INDIAN SCHOOL AL WADI AL KABIR
Assessment – 1 (2025 – 2026)

Class: XI | Sub: MATHEMATICS (041) | Max Marks: 80
Date: 14.09.2025 | Set -1 | Time: 3 hr

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 6 pages

SECTION – A
(Each MCQ Carries 1 Mark)

1 Set builder form for A = {0, 2, 10, 30, 68}, is

a) $A = \{x: x = n^3 + n, n \in W, n \leq 5\}$ c) $A = \{x: x = n^3 + n, n \in W, n < 5\}$

b) $A = \{x: x = n^3 - n, n \in W, n \leq 5\}$ d) $A = \{x: x = n^3 - n, n \in W, n < 5\}$

2 $(A \cup B)^{l} =$

a) $A' \cup B^{'}$ b) $A \cup B'$ c) $A' \cap B'$ d) $A \cap B$

3 The value of x and y for the complex number, $4x + i(3x - y) = 3 - 6i$ is

a) $x = \frac{3}{4}, y = \frac{33}{4}$ b) $x = \frac{4}{3}, y = \frac{33}{4}$ c) $x = \frac{3}{4}, y = 6$ d) $x = \frac{-3}{4}, y = 6$

4 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

a) m^n b) n^m c) $mn - 1$ d) $2^{mn}-1$

5 Angle formed by the large hand of a clock in 20 minutes is

a) $\frac{\pi}{3}$ b) $\frac{2\pi}{3}$ c) $\frac{3\pi}{4}$ d) $\frac{4\pi}{5}$

6 If $\sin\theta + \cos\theta = 1$, then the value of $\sin 2\theta$ is

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

7 Standard deviation of the data 5, 5, 5, 5, 5 is

a) 0 b) $\sqrt{5}$ c) 5 d) 25

8 The Value of $\sin 50^0 - \sin 70^0 + \sin 10^0$ is

a) $\frac{1}{2}$ b) 0 c) 1 d) 2

9 Let A = {x : x is a positive integer < 8 and x is a multiple of 3 or 5} and B = {x : x is an even number < 7}, then (A – B) ∩ B is:

a) {2, 4, 6} b) {3, 5, 6} c) { } d) {3, 5}

10 The value of $(1 + i)^2 - (1 - i)^2$ is equal to:

a) 4 b) 4i c) -4 d) 4+4i

11 How many 4-digit numbers can be formed by using the digits 1 to 9, if repetition of digits is not allowed

a) 3024 b) 3026 c) 3040 d) 3014

12 If A × B = {(a, 1), (b, 3), (a, 3), (b, 1), (a, 2), (b, 2)}, then set B is

a) {a, b, 1, 2, 3} b) {a, b} c) {1, 3} (d) {1, 2, 3}

13 If –3x + 17 < –13, then

a) x ∈ (10, ∞) b) x ∈ (-10, 10) c) x ∈ (-∞, 10) d) x ∈ (-∞, -10)

14 The value of '*x*' for the inequality 3x + 17 ≥ 2(1 - x), when '*x*' is a positive real number

a) (-∞, -3] b) (-∞, 0] c) [0, ∞) d) [-3, ∞)

15 Let A = {–1, 1, 2} and B = {1, 4, 9, 10}. Let a relation R from set A to set B (a R b) means $a^2 = b$. Then roster form of R is given by

a) {(1, 1), (2, 4)} b) {(-1, 1), (1, 1)} c) {2, 4} d){(-1, 1), (1, 1), (2, 4)}

16 $\frac{6!}{0!\ x\ 3!}$ = _____

a) 0 b) 3! c) 120 d) Not Defined

17 If $\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$, then find x = ___

a) 42 b) 48 c) 56 d) 64

18 $a + ib = c + id$, then

a) $a^2 + c^2 = 0$ b) $a^2 + c^2 = b^2 + d^2$ c) $c^2 + d^2 = 0$ d) $a^2 + b^2 = c^2 + d^2$

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 (A) :** Mean deviation about the median of the observations 3, 5, 8, 7, 6 is 1.4
Reason (R) : Mean deviation about the median = $\frac{\sum|x_i - median|}{n}$

20 **Assertion (A) :** The value of $\tan\left(\frac{11\pi}{4}\right) = -1$.
Reason (R): $\tan(\pi + \theta) = \tan\theta$

SECTION – B

(Each Question Carries 2 Marks)

21 Evaluate $\cos 2x \cdot \cos 2y + \sin^2(x - y) - \sin^2(x + y)$.

- OR -

If $\sin x = \frac{3}{5}$, $\cos y = \frac{-12}{13}$ and x, y both lie in the 2nd quadrant, then find the value of $\sin(x + y)$

22 If $z_1 = 1 - i$ and $z_2 = -2 + 4i$, then find Im $\left[\frac{z_1 \cdot z_2}{\overline{z_1}}\right]$

23 In an experiment, a solution of hydrochloric acid is to be kept between 30° and 35° Celsius. What is the range of temperature in degree Fahrenheit if conversion is $C = \frac{5}{9} \times (F - 32)$

24 If ${}^9P_5 + 5.{}^9P_4 = {}^{10}P_r$, then find r.

- OR -

Find the number of words with or without meaning which can be made using all the letters of the word AGAIN. If these words are written as in a dictionary, what will be the 50th word?

