KOTHARI INTERNATIONAL SCHOOL, NOIDA
ANNUAL EXAMINATION, SESSION: 2025-26
GRADE: 11 SUBJECT: MATHEMATICS (041)
SET C

DAY & DATE: WEDNESDAY- FEBRUARY 18, 2026
MAXIMUM MARKS: 80 **TIME ALLOTTED: 3 HOUR**
NAME: _____ **ROLL NO: _____**

GENERAL INSTRUCTIONS:

i). *This is objective &Subjective Question Paper containing 38 questions.*
ii). *This paper contains 20 questions of 1 marks each, 5 questions of 2 marks each and 6 questions of 3 marks each 4 questions of 5 marks each and 3 case based question of 4 marks*
iii). *1 marks questions are MCQs.*
iv). *2 marks questions are Short Answer Type Questions and are to be answered in 50-80 words.*
v). *5 marks questions are Long Answer Type Questions and are to be answered in 80-120 words.*
vi). *This question paper contains Case/Source Based Questions.*

SECTION – A

Q1. A coin is tossed twice. What is the probability that at least one tail occurs? **(1)**

(A) $\frac{1}{2}$ (B) $\frac{1}{4}$ C) $\frac{3}{4}$ (D) 1

Q2. If $f(x) = 1 + x + \frac{x^2}{2} + \frac{x^3}{3} + \cdots \frac{x^{100}}{100}$, then $f'(1)$ is equal to **(1)**

(A) $\frac{1}{100}$ (B)100 (C) 0 (D) does not exist

Q3. If e is the eccentricity of the ellipse $\frac{x^2}{4} + \frac{y^2}{9} = 1$ then the value of e is **(1)**

(A) 9/4 (B)$\frac{\sqrt{13}}{3}$ (C)$\frac{\sqrt{5}}{3}$ (D) none of these

Q4. What is the perpendicular distance of the point P (6, 7, 8) from XY-plane? **(1)**

(A) 8 (B) 7 (C) 6 (D) None of these

Q5. Which of the following is not correct? **(1)**

(a) $\sin\theta = -\frac{1}{5}$ (c) $\sec\theta = \frac{1}{2}$
(b) $\cos\theta = 1$ (d) $\tan\theta = 20$

Q6. **Let n (A) = m, and n (B) = n. Then the total number of non-empty relations that can be defined from A to B is** **(1)**

(A) m^n (B) $n^m - 1$ (C) $mn - 1$ (D) $2^{mn} - 1$

Q7. Let F_1 be the set of all parallelograms, F_2 be the set of all rectangles, F_3 be the set of all rhombuses and F_4 be the set of all squares. Then which of the following is false **(1)**

(A)$F_2 \subseteq F_1$ (B) $F_4 = F_2 \cap F_3$ (C) $F_1 = F_2 \cup F_3 \cup F_4$ (D) $F_4 = F_1 \cap F_2 \cap F_3$

Q8. There are four bus routes between A and B ; and three bus routes between B and C. A man can travel round trip in number of ways by bus from A to C via B. If he does not want to use a bus route more than once, in how many ways can he make round trip? **(1)**

a) 72 b) 144 c) 14 d) 19

Q9. The domain and range of the real function f defined by $f(x) = \sqrt{x-1}$ are **(1)**

(a) Domain= (1, ∞), Range = (0, ∞)
(b) Domain= [1, ∞), Range = (0, ∞)
(c) Domain= [1, ∞), Range = [0, ∞)
(d) Domain= (1, ∞), Range = [0, ∞)

Q10. Which of the following ralations is a function? **(1)**

(a) R = {(4,6), (3,9), (-11, 6), (3, 11)}
(b) R = {(1,2), (2,4), (2, 6), (3, 5)}
(c) R = {(2,1), (4,3), (6, 5), (8, 7), (10,9)}
(d) R = {(0,1), (1,3), (2, 4), (3, 1), (3,5)}

