INDIAN SCHOOL AL WADI AL KABIR
Assessment – II (2025 – 2026)

Class: XI   Sub: MATHEMATICS (041)   Max Marks: 80
Date: 27.11.2025   Revision Paper   Time: 3 hrs

General Instructions:
1. This question paper is divided in to 5 sections- A, B, C, D and E
2. Section A comprises of 20 MCQ type questions of 1 mark each.
3. Section B comprises of 5 Very Short Answer Type Questions of 2 marks each.
4. Section C comprises of 6 Short Answer Type Questions of 3 marks each.
5. Section D comprises of 4 Long Answer Type Questions of 5 marks each.
6. Section E comprises of 3 source based / case based / passage-based questions (4 marks each) with sub parts.
7. Internal choice has been provided for certain questions
8. This question paper contains 5 pages

SECTION – A
(Each MCQ Carries 1 Mark)

1   Which of the following statement is false?
   (a) $A - B = A \cap B'$
   (b) $A - B = A - (A \cap B)$
   (c) $A - B = A - B'$
   (d) $A - B = (A \cup B) - B$

2   The number of non-empty subsets of a set, containing n elements, is
   (a) n   (b) n^2 (c) 2^n (d) $2^n - 1$

3   Let R be a relation on N defined by $R = \{(x, y): x + 2y = 8, x, y \in N\}$. Then domain of R is
   (a) $\{2, 4, 8\}$ (b) $\{2, 4, 6, 8\}$ (c) $\{2, 4, 6\}$ (d) $\{1, 2, 3, 4\}$

4   If $f(x) = x^3 - \frac{1}{x^3}$, then $f(x) + f\left(\frac{1}{x}\right)$ is equal to
   (a) $2x^3$ (b) $\frac{2}{x^3}$ (c) 0   (d) 1

5   If $z = \frac{1+7i}{(2-i)^2}$, then |z| equals
   (a) $\frac{1}{2}$ (b) 2   (c) $\frac{1}{\sqrt{2}}$ (d) $\sqrt{2}$

6   If $-(x - 3) + 4 < 5 - 2x$, then x belongs to
   (a) (-∞, 2)   (b) (-∞, -2)   (c) (2, ∞)   (d) (-2, ∞)

7   The number of triangles that can be formed by choosing the vertices from 12 given points, out of which 7 are collinear, is
   (a) 155   (b) 175   (c) 185   (d) 195

8 The value of $\tan 75° - \cot 75°$ is
   (a) $2\sqrt{3}$ (b) 4   (c) 1   (d) 0

9 If $x + iy = \dfrac{1 + 5i}{1 - 6i}$, then y
   a) $\dfrac{9}{85}$ b) $\dfrac{-9}{85}$ c) $\dfrac{53}{85}$ d) c)$\dfrac{-53}{85}$

10 The nth term of a GP is 128 and the sum of its n terms is 255. If its common ratio is 2, then its first term is
   a) 1   b) 3   c) 8   d) 5

11 The number of word from the letter of the word 'BHARAT' in which B and H will never come together is
   a) 360   b) 240   c) 120   d) None of these

12 In a test with a maximum sure 25, eleven students scored 3,9,5,3,12,10,17,4,7,19,21 marks respectively. Then the range of the data is
   a) 3   b) 18   c) 21   d) 25

13 If the mean of 2,7,4,6,8 and p is 7, then the median of the data is
   a) 6   b) 6.5   c) 7   d) 7.5

14 When n is a positive integer, the number of terms in the expansion of $(x + a)^n$ is
   a) 2^n b) n - 1   c) n   d) n + 1

15 $^{10}C_0 + {}^{10}C_2 + {}^{10}C_4 + \ldots\ldots + {}^{10}C_{10} = $ ____
   a) 128   b) 256   c) 512   d) 1024

16 The angle between the x - axis and the line joining the points (3,-1) and (4,-2) is
   a) 0^0 b) 30^0 c) 45^0 d) 90^0

17 The value of 'k' so that the line $2x + ky - 9 = 0$ may be parallel to $3x - 4y + 7 = 0$
   a) $\dfrac{-3}{8}$ b) $\dfrac{3}{8}$ c) $\dfrac{-8}{3}$ d) $\dfrac{8}{3}$

18 Find the distance of the point (2,3)from the line $12x - 5y = 2$
   a) $\dfrac{41}{13}$ b) $\dfrac{37}{13}$ c) $\dfrac{23}{13}$ d) None of these

Directions: In the following 2 questions, A statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as.
(A) Both A and R are true and R is the correct explanation of A
(B) Both A and R are true but R is NOT the correct explanation of A
(C) A is true but R is false
(D) A is false and R is True

19 **Assertion:** If the third term of a G.P. is 4, then the product of its first five terms is 4^5.

Reason: Product of first five terms is a G.P. is given as $a.(ar).(ar^2).(ar^3).(ar^4)$.

20 **Assertion (A):** $\left(1 + \sqrt{2}\right)^4 + \left(1 - \sqrt{2}\right)^4 = 16\sqrt{2}$

Reason (R): The expansion of $(1 + x)^n = {}^nC_0 + {}^nC_1 x + {}^nC_2 x^2 + \cdots {}^nC_n x^n$

SECTION – B
(Each Question Carries 2 Marks)

21 Find the value of x, such that $\dfrac{3+2i\ sinx}{1-2i\ sinx}$ is purely imaginary.

22 (a) If ${}^mC_1 = {}^nC_2$, then show that $2m = n\ (n - 1)$

-   OR   -

(b) If $\dfrac{1}{6!} + \dfrac{1}{7!} = \dfrac{x}{8!}$, then find x.

23 (a) Find $\tan \dfrac{\pi}{12}$

-   OR   -

(b) Convert into radian measures. $-37^0\ 30'$

24 Find the sum of the following series up to *n* terms $0.6 + 0.66 + 0.666 + \ldots\ldots$

25 Draw the Venn diagram of following: -

(i) $A' \cap B'$

(ii) $(A\ U\ B) - (A \cap B)$

SECTION – C
(Each Question Carries 3 Marks)

26 In a school library, 5 Hindi novels and 5 English novels are available. A student has to select 4 novels out of them. In how many ways he can do it, if
(i)   he has to select 2 Hindi and 2 English novels
(ii) he has to select at least 2 Hindi novels
(iii) he has to select at least one novel from each language

27 Find domain and range of real function $f(x) = \dfrac{ax+b}{bx-a}$

-   OR   -

Find domain and range of $\sqrt{9 - x^2}$

28 (a) If $\sin x = -\dfrac{5}{13}$, x lies in III quadrant, find the values of $\sin\dfrac{x}{2}$, $\cos\dfrac{x}{2}$ and $\tan\dfrac{x}{2}$.

- **OR** -

(b) If $\sin x + \sin y = \sqrt{3}\,(\cos y - \cos x)$, then prove that $\sin 3x + \sin 3y = 0$.

29 Calculate Mean and Variance for the following data

Marks	70 - 80	80 - 90	90 - 100	100 - 110	110 - 120
Number of Students	7	14	24	12	3

30 The owner of a milk store finds that, he can sell 980 liters of milk each week at 14 liter and 1220 liter of milk each week at Rs 16 liter. Assuming a linear relationship between selling price and demand how many liters could he sell weekly at Rs 17 liter?

31 (a) Using binomial theorem, prove that 6^n - 5n always leaves remainder 1 when divided by 25

- OR -

(b) Using Binomial theorem, compute 98^5

SECTION – D
(Each Question Carries 5 Marks)

32 (a) Find three numbers in G.P. whose sum is 13 and the sum of whose squares is 91.

- **OR** -

(b) If a, b, c and d are different real numbers such that
$(a^2 + b^2 + c^2)p^2 - 2(ab + bc + cd)p + (b^2 + c^2 + d^2) \le 0$,
then show that a, b, c and d are in G.P.

33 A committee of 7 has to be formed from 9 boys and 4 girls. In how many ways can this be done when the committee consists of
(i) Exactly 3 girls?
(ii) At least 3 girls?
(iii) At most 3 girls?

34 (a) Find the equations of the lines which pass through the point (4, 5) and make equal angles with the lines $5x - 12y + 6 = 0$ and $3x - 4y - 7 = 0$

- OR -

(b) A person standing at the junction (crossing) of two straight paths represented by the equations $2x - 3y + 4 = 0$ and $3x + 4y - 5 = 0$ wants to reach the path whose equation is $6x - 7y + 8 = 0$ in the least time. Find equation of the path that he should follow.

35 Find $(a + b)^4 - (a - b)^4$. Hence evaluate $(\sqrt{3} + \sqrt{2})^4 - (\sqrt{3} - \sqrt{2})^4$

SECTION – E
(CASE STUDY - Each Question Carries 4 Marks)

36   In a certain city, all telephone numbers have 6 digits. There are 3 telephone operator companies in the city to provide services. Each operator is allotted one specific non-zero digit to be used as first digit of the phone number of its company.

Based on above information, answer the following questions
(i)   How many different phone numbers are available for each company?   (1m)
(ii)   How many different phone numbers are there in all in the city?   (1m)
(iii) (a) How many different phone numbers are there in the city if digits are not repeated?
     - OR -
     (b) If the last digit of the phone number must be even and digits may be repeated, how many different numbers can that company assign?   (2m)

37   Chessboard is the type of game board used for the game of chess, on which the chess pawns and pieces are placed. A chessboard is usually square in shape, with an alternating pattern of squares in two colours, with its side being divided into eight parts, resulting in a total of 64 squares. The inventor of the chess board suggested a reward of one grain of wheat for the first square,2 grains for the second,4 grains for the third and so on doubling the number of grains for subsequent squares.
Based on the above information answer the questions given below:
(i) How many grains would have to be given to the inventor for 30th square?   (2m)
(ii) How many grains would have to be given to the inventor in all?   (2m)

38   One triangular shaped pond is there in a park. Three friends Rani, Mansi, Sneha are sitting at the corners of the triangular park. They are studying in Class XI in an International. Rani marked her position as (2, –2), Mansi marked as (1, 1) and Sneha marked her position as (–1, 0) as shown in figure given below. Based on the above information answer the following questions
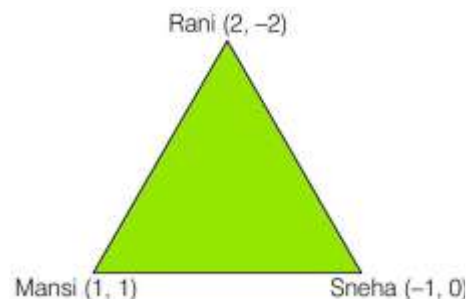
(i)   Find the equation of lines formed by Rani and Mansi.   (1m)
(ii)   Find the Slope of equation of line formed by Rani and Sneha.   (1m)
(iii) Find the equation of median of lines through Rani.   (2m)
     - OR -
     Find the equation of altitude through Mansi.   (2m)

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1	(c) A – B = A – B′
2	(d) $2^n – 1$
3	(c) {2, 4, 6}
4	(c) 0
5	(d) √2
6	(b) (-∞, -2)
7	(c) 185
8	(a) 2√3
9	c) $\frac{53}{85}$
10	a) 1
11	b) 240
12	b) 18
13	b) 6.5
14	d) n + 1
15	c) 512
16	c) 45^0
17	c) $\frac{-8}{3}$
18	a) $\frac{41}{13}$
19	(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
20	(D) A is false but R is true
21	$x = \frac{\pi}{3}$ (or any appropriate answer)
22	64

23	$\tan\frac{\pi}{6} = \frac{2\,tan\,(\frac{\pi}{12})}{1- tan^2(\frac{\pi}{12})}$ $x^2 + 2\sqrt{3}x – 1= 0$ (x = tan π/12) x = tan π/12 = $2 – \sqrt{3}$	$-37°30' = -\frac{5\pi}{24}$ radians $\Big|\approx -0.6545$ rad

24	$S_n = \frac{2}{27}\left(9n - 1 + \frac{1}{10^n}\right)$

26	(i) $^5C_2 \times {}^5C_2 = 10 \times 10 = 100$ (ii) $^5C_2 \times {}^5C_2 + {}^5C_3 \times {}^5C_1 + {}^5C_4 = 100+50+5 = 155$ (iii) $^5C_1 \times {}^5C_3 + {}^5C_2 \times {}^5C_2 + {}^5C_3 \times {}^5C_1 = 50+100+50 = 200$

