



INDIAN SCHOOL AL WADI AL KABIR
Revision Paper (2024 – 2025)

Class: XI
Date: 02/02/2025

Sub: MATHEMATICS (041)

Max Marks: 80
Time: 3 hrs

General Instructions:

1. This question paper is divided into 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 If $A = \{1, 2, 3, 4, 5, 6\}$ and $B = \{2, 4, 6, 8\}$ then number of subsets of $(A \cap B)$ is:
a) 512 b) 10 c) 8 d) 3
- 2 If set $A = \{x: x = 10n, n \in N, n < 11\}$ and set $B = \{10, 15, 20, 25, 30 \dots 100\}$ then $B - (A \cap B)$
a) $\{15, 25, 35, \dots\}$ b) $\{15, 25, 35, \dots, 95\}$ c) $\{15, 20, 25, 30, 35, \dots\}$ d) $\{10, 15, 25, 35, \dots\}$
- 3 The domain of the relation R be a relation on N defined by $x + 2y = 8$ is
a) $\{1, 2, 3, 4\}$ b) $\{2, 4, 8\}$ c) $\{2, 4, 6, 8\}$ d) $\{2, 4, 6\}$
- 4 $\tan \frac{\pi}{8} = \underline{\hspace{2cm}}$
a) $2 - \sqrt{2}$ b) $\sqrt{2} - 1$ c) $\sqrt{3} - 2$ d) $1 + \sqrt{2}$
- 5 If $\sin \theta + \operatorname{cosec} \theta = 2$, then the value of $\sin^2 \theta + \operatorname{cosec}^2 \theta$ is
a) 1 b) 0 c) -1 d) 2
- 6 The length (l) of a rectangle is 3 times the breadth (b). If the minimum perimeter of a rectangle is 160cm, then
a) $b > 20\text{cm}$ b) $l < 20\text{cm}$ c) $b \geq 20\text{cm}$ d) $l \leq 20\text{cm}$
- 7 If $z = \frac{1+i}{1-i}$, then z^4 is
a) 0 b) -1 c) 2 d) 1

- 8 The values of x and y if $(2x + 3) - i(y - 4) = 5 + 2i$
- a) $x = 1, y = -2$ b) $x = -1, y = -2$ c) $x = -1, y = 2$ d) $x = 1, y = 2$
- 9 The value of x if $\frac{100}{10!} = \frac{1}{8!} + \frac{x}{9!}$
- a) 3 b) 1 c) 2 d) 0
- 10 The number of triangles which can be formed from 10 points in plane if 4 points are collinear is:
- a) 120 b) 124 c) 116 d) 720
- 11 The number of terms in $(1 + 16x + 64x^2)^{60}$ is
- a) 112 b) 121 c) 211 d) 120
- 12 The sum of first 10 terms of the geometric sequence 3, 6, 12, 24, is
- a) 3096 b) 3906 c) 3069 d) 3609
- 13 The midpoint of $A(3, 4, 1)$ and $B(-5, -2, 1)$ lies in _____ octant.
- a) II b) III c) V d) VII
- 14 The angle between the lines $3x - y = 7$ and $x + 3y - 9 = 0$ is
- a) $\frac{\pi}{6}$ b) $\frac{\pi}{2}$ c) $\frac{\pi}{3}$ d) $\frac{\pi}{4}$
- 15 The equation of a circle with centre $(0, 0)$ and passing through $(3, -4)$ is:
- a) $x^2 + y^2 = 25$ b) $x^2 - y^2 = 25$ c) $x^2 + y^2 = 7$ d) $x^2 + y^2 + 6x - 8y = 0$
- 16 The perpendicular distance from the point $(3, -4)$ to the line $3x - 4y + 10 = 0$ is
- a) 7 b) 8 c) 9 d) 10
- 17 $\lim_{x \rightarrow 2} \frac{x^5 - 32}{x - 2} = \text{_____}$
- a) 32 b) 5 c) 80 d) Does not exist
- 18 The derivative of $\sin x \cdot \cos x$:
- a) $\sin^2 x$ b) $\cos 2x$ c) $\sin 2x$ d) $\cos^2 x$

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 (A) $\lim_{x \rightarrow 0} \frac{\sin 3x}{\sin 5x} = \frac{3}{5}$ (R) $\frac{\sin ax}{\sin bx} = \frac{a}{b}$
- 20 (A) Consider the experiment of rolling a die. If A be the event “the number appears on die is a prime number” and B be the event “number appears on the die is an even number”, then A and B are mutually exclusive events.
(R) If A and B are mutually exclusive, then $A \cap B$ is a nullset.