Q11. If $n_{C_{12}} = n_{C_8}$, then n is equal to **(1)**

(A) 20 (B) 12 (C) 6 (D) 30

Q12. Let $A = \{x: x = 3n, n \in N\}, B = \{x: x = 5n, n \in N\}$, then $\overline{A \cap B}$ *equals to* **(1)**

(A) $\{x: x = 15n, n \in N\}$
(B) $\{x: x = 3n \text{ or } x = 5n, n \in N\}$
(C) $N - \{x: x = 15n, n \in N\}$
(D) $N - \{x: x = 3n \text{ or } x = 5n, n \in N\}$

Q13. Which of the following statement is false? **(1)**

(a) A – B = A∩B′
(b) A – B = A – (A∩B)
(c) A – B = A – B′
(d) A – B = (A∪B) – B

Q14. If $\tan\theta = \frac{1}{2}$, $\tan\emptyset = \frac{1}{3}$, then the value of $\theta + \emptyset$ is **(1)**

a) $\frac{\pi}{6}$ b) π c) 0 d) $\frac{\pi}{4}$

Q15. The value of $\cos^2\left(\frac{\pi}{6} + x\right) - \sin^2\left(\frac{\pi}{6} - x\right)$ is **(1)**

a) $\frac{1}{2}\cos 2x$ b) 0 c) $-\frac{1}{2}\cos 2x$ d) 1/2

Q16. The value of $1 + i^2 + i^4 + i^6 + \ldots + i^{2n}$ is **(1)**

(a) positive
(b) negative
(c) 0
(d) None of the above

Q17. In a G.P. of even number of terms, the sum of all the terms is 5 times the sum of odd terms. The common ratio of the G.P. is **(1)**

(a) $\frac{4}{5}$ (b) $\frac{1}{5}$ (c) 4 (d) none of these

Q18. **(1)**

$$\text{Evaluate} : \lim_{x \to 0} \frac{ax + \sin x}{\tan x + bx^2}$$

a) a + 1 b) a c) $\frac{a}{b}$ d) $\frac{a+1}{b+1}$

Assertion – Reason based questions
In questions 8 and 9, a statement of assertion (A) is followed by a statement of Reason (R) is given. Choose the correct answer out of the following choices.

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true and R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

Q19. **Assertion(A):** Let A={1,2,3}. Number of relations on A is 2^9 **(1)**

Reason (R): Total number of relations from A to A is total number of proper subsets of A×A

Q20. **Assertion (A):** If $(A + B) = \frac{\pi}{4}$, then the value of $(\cot A - 1)(\cot B - 1)$ is 2. **(1)**

Reason (R): $\cot(A + B) = \frac{\cot A \cot B - 1}{\cot A + \cot B}$

SECTION B

Q21. Draw appropriate Venn diagrams for each of the following: **(2)**
(i) $(A \cap B)'$
(ii) $(A \cup B)'$

Q22. Evaluate : $\lim_{x \to 3} \frac{x^4 - 81}{2x^2 - 5x - 3}$ **(2)**

OR

Evaluate: $\lim_{x \to 2} \frac{1}{x-2} - \frac{2(2x-3)}{x^3 - 3x^2 + 2x}$

Q23. Show that tan 5x tan 3x tan 2x = tan 5x – tan 3x – tan 2x **(2)**

Q24. Find $(\alpha + \beta)^4 - (\alpha - \beta)^4$. **(2)**

Q25. Find the locus of a point whose each point is equidistant from A (2,3, -4) and B (-1,2,3) **(2)**

SECTION C

Q26. Find the mean deviation about the median for the following data . **(3)**

x_i	15	21	27	30	35
f_i	3	5	6	7	8

Q27. Find the coordinates of the foci, the vertices, the length of major and minor axes, eccentricity and length of latus rectum of the ellipse 9x2 + 4y2 = 36. **(3)**

OR

Find the equation of the hyperbola, the length of whose latus rectum is 4 and the eccentricity

is 3.

