



INDIAN SCHOOL AL WADI AL KABIR
ASSESSMENT -II (2025-26)

Class: XI
Date: 04.12.2025

Sub: MATHEMATICS
SET-1

Max Marks: 80
Time: 3 hour

General Instructions:

1. This Question paper contains - five sections A, B, C, D and E. Each section is compulsory. However, there are internal choices in some questions.
2. Section A has 18 MCQ's and 02 Assertion-Reason based questions of 1 mark each.
3. Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.
4. Section C has 6 Short Answer (SA)-type questions of 3 marks each.
5. Section D has 4 Long Answer (LA)-type questions of 5 marks each.
6. Section E has 3 source based/case based/passage based/integrated units of assessment (4 marks each) with sub parts.

Section A (MCQ-1 mark each)

Q.1. The number of subsets of $A = \{a, b, c\}$ is:

A 8 **B** 6 **C** 4 **D** 9

Q.2. If the sets A and B are given by $A = \{1, 2, 3, 4\}$, $B = \{2, 4, 6, 8, 10\}$ and the universal set $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, then:

A $(A \cup B)' = \{5, 7, 9\}$ **B** $(A \cap B)' = \{1, 3, 5, 6, 7\}$
C $(A \cap B)' = \{1, 3, 5, 6, 7, 8\}$ **D** $A - B = \{1, 3, 6, 8, 10\}$

Q.3. If $(x - 1, 2x - y) = (-1, 3)$, then y^x is:

A -3 **B** 3 **C** 1 **D** 0

Q.4. For $f(x) = \sqrt{x^2 - 9}$, the domain is given by

A $x \in \mathbb{R}$ **B** $x \in \mathbb{R} - (-3, 3)$
C $x \in [-3, 3]$ **D** $x \in [3, \infty)$

Q.5. If $\sin A + \cos A = 1$, then $\sin 2A$:

A 2 **B** 4 **C** 1 **D** 0

Q.6. The magnitude of the complex number $Z = 12i - 5$:

A 12 **B** 17 **C** 13 **D** 15

Q.7. $(1 + i)^2 + (1 - i)^2 = ?$

- A** 4 **B** 0 **C** -4 **D** $4i$

Q.8. If $\frac{1}{2}\left(\frac{3}{5}x + 4\right) \geq \frac{1}{3}(x - 6)$, $x \in R$, then

- A** $x \in (-\infty, 120]$ **B** $x \in [120, \infty)$ **C** $x \in (-\infty, 120)$ **D** $x \in (120, \infty)$

Q.9. If the mean of first n natural numbers is $\frac{5n}{9}$ then $n = ?$

- A** 9 **B** 5 **C** 7 **D** 8

Q.10. The mean deviation from the mean for the following data: 4, 7, 8, 9, 10, 12, 13 and 17 is

- A** 1 **B** 3 **C** 2 **D** 4

Q.11. There are 10 points in a plane out of which 5 are collinear. The number of triangles formed by the points as vertices is

- A** 110 **B** 80 **C** 660 **D** 700

Q.12. The number of four-digit numbers which can be formed by using the digits 0, 1, 2, 3, 4 and 5 without repetition.

- A** 300 **B** 150 **C** 200 **D** 400

Q.13. The total number of terms in the expansion of $(x + a)^{51} - (x - a)^{51}$ after simplification is

- A** 102 **B** 26 **C** 25 **D** 52

Q.14. The coefficient of x^2 in the binomial expansion of $(2 + x)^5$ is:

- A** 40 **B** 80 **C** 10 **D** 60

Q.15. Which term of the GP 5, 10, 20, 40, ... is 5120?

- A** 10 **B** 11 **C** 12 **D** 9

Q.16. The 5th term from the end of the sequence $16, 8, 4, 2 \dots \frac{1}{16}$ is:

- A** 1 **B** $\frac{1}{2}$ **C** 5 **D** 4

Q.17. If the line $\frac{x}{a} + \frac{y}{b} = 1$ passes through the points $(2, -3)$ and $(4, -5)$, then $(a, b) = ?$

- A** $(1, 1)$ **B** $(1, -1)$ **C** $(-1, 1)$ **D** $(-1, -1)$

Q.18 If a line makes equal intercepts on both coordinate axes, then slope of the line is:

- A** not defined **B** 0 **C** -1 **D** 1

Direction for questions 19 & 20: In question numbers 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

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

Q.19. Assertion (A): $nC_0 + nC_1 + nC_2 + nC_3 + \dots + nC_n = n^2$.

Reason (R): If $nC_a = nC_b$, then $a = b$ or $a + b = n$.

Q.20. Assertion (A): Slope of line $3x - 4y + 10 = 0$ is $\frac{3}{4}$.

Reason (R): x-intercept and y-intercept of $3x + 4y + 10 = 0$ respectively are $\frac{10}{3}$ and $\frac{5}{2}$.

Section B (2 marks each)

Q.21. If $U = \{1,2,3,4,5,6,7,8,9\}$, $A = \{2, 3, 5, 6\}$, $B = \{1, 4, 5, 6, 7\}$ and $C = \{3, 4, 8, 9\}$.
Find $((A - B) \cup C')$.

Q.22. a) Prove $\frac{\cos(\pi + x) \cdot \cos(-x)}{\sin(\pi - x) \cdot \cos(\frac{\pi}{2} + x)} = \cot^2 x$

OR

b) Prove $\sin(n + 1) \alpha \cdot \sin(n + 2) \alpha + \cos(n + 1) \alpha \cdot \cos(n + 2) \alpha = \cos \alpha$

Q.23. If $z_1 = 2 - i$, $z_2 = 1 + i$ then find $\frac{z_1 + z_2 + 1}{z_1 - z_2 + 1}$.

Q.24. Find the number of ways in which the letter of the word MACHINE can be arranged such that the vowels may occupy only odd positions.

Q.25. a) If a, b, c, d are in G.P.; prove that, a + b, b + c, c + d are also in G.P.

OR

b) Find the sum of the sequence 4,44, 444..... up to n terms

Section C (3 marks each)

Q.26. There are 200 individuals with a skin disorder, 120 has been exposed to chemical C1, 50 to chemical C2 and 30 to both the chemicals C1 and C2. Find the number of individuals exposed to

- (i) Chemical C1 or chemical C2
- (ii) Chemical C1 but not chemical C2
- (iii) Chemical C2 but not chemical C1.

Q.27. a) Find the domain of the following functions

(i) $f(x) = \sqrt{4 - x^2}$

ii) $f(x) = \frac{x^2 + 3x + 5}{x^2 - 5x + 4}$

OR

b) Let $A = \{1, 2, 3, 4, 6\}$, R be a relation defined as $R = \{(x, y) : y \text{ is exactly divisible by } x, x, y \in A\}$.

i) Write R in roster form. ii) Write domain and range of R

Q.28. a) If $\cos A = -\frac{24}{25}$ and $\cos B = \frac{3}{5}$ where $\pi < A < \frac{3\pi}{2}$ and $\frac{3\pi}{2} < B < 2\pi$, evaluate $\sin(A+B)$.

OR

b) Prove that $\frac{\tan\left(\frac{\pi}{4} + x\right)}{\tan\left(\frac{\pi}{4} - x\right)} = \left(\frac{1 + \tan x}{1 - \tan x}\right)^2$.

Q.29 The water acidity in a pool is considered normal when the average pH reading of three daily measurements is between 7.2 and 7.8. If the first two pH reading are 7.48 and 7.85, find the range of pH value for the third reading that will result in the acidity level being normal.

