CARMEL CONVENT SCHOOL, CHANDIGARH
TERM 1 EXAMINATION (SESSION 2026-2027)
SUBJECT: MATHEMATICS

CLASS: XI **MAX. MARKS: 80**
DATE: 11/09/2026 **MAX. TIME: 3 HOURS**

General Instructions:

i. All questions are compulsory.
ii. There are 38 questions in the paper.
iii. The question paper has five sections: A, B, C, D and E.
Section–A has 20 questions (Q1 to 20) of 1 mark each.
Section–B has 5 questions (Q21 to 25) of 2 marks each.
Section–C has 6 questions (Q26 to 31) of 3 marks each.
Section D has 4 questions (Q32 and 35) of 5 marks each.
Section–E has 3 Case Study questions (Q36 to 38) of 4 marks each.
iv. All questions are compulsory.
v. Draw neat figures wherever required.

SECTION A

Q. No.		Marks
1.	Given relation R = $\{(a,1),(b,2),(c,3)\}$ Then the domain of R is a) $\{a,b,c\}$ b) $\{b,c\}$ c) $\{1,2,3\}$ d) $\{1,3\}$	1
2.	The set $A = \{-1, 1-i, i\}$ in set builder form can be written as a) $\{x \epsilon R : x^2 - 1 = 0\}$ b) $\{x \epsilon C : x^2 + 1 = 0\}$ c) $\{x \epsilon C : x^4 - 1 = 0\}$ d) $\{x \epsilon R : x^4 - 1 = 0\}$	1
3.	Let $A = \{x : x \text{ is a positive integer} < 8 \text{ and } x \text{ is a multiple of } 3 \text{ or } 5\}$ and $B = \{x : x \text{ is an even number } \leq 7\}$, then $(A - B) \cap B$ is a) $\{2,4,6\}$ b) $\{3,5,6\}$ c) $\emptyset$ d) $\{3,5\}$	1
4.	Represent the complex number $3i - 2$ as an ordered pair. In which the quadrant it will lie, corresponding to x axis & y axis in argand plane. a) I Quadrant b) II Quadrant c) III Quadrant d) IV Quadrant	1

5.	Given set $A \times B = \{(a,1),(b,2),(c,3),(b,5),(d,1)\}$. Which of the following is not a function from A to B? a) $\{(a,1)\}$ b) $\{(a,1),(b,2)\}$ c) $\{(a,1),(c,3),(d,1)\}$ d) $\{(b,2),(c,3),(b,5)\}$	1
6.	If $x+2i-y+7-xi=3+6i$, then the value of x and y are a) $x=4, y=8$ b) $x=-4, y=0$ c) $x=8, y=12$ d) $x=3, y=7$	1
7.	If third term of a G.P is (-4), the product of first five terms is a) -4 b) 256 c) 16 d) $(-4)^5$	1
8.	If arithmetic means between a and b, p and q are equal, then a) $ab=pq$ b) $aq=bp$ c) $a+p=b+q$ d) $a-q=p-b$	1
9.	The value of $\sin 15^\circ$ is a) $\frac{\sqrt{6}+\sqrt{2}}{2}$ b) $\frac{\sqrt{6}-\sqrt{2}}{2}$ c) $\frac{\sqrt{2}-\sqrt{6}}{4}$ d) $\frac{\sqrt{6}-\sqrt{2}}{4}$	1
10.	If $\tan\theta = 1$ then θ lies in a) I or II quadrant b) II or III quadrant c) III or IV quadrant d) I or III quadrant	1
11.	$\tan\left(\frac{-11\pi}{6}\right)$ is equal to a) $\sqrt{3}$ b) $\frac{-1}{\sqrt{3}}$ c) $\frac{1}{\sqrt{3}}$ d) $-\sqrt{3}$	1