25 Find the mean deviation about the mean for the data: 6, 7, 10, 12, 13, 4, 8, 12.

SECTION – C

(Each Question Carries 3 Marks)

26 If U = {x: x ∈ N and x ≤ 10}, A = {x: x is prime and x ≤ 10} and B = {x: x is a factor of 24} Then verify the following result

(i) A – B = A ∩ B'

(ii) (A ∪ B)' = A' ∩ B'

27 Prove that $\frac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$

- OR -

Show that $\cos\left(\frac{3\pi}{2} + x\right).\cos(2\pi + x)\left[\cot\left(\frac{3\pi}{2} - x\right) + \cot(2\pi + x)\right] = 1$

28 (a) Answer the following questions

(i) Let $f : R \to R$ be given by $f(x) = x^2 + 3$ then find $\{x : f(x) = 28\}$

(ii) Let A = {1, 2, 3, ……20}. Define a relation R from A to A by R = {(a, b): a – 2b = 0, a, b ∈ A}. Depict the relation using roster form and write down the domain and range of the relation.

- OR -

(b) Answer the following questions

(i) If $f(x) = x^2 - 3x + 1$ then, find x ∈ R such that $f(2x) = f(x)$.

(ii) Let f and g be two real valued functions, defined by, $f(x) = x$, $g(x) = |x|$. Then find (i) $f + g$ and (ii) $\frac{f}{g}$

29 Find the conjugate of $\frac{(3 - 2i)(2 + 3i)}{(1 + 2i)(2 - i)}$

- OR -

If $(x + iy)^3 = u + iv$, then show that $\frac{u}{x} + \frac{v}{y} = 4(x^2 - y^2)$

30 Find the number of arrangements of the letters of the word INTERMEDIATE. In how many of these arrangements,

(i) do the word starts with D

(ii) do all vowels always occur together

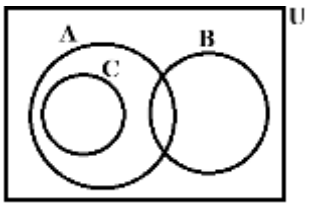
31 Find the mean deviation about the median for the following data:

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

SECTION – D

(Each Question Carries 5 Marks)

32 Answer the following



(a) In the given Venn diagram, if n(U) = 100, n(A) = 60, n(B) = 48, n(A ∩ B) = 22 and n (A ∩ C) = 30, then find the value of

(i) n(B' ∩ C') (ii) n(A ∪ B)

(b) Draw the Venn diagram of following: -

(i) A ' ∩ B ' (ii) (A ∩ B) '

33 Prove that $2 \cos \frac{\pi}{13} . \cos \frac{9\pi}{13} + \cos \frac{3\pi}{13} + \cos \frac{5\pi}{13} = 0$

- OR -

If $\tan x = \frac{3}{4}$, $\pi < x < \frac{3\pi}{2}$, then find the value of $\sin \frac{x}{2}$, $\cos \frac{x}{2}$ and $\tan \frac{x}{2}$

34 (i) Solve the inequalities and represent the solution graphically on number line

$5(2x - 7) - 3(2x + 3) \leq 0$ & $2x + 19 \leq 6x + 47$

(ii) Find all pairs of consecutive even positive integers, both of which are larger than 5 such that their sum is less than 23.

35 Calculate Mean, Variance and Standard Deviation for the following data

Marks	0 – 30	30 – 60	60 – 90	90 – 120	120 – 150	150 – 180	180 – 210
Number of Students	2	3	5	10	3	5	2

SECTION – E

(CASE STUDY - Each Question Carries 4 Marks)

36 A mobile app development company is analyzing the behaviour of two mathematical functions that model the response time (in milliseconds) of two different versions of an app based on the number of users '*x*'. These functions help the company determine the safe number of concurrent users before the app's performance degrades. Find the domain and range of the function and Explain why these values make sense in a real-world context. The functions are defined as follows:

(i) $\sqrt{100 - x^2}$ (2m)

(ii) $\frac{x + 3}{x^2 - x - 6}$ (2m)

37 A survey was conducted among 100 students in a school to find their preferences for two extracurricular activities: Music (M) and Dance (D). 55 students like Music, 45 students like Dance 20 students like both Music and Dance. Answer the following questions based on the above data:

(i) Find the number of students who like only Music (1m)

(ii) Find the number of students who like at least one of the two activities. (1m)

(iii) (a) Find the total number of students who like only Dance and the number of students who like neither Music nor Dance. (2m)

- OR -

(b) Verify the formula $n(M \cup D) = n(M) + n(D) - n(M \cap D)$ (2m)

38 Libna wants a mobile number having 10 digits. All mobile numbers have 3 things in common. a 2-digit Access code (AC), a 3-digit provider code (PC), and a 5digit subscriber code (SC). AC code and PC code are fixed, then

(i) How many mobile numbers are possible if number start with 98073 and no other digit can repeat? (1m)

(ii) How many AC code are possible if both digit in AC code are different and must be greater than 6? (1m)

(iii) (a) How many mobile numbers are possible if AC and PC code are fixed and digits can repeat? (2m)

- OR -

(b) How many mobile numbers are possible with AC code 98 and PC code 123 and digit used in AC and PC code will not be used in SC code? (2m)

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