Q.30. Find mean deviation about Median for the following data

Size	10	11	12	14	15
Frequency	2	3	8	3	4

Q.31. By using binomial theorem show that: $6^n - 5n - 1$ is divisible by 25, $n \in \mathbb{N}$

Section D (5 Marks Each)

Q.32. A bag contains 6 white and 5 red marbles. Four marbles are drawn at random. Answer the following.

- (i) In how many ways can 4 marbles be drawn if they can be of any colour?
- (ii) In how many ways can 4 marbles be drawn if exactly 2 must be white and 2 must be red?
- (iii) In how many ways can 4 marbles be drawn if all 4 must be of the same colour?
- (iv) In how many ways can 4 marbles be drawn if at least 2 of them must be red?

Q.33. Evaluate $(\sqrt{2} + 1)^6 - (\sqrt{2} - 1)^6$ and show that $(\sqrt{2} + 1)^6 - (\sqrt{2} - 1)^6$ lies between 197 and 198. (Take $\sqrt{2} \approx 1.414$)

Q.34. a) The arithmetic mean of two positive numbers a and b is 3 times their geometric mean. Prove that $a : b = (3 + 2\sqrt{2}) : (3 - 2\sqrt{2})$

OR

b) If a and b are the roots of $x^2 - 3x + p = 0$ and c, d are roots of $x^2 - 12x + q = 0$, where a, b, c, d form a G.P. Prove that $(q + p) : (q - p) = 17 : 15$.

Q.35. a) 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 the equation of the path that he should follow.

OR

b) Assuming that straight lines work as the plane mirror for a point $(1, 2)$, find the image of the point in the line $x - 3y + 4 = 0$.

SECTION E (CASE STUDY QUESTIONS 4 MARKS EACH)

Q.36. A question paper is divided into two sections, A and B. Section A contains 5 questions, and Section B contains 7 questions. A student has to answer 7 questions in total.

Based on the above information, answer the following questions.

- (i) In how many ways can a student answer if they attempt 3 questions from Section A and 4 questions from Section B? (2m)
- (ii) In how many ways can a student answer if they attempt at least 3 questions from each section? (2m)

Q.37. A sequence of non-zero numbers is to be a geometric progression, if the ratio of each term, except the first one, by its preceding term is always constant. Rahul being a plant lover, decides to open a nursery and he bought new plants and pots. He wants to place pots in such a way that the number of pots in the first row is 2, in second row is 4 and in the third row is 8 and so on.



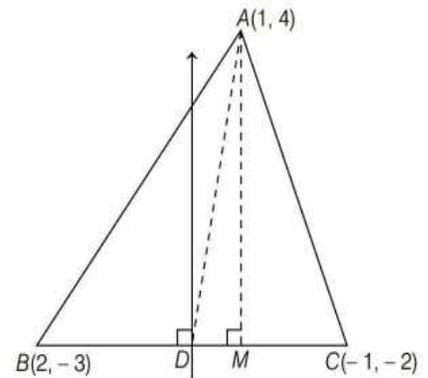
Based on the above information answer the following questions

- (i) Find the difference in number of pots placed in seventh row and fifth row. (1m)
- (ii) Find the total number of pots in the first ten rows. (1m)
- (iii) a) Find the number of rows formed if Rahul wants to place 510 plants as mentioned the above order. (2m)

-OR -

b) Suppose Rahul arranged the pots in the geometric progression starting with one pot and common ratio of the sequence of the pots is 3 then find the number of rows formed for 1093 plants. (2m)

Q.38. One day the Mathematics teacher drew a triangle ΔABC while revising straight lines. He marked vertices $A(1, 4)$, $B(2, -3)$ and $C(-1, -2)$ as shown in the given below figure. AD is the median and AM is the altitude through A .



Based on the above information answer the following questions.

- i. Find the slope of BC . (1m)
- ii. Find the equation of median through A . (1m)
- iii. a) Find the equation of the altitude through A . (2m)

OR

b) Find the equation of right bisector of side BC . (2m)