12.	If $x, 2y, 3z$ are in A.P, where the distinct numbers x, y, z are in G.P, then the common ratio of the G.P is a) 3 b) $\frac{1}{3}$ c) 2 d) $\frac{1}{2}$	1
13.	Find n, if ${}^nC_5 = {}^nC_7$, then ${}^nC_2$ is a) 132 b) 66 c) 12 d) 36	1
14.	Total number of terms in the expansion of $(x^3 + 3x^2 + 3x + 1)^{10}$ is a) 11 b) 21 c) 30 d) 31	1
15.	If ${}^{10}P_r = 5040$, then r is equal to a) 5 b) 2 c) 4 d) 3	1
16.	Solution of $\frac{5-2x}{3} \leq \frac{x}{6} - 5$, is a) $8 \geq x$ b) $x \geq 8$ c) $x \leq 4$ d) $x \geq 4$	1
17.	If $-3x + 17 < -13$, then a) $x \in (10, \infty)$ b) $x \in [10, \infty)$ c) $x \in (-\infty, 10]$ d) $x \in [-10, 10)$	1
18.	If $A = \{1,2,3\}$ and $B = \{3,4,5\}$ then which is true a) $A - B = \{1,2\}$ b) $B - A = \{3,4\}$ c) $A \cup B = \{1,2,4,5\}$ d) $A \times B = \{(1,3), (2,4), (3,5)\}$	1
	Assertion- Reason question a) Both assertion and reason are true, and reason is the correct explanation of assertion. b) Both assertion and reason are true, but reason is not the correct explanation of assertion. c) Assertion is true, but reason is false. d) Assertion is false but reason is true.	

19.	Assertion (A): A set containing one element is known as singleton set Reason (R) : The set $\{x \in R: x^2 - 4 = 0\}$ is not a singleton set.	1
20.	Assertion (A): Given $f(x) = 2x + 5$ for $f: R \to R$, if (a, 9) belongs to function 'f' the value a is 2. Reason (R) : For the $f(x) = ax + b$ if ordered pair $(p, q) \in f \Rightarrow q = ap + b$.	1

SECTION B

Q. No.		Marks
21.	Let $\cup = \{1,2,3,4,5,6,7,8,9,10\}$ $C = \{1,2,3,5\}$ $B = \{2,4,6,7\}$, then find $(B \cap C)'$	2
22.	If $\tan\theta = \frac{1}{2}$ and $\tan\emptyset = \frac{1}{3}$, find the value of $\theta + \emptyset$	2
23.	Express $\frac{3-i}{5+6i}$ in the standard form.	2
24.	Solve the system of inequations $2x - 1 > x + \frac{7-x}{3}; 4x + 7 > 15, x \in R$.	2
25.	How many 3-letter words can be made using the letters of the word 'ORIENTAL'?	2

SECTION C

Q. No.		Marks
26.	If $A = \{2,4,6,9\}$ and $B = \{4,6,18,27,54\}$. Let R be a relation from set A to set B defined as R = {(a, b): a < b and a is a factor of b}. Express R in roster form. Also find the domain and range.	3
27.	Where does z lies in a plane, if $\left\|\frac{z-5i}{z+5i}\right\| = 1$?	3
28.	A company produces certain items. The manager in the company used to make data record on daily basis about the cost and revenue of these items separately. The cost function is given by $C(x) = 40x + 14000$ and the revenue function is given by $R(x) = 80x + 6000$ where x is the number of items produced and sold considering that all items produced are sold. a. Find the number of items to be produced to get some profit. b. To get at least ₹26000 revenue per day, find the minimum number of items produced and sold per day.	3
29.	Expand $(a + b)^4 + (a - b)^4$ and use it to evaluate $(x + \sqrt{1 - x^2})^4 + (x - \sqrt{1 - x^2})^4$.	3
30.	Prove that $\frac{\sin A . \sin 2A + \sin 3A . \sin 6A}{\sin A . \cos 2A + \sin 3A . \cos 6A} = \tan 5A$	3
31.	Find three numbers in GP whose sum is 7 and product is 8.	3

SECTION D

Q. No.		Marks
32.	Show that $9^{n+1} - 8n - 9$ is divisible by 64, whenever n is a positive integer.	5
33.	Prove that $$\cos^2\frac{\pi}{8} + \cos^2\frac{3\pi}{8} + \cos^2\frac{5\pi}{8} + \cos^2\frac{7\pi}{8} = 2$$	5
34.	The sum of four numbers in GP is 60 and the arithmetic mean of first and the last is 18. Find the numbers.	5
35.	A boy has 3 library ticket and 8 books of his interest in the library. Of these 8, he does not want to borrow Mathematics Part II, unless Mathematics Part I is also borrowed. In how many ways can he choose the three books to be borrowed?	5

SECTION E

Q. No.		Marks
36.	Four friends are sitting together in a line and they are clicking pictures. Frequently they are changing their position, suddenly one of them asked, "Are all these pictures same?" They started thinking and answered 'No' One of the friends asked. a) What do we call these assignments? b) In how many of ways, can be letter of word 'PERMUTATIONS' be arranