cos x$

(4) $\cos x$

---

29. The minimum value of $1 - \sin x$ is:

(1) -1

(2) 1

(3) 2

(4) 0

---

30. The function $f(x) = \tan x - x$

(1) always decreases

(2) never increases

(3) neither increases nor decreases

(4) always increases

---

31. The value of $\int \frac{dx}{(x+1)(x+2)}$ is:

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

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

(3) $\log\left|\frac{x+1}{x+2}\right| + c$

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

---

32. The value of $\int_{-1}^{1}\sin^5 x\cos^4 x\,dx$ is:

(1) π

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

(3) 0

(4) $-\pi$

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33. The value of $\int_{0}^{\frac{2\pi}{0}}\left(1+\sin\left(\frac{x}{2}\right)\right)\,dx$ is:

(1) 4

(2) 2

(3) 0

(4) 8

---

34. The integral

$$\int\frac{dx}{x^2\left(x^4+1\right)^{3/4}}$$

equals:

(1) $\left(x^4+1\right)^{1/4}+c$

(2) $-\left(x^4+1\right)^{1/4}+c$

(3) $-\frac{(x^4+1)^{1/4}}{x^4}+c$

(4) $\left(\frac{x^4+1}{x^4}\right)^{1/4}+c$

---

35. The value of the integral

$$\int_0^1\log(1-x)\,dx$$

is:

(1) 0

(2) log(2)

(3) $\log\left(\frac{1}{2}\right)$

(4) 1

---

36. The area bounded by the curve

$$y = \sin\left(\frac{x}{3}\right), \quad x \text{ axis}, \quad \text{the lines } x = 0 \text{ and } x = 3\pi$$

is:

(1) 1 sq. units

(2) 6 sq. units

(3) 3 sq. units

(4) 9 sq. units

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37. The area of the region bounded by the curve

$$y = x^2 \quad \text{and the line} \quad y = 16 \quad \text{is:}$$

(1) $\frac{256}{3}$ sq. units

(2) 64 sq. units

(3) $\frac{128}{3}$ sq. units

(4) $\frac{32}{3}$ sq. units

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38. General solution of the differential equation

$$\frac{dy}{dx} + y\tan x = \sec x \quad \text{is:}$$

(1) $y\tan x = \sec x + c$

(2) $\cos x = y\tan x + c$

(3) $y\sec x = \tan x + c$

(4) $y\sec x = \sec x \int \sec x\, dx + c$

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39. If 'a' and 'b' are the order and degree respectively of the differentiable equation

$$\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^3 + x^4 = 0, \quad \text{then } a - b = \_\_$$

(1) 2

(2) -1

(3) 0

(4) 1

40. The distance of the point $P(-3,4,5)$ from the yz-plane is: (1) 5 units

(2) 3 units

(3) 4 units

(4) 3 units

41. If $A = \{x : x$ is an integer and $x^2 - 9 \geq 0\}$,

$B = \{x : x \text{ is a natural number and } 2 \leq x \leq 5\}, \quad C = \{x : x \text{ is a prime number} \leq 4\}$

Then $(B - C) \cup A$ is: (1) $\{2,3,4\}$

(2) $\{3,4,5\}$

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

(4) $\{-3,3,4\}$

42. A and B are two sets having 3 and 6 elements respectively. Consider the following statements: - Statement (I): Minimum number of elements in $A \cup B$ is 3 - Statement (II): Maximum number of elements in $A \cap B$ is 3

Which of the following is correct? (1) Statement (I) is false, statement (II) is true.

(2) Both statements (I) and (II) are true.

(3) Both statements (I) and (II) are false.

(4) Statement (I) is true, statement (II) is false.

43. Domain of the function $f(x) = \frac{1}{(x-2)(x-5)}$ is: (1) $(-\infty, 2) \cup (5, \infty)$

(2) $(-\infty, 3] \cup (5, \infty)$

(3) $(-\infty, 3) \cup (5, \infty)$

(4) $(-\infty, 2] \cup [5, \infty)$

44. If $f(x) = \sin[\lfloor x^2 \rfloor] - \sin[\lfloor -x^2 \rfloor]$, where $\lfloor x \rfloor$ denotes the greatest integer less than or equal to x, then which of the following is not true? (1) $f(\frac{\pi}{2}) = 1$

(2) $f(\frac{\pi}{4}) = 1 + \frac{1}{\sqrt{2}}$

(3) $f(\pi) = -1$

(4) $f(0) = 0$

45. Which of the following is not correct?

(1) $\sin 2\pi = \sin(-2\pi)$

(2) $\sin 4\pi = \sin 6\pi$

(3) $\tan 45^\circ = \tan(-315^\circ)$

(4) $\cos 5\pi = \cos 4\pi$

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46. If $\cos x + \cos^2 x = 1$, then the value of $\sin^2 x + \sin^4 x$ is:

(1) 1

(2) 0

(3) 2

(4) -1

---

47. The mean deviation about the mean for the data $4, 7, 8, 9, 10, 12, 13, 17$ is:

(1) 3

(2) 8.5

(3) 4.03

(4) 10

---

48. A random experiment has five outcomes w_1, w_2, w_3, w_4, w_5. The probabilities of the occurrence of the outcomes w_1, w_2, w_4, w_5 are respectively $\frac{1}{6}, a, b, \frac{1}{12}$ such that $12a + 12b - 1 = 0$. Then the probabilities of occurrence of the outcome w_3 is:

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

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

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

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

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49. A die has two faces each with number '1', three faces each with number '2' and one face with number '3'. If the die is rolled once, then $P(1$ or $3)$ is:

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

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

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

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

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50. Let $A = \{a, b, c\}$, then the number of equivalence relations on A containing (b, c) is:

(1) 3

(2) 2

(3) 4

(4) 1

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51. Let the functions f and g be

$f : [0, \frac{\pi}{2}] \to \mathbb{R}$ given by $f(x) = \sin x$ and $g(x) = \cos x$, where R is the set of real numbers.

Consider the following statements: **Statement (I):** f and g are one-to-one. **Statement (II):** $f + g$ is one-to-one. Which of the following is correct?

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

(2) Both statements (I) and (II) are true.

(3) Both statements (I) and (II) are false.

(4) Statement (I) is true, statement (II) is false.

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52. Find

$$\sec^2\left(\tan^{-1} 2\right) + \csc^2\left(\cot^{-1} 3\right) = ?$$

(1) 5

(2) 15

(3) 10

(4) 1

---

53. The equation

$$2\cos^{-1} x = \sin^{-1}\left(2\sqrt{1 - x^2}\right)$$

is valid for all values of x satisfying:

(1) $-1 \leq x \leq 1$

(2) $0 \leq x \leq 1$

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

(4) $0 \leq x \leq \frac{1}{\sqrt{2}}$

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54. Consider the following statements:

Statement (I): In a LPP, the objective function is always linear. **Statement (II):** In a LPP, the linear inequalities on variables are called constraints. Which of the following is correct?

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

(2) Both Statements (I) and (II) are false.

(3) Statement (I) is false, Statement (II) is true.

(4) Both statements (I) and (II) are true.

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55. The maximum value of $z = 3x + 4y$, subject to the constraints $x + y \leq 40, x + 2y \geq 60$ and $x, y \geq 0$ is:

(1) 120

(2) 140

(3) 40

(4) 130

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56. Consider the following statements. Statement (I): If E and F are two independent events, then E' and F' are also independent. **Statement (II):** Two mutually exclusive events with non-zero probabilities of occurrence cannot be independent. Which of the following is correct?

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

(2) Both the statements are true.

(3) Both the statements are false.

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

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57. If A and B are two non-mutually exclusive events such that $P(A|B) = P(B|A)$, then:

(1) $A = B$

(2) $A \cap B = \emptyset$

(3) $P(A) = P(B)$

(4) $A \subseteq B$ but $A \neq B$

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58. If A and B are two events such that $A \subseteq B$ and $P(B) \neq 0$, then which of the following is correct?

(1) $P(A) < P(B)$

(2) $P(A|B) \geq P(A)$

(3) $P(A) = P(B)$

(4) $P(A|B) = \frac{P(A)}{P(B)}$

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59. Meera visits only one of the two temples A and B in her locality. Probability that she visits temple A is $\frac{2}{5}$. If she visits temple A, the probability that she meets her friend is $\frac{1}{3}$. The probability that she meets her friend, whereas it is $\frac{2}{7}$ if she visits temple B. Meera met her friend at one of the two temples. The probability that she met her friend at temple B is:

(1) $\frac{5}{16}$

(2) $\frac{3}{16}$

(3) $\frac{9}{16}$

(4) $\frac{7}{16}$

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60. If Z_1 and Z_2 are two non-zero complex numbers, then which of the following is not true?

(1) $|Z_1 Z_2| = |Z_1||Z_2|$

(2) $Z_1 Z_2 = Z_1 \cdot Z_2$

(3) $|Z_1 + Z_2| \geq |Z_1| + |Z_2|$

(4) $Z_1 + Z_2 = Z_1 + Z_2$