SECTION – B

(Each Question Carries 2 Marks)

- 21 If $U = \{x: x \leq 10, x \in N\}$, $A = \{x: x \in N, x \text{ is prime}\}$ and $B = \{x: x \in N, x \text{ is even}\}$, write down $A \cap B'$ in roster form and $n(A \cap B')$.
- 22 (a) Write domain and range of the real valued function $f(x) = \sqrt{16 - x^2}$
OR
(b) Write the relation $R = \{(x, y): x + 3y = 15, x, y \in N\}$ in roster form.
- 23 Two finite sets have m and n elements ($m > n$). The total number of subsets of the first set is 96 more than the total number of subsets of the second set. Find the values of m and n.
- 24 a) Evaluate: $\lim_{x \rightarrow \frac{\pi}{6}} \frac{\sqrt{3}\sin x - \cos x}{x - \frac{\pi}{6}}$ -OR -
(b) If $f(x) = \frac{x^{10}}{10} + \frac{x^9}{9} + \frac{x^8}{8} + \dots + x + 1$, then evaluate $f'(1)$.
- 25 Find mean deviation about the median 36, 72, 46, 42, 60, 45, 53, 46, 51, 49.

SECTION – C

(Each Question Carries 3 Marks)

- 26 If $A = \{3, 6, 9, 12, 15, 18, 21\}$, $B = \{4, 8, 12, 16, 20\}$, $C = \{2, 4, 6, 10, 12, 14, 16\}$, find
(i) $A - B$ and prove (ii) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
- 27 A bag contains 9 discs of which 4 are red, 3 are blue and 2 are yellow. The discs are similar in shape and size.
i) If two discs are drawn at random from the bag, calculate the probability that it will be both either red or blue.
ii) If two discs are drawn at random from the bag calculate the probability that one will be red and one will be blue
- 28 Find the value of $\tan \frac{13\pi}{12}$.
- OR -
Prove that $\cos\left(\frac{\pi}{4} + x\right) + \cos\left(\frac{\pi}{4} - x\right) = \sqrt{2}\cos x$.
- 29 $A = \{x: x^2 \leq 4, x \in Z\}$ and $B = \{y: y = 2n - 1, n < 4, n \in N\}$ then
(i) Prove: $n(A \cap B) = 0$ find (ii) $n(A \times B)$ (iii) Number of relations from B to A
- 30 a) Insert 2 numbers between 3 and 81 so that resulting sequence is a Geometric Progression.
- OR -
b) How many terms of the G.P $3, \frac{3}{2}, \frac{3}{4}, \dots$ are needed to give the sum $\frac{3069}{512}$

- 31 (a) If $y = \frac{\sec 2x - 1}{\sec 2x + 1}$, prove that $\frac{dy}{dx} = 2 \tan x \sec^2 x$ -OR-
 (b) Find the derivative of $\sin x$ using first principle of calculus

SECTION – D

(Each Question Carries 5 Marks)

- 32 Simplify $(x + y)^6 + (x - y)^6$ hence evaluate $(\sqrt{3} + 1)^6 + (\sqrt{3} - 1)^6$
 33 (a) If $\sin x = \frac{3}{5}$, $\cos y = \frac{-12}{13}$, where x and y both lie in second quadrant, find the value of
 (i) $\sin(x + y)$ and (ii) $\cos 2x$

- OR -

- (b) Prove that: Prove that $\frac{\sin A + \sin 3A + \sin 5A + \sin 7A}{\cos A + \cos 3A + \cos 5A + \cos 7A} = \tan 4A$

- 34 (a) Find the equations of the lines, which cut off intercepts on the axes whose sum and products are 1 and -6 respectively.

- OR -

- (b) Find the co-ordinates of the foot of the perpendicular and image from the point (5, 4) to the line $3x - y - 1 = 0$

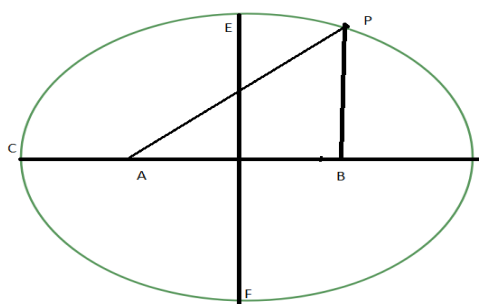
- 35 Calculate mean, variance and standard deviation for the following distribution

Classes	0 – 30	30-60	60-90	90-120	120-150	150-180	180-210
Frequencies	2	3	5	10	3	5	2

SECTION – E

(CASE STUDY - Each Question Carries 4 Marks)

- 36 A sport authority wants to design a field as given in the figure. P is a point on the curve such that the sum of distances from two fixed points A and B on horizontal axis is 100m and $AB = 60$ m.