27	Domain: $bx – a \neq 0 \Rightarrow x \neq \frac{a}{b}$ So $D_f = \mathbf{R} – \{\frac{a}{b}\}$ Range: $y = \frac{ax+b}{bx-a} \Rightarrow x = \frac{ay+b}{by-a}$ $by – a \neq 0 \Rightarrow y \neq \frac{a}{b}$ So $R_f = \mathbf{R} – \{\frac{a}{b}\}$	Domain : [-3, 3] Range : [0, 3]

28	$\cos x = -12/13$ $\cos x = 2cos^2\frac{x}{2} - 1$ $-\frac{12}{13} = 2cos^2\frac{x}{2} - 1$	$\Rightarrow cos^2\frac{x}{2} = \frac{1}{26}$ $\Rightarrow cos\,\frac{x}{2} = -\frac{1}{\sqrt{26}}$

		Similarly $sin\frac{x}{2} = \frac{5}{\sqrt{26}}$	And $tan\frac{x}{2} = -5$

29

C.I.	f_i	x_i	y_i	y_i^2	f_iy_i	$f_iy_i^2$
70-80	7	75	-2	4	-14	28
80-90	14	85	-1	1	-14	14
90-100	24	95	0	0	0	0
100-110	12	105	1	1	12	12
110-120	3	115	2	4	6	12
	$\sum f_i = 60$				$\sum f_iy_i = -10$	$\sum f_iy_i^2 = 66$

a = 95 , h = 10
Correct formula and calculation of Mean $\overline{x} = 93.33$
Correct formula and calculation of Variance = 107.2

30 | $x = 1340$ litres.

31

Let $6^n = (1+5)^n = 1 + {}^nC_1 5^1 + {}^nC_2 5^2 + {}^nC_3 5^3 + \ldots\ldots + 5^n$ $= 1 + 5n + 5^2\left({}^nC_2 + {}^nC_3.5 + \ldots\ldots + 5^{n-2}\right)$

$6^n - 5n = 1 + 25\left({}^nC_2 + {}^nC_3.5 + \ldots\ldots + 5^{n-2}\right)$ $= 1 + 25k\left[\text{where } k = {}^nC_2 + {}^nC_3.5 + \ldots\ldots 5^{n-2}\right]$ $= 25k + 1$

- OR -

An: 9,038,109,968

32 | $a + ar + ar^2 = 13 \Rightarrow a(1 + r + r^2) = 13$ ……(i)
$a^2 + a^2r^2 + a^2r^4 = 91 \Rightarrow a^2(1 + r^2 + r^4) = 91$ ……(ii)
Squaring (i) both sides and using (i) and (ii) we get
$ar = 3$ ……(iii)
on dividing (i) by (iii) $3(1 + r + r^2) = 13r \Rightarrow 3r^2 - 10r + 3 = 0$
$\Rightarrow r = 3 \text{ or } \frac{1}{3}$ $\Rightarrow a = 1 \text{ or } 9$ So numbers are 1, 3, 9 or 9, 3, 1.

33 | (i) ${}^9C_4 \times {}^4C_3 = 504$
(ii) ${}^9C_4 \times {}^4C_3 + {}^9C_3 \times {}^4C_4 = 588$
(iii) ${}^9C_7 \times {}^4C_0 + {}^9C_6 \times {}^4C_1 + {}^9C_5 \times {}^4C_2 + {}^9C_4 \times {}^4C_3 = 1632$

34 | 7x + 4y = 48 | 119x + 102y = 205

35 | 40√6

36 | (i) $1 \times 10 \times 10 \times 10 \times 10 \times 10 = 10^5 = 100000$
(ii) $3 \times 100000 = 300000$
(iii) $3 \times (1 \times 9 \times 8 \times 7 \times 6 \times 5) = 45360$ OR Total numbers = $1 \times 10 \times 10 \times 10 \times 10 \times 5 = 50,000$

37 | (i) 1, 2, 4, 8, 16, …… a=1, r=2
$a_{30} = a.r^{29} = 2^{29}$ | (ii) $S_n = \frac{a(r^n - 1)}{r-1}$, n=64
$S_{64} = \frac{1(2^{64} - 1)}{2-1} = 2^{64} - 1$

38 | (i) 3x + y = 4
(ii) Slope of AC = − 2/3
(iii) 5x + 4y = 2
(iv) 3x − 2y = 1