Q28. Find k so that for the function f defined by **(3)**

$$f(x)=\begin{cases}\dfrac{\sqrt{1+kx}-\sqrt{1-kx}}{x}, & \text{if } -1\le x<0\\ \dfrac{2x+1}{x-1}, & \text{if } 0\le x<1\end{cases}$$

$\lim_{x\to 0} f(x)$ exists.

Q29. **(3)**

If $z_1=2-i$, $z_2=1+i$, find $\left|\frac{z_1+z_2+1}{z_1-z_2+1}\right|$

Q30. Find all pairs of consecutive odd natural numbers, both of which are larger than 10, such that their sum is less than 40. **(3)**

Q31. Find the domain and range of the function $f=\left\{\left(x,\frac{1}{1-x^2}\right): x\in R, x\neq \pm 1\right\}$. **(3)**

OR

If $f(x)=x^2+x-6$ and $g(x)=\frac{1}{x+3}$ then what is $(f.g)(x)$ and what is its domain?

SECTION D

Q32. **Given $\cos x = -\frac{4}{5}$ and $\sin y=\frac{5}{13}$, x & y both lie in second quadrant.** **(5)**

(i) Find the value of sin (x − y).

(ii) Find the value of cos (x + y).

(iii) The value of tan (x + y) =

Q33. Find the derivative of $\sqrt{\tan x}$ using first principle. **(5)**

OR

Find the derivative of following functions with respect to x:

i). $f(x)=\text{Sin}(x^2+1)$ **(2)**

ii). If $y=\sqrt{\frac{1-x}{1+x}}$, prove that $(1-x^2)\frac{dy}{dx}+y=0$ **(3)**

Q34. Find the equations of the lines which passes through the point $(4,5)$ and makes equal angles with the lines $5x-12y+6=0$ and $3x-4y-7=0$. **(5)**

Q35. The sum of three numbers in G.P. is 56. If we subtract 1, 7, 21 from these numbers in that order, we obtain an arithmetic progression. Find the numbers. **(5)**

OR

If A and G be the A.M. and G.M. respectively between two positive numbers prove that the Numbers are $\pm\sqrt{(A+G)(A-G)}$.

SECTION E

Q36. A school administration decides to send some of its students of class XI to an educational tour.

From a class of 25 students, 10 are to be chosen for the tour. There are three friends - Rajesh, Shreya and Deepa - who decide that either all of them will join or none of them will join.

Based on the above information, answer the following questions.

(i) In how many ways can the students be chosen for this educational tour, if these three friends will join? **1**

(ii) In how many ways can the students be chosen for this educational tour, if these three friends will not join? **1**

(iii) Mathematics teacher of school puts some questions for these three students – with a condition that if any one of them answers correctly then, they may join this tour.

He asks them to find the number of words formed using all the letters of 'Rajesh'. Deepa answers it correctly. What could be her answer? **2**

OR

Further the teacher asked all of them to find the number of words formed using all letters of 'Deepa'. What could be the correct answer? **2**

Q37. After striking a floor a certain ball rebounds $\left(\frac{4}{5}\right)^{th}$ of the height from it has fallen. The ball is gently dropped from a height of 100 metres.

Based on this information, answer the following questions:

(i) Find the height to which the ball rebounds in 3rd rebound. **1**

(ii) Find the height to which the ball rebounds in 8th rebound. **1**

(iii) Find the total distance travelled by the ball in first five rebounds.

OR

(iii) Find the total distance travelled by the ball before coming to rest. **2**

Q38. Two candidates Anil and Surabhi appeared in a written test for a job position in a company. The probability that Anil will qualify the test is 0.05 and that Surabhi will qualify the test is 0.10, The probability that both will qualify the test is 0.02. **2**

Based on the given information, answer the following questions.

(i) Probability that both Anil and Surabhi will not qualify the examination? **1**

(ii) Probability that at least one of them will not qualify the examination? **1**

(iii) Probability that only one of them will qualify the examination? **2**