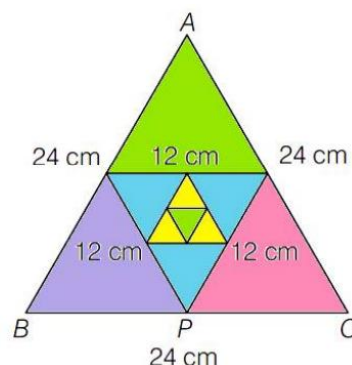
Answer the following questions:

- What is the length of major axis CD? (1m)
- If E and F are points on the curve and lie on the vertical axis find the length of EF. (1m)
- Write equation of the curve. OR
 - Find the distance PB if PB is perpendicular to CD (2 m)

- 37 A group consists of 4 girls and 7 boys. In how many ways can a team of 6 members be selected if the team has
- equal number of boys and girls
 - at least 3 girls?
 - (a) at most 2 girls?
OR
(b) at most 2 boys



- 38 In Rangoli competition in school, a student made Rangoli in the equilateral shape. Each side of an equilateral triangle is 24 cm. The mid-point of its sides is joined to form another triangle. This process is going continuously infinite. Based on the above information answer the following



- Find the side of the 5th triangle. (2 m)
- Find the sum of perimeter of first 6 triangles. (2 m)



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ANSWERS

SECTION-A (MCQ)

1	c) 8	6	c) $b \geq 20cm$	11	b) 121	16	a) 7
2	a) {15, 25, 35, ...}	7	d) 1	12	c) 3069	17	c) 80
3	d) {2, 4, 6}	8	d) $x = 1, y = 2$	13	a) II	18	b) $\cos 2x$
4	b) $\sqrt{2} - 1$	9	b) 1	14	b) $\frac{\pi}{2}$	19	(C)
5	d) 2	10	c) 116	15	a) $x^2 + y^2 = 25$	20	(D)

SECTION-B (2 MARKS)

21	$A \cap B' = \{3, 5, 7\}$ and $n(A \cap B') = 3$
22	(a) $[-4, 4]$ and $[0, 4]$ (b) $R = \{(3, 4), (6, 3), (9, 1)\}$
23	$m = 7$ and $n = 5$
24	(a) 2 (OR) (b) 10
25	Median = 47.5 M.D = 7

SECTION-C (3 MARKS)

26	(i) $A - B = \{3, 6, 9, 15, 18, 21\}$ (ii) $A \cap (B \cup C) = \{6, 12\}$ $(A \cap B) = \{12\}$ $(A \cap C) = \{6, 12\}$ $(A \cap B) \cup (A \cap C) = \{6, 12\}$
27	(i) $\frac{4c_2}{9c_2} + \frac{3c_2}{9c_2}$ (ii) $\frac{4c_1 \times 3c_1}{9c_2}$ (Evaluate)
28	(a) $\tan\left(\pi + \frac{\pi}{12}\right) = \tan \frac{\pi}{12} = 2 - \sqrt{3}$
29	(iii) 15 (iii) 2^{15}
30	Two terms are 9, 27 -OR- $n = 10$
31	(b) $\cos x$

SECTION-D (5 MARKS)

32	$2(x^6 + 15x^4y^2 + 15x^2y^4 + y^6)$
33	(a) $-\frac{56}{65}$ and $\frac{7}{25}$
34	(a) Sum of intercepts, i.e., $a+b=1$(i) Product of intercepts, i.e., $ab=-6$(ii) $a^2-a-6=0$ $a=3$ or $a=-2$ $2x-3y-6=0$ and $3x-2y+6=0$

- OR -

(b) $3x - y = 1$

Slope of line AB (m_1) = 3

Slope of line perpendicular to AB (m_2) = $-\frac{1}{3}$

Equation of perpendicular line through (5, 4) is $x + 3y = 17$

Hence foot of perpendicular (2, 5)

35

Class	Frequency f_i	Mid-point x_i	$y_i = \frac{x_i - 105}{30}$	y_i^2	$f_i y_i$	$f_i y_i^2$
0-30	2	15	-3	9	-6	18
30-60	3	45	-2	4	-6	12
60-90	5	75	-1	1	-5	5
90-120	10	105	0	0	0	0
120-150	3	135	1	1	3	3
150-180	5	165	2	4	10	20
180-210	2	195	3	9	6	18
	30				2	76

Mean, $\bar{x} = A + \frac{\sum f_i y_i}{N} \times h = 105 + \frac{2}{30} \times 30 = 105 + 2 = 107$

Variance (σ^2) = $\frac{h^2}{N^2} \left[N \sum f_i y_i^2 - \left(\sum f_i y_i \right)^2 \right]$

$= \frac{(30)^2}{(30)^2} [30 \times 76 - (2)^2]$

$= 2280 - 4$

$= 2276$

SECTION-E (4 MARKS)

36

(i) 100

(ii) 80 ways

(iii) (a) $\frac{x^2}{2500} + \frac{y^2}{1600} = 1$ OR (b) 32

37

(i) $4C_3 \times 7C_3 = 140$ (ii) $140 + 21 = 161$ (iii) (a) $210 + 84 + 7 = 301$ (b) 21

38

(i) Side of the 5th triangle = $a_5 = ar^4 = 1.5 \text{ cm}$

(ii) Sum of perimeter of first 6 triangles = $S_6 = \frac{a(1-r^6)}{1-r} = \frac{72 \left(1 - \frac{1}{2^6} \right)}{1 - \frac{1}{2}} = \frac{567}{4}$

$= 141.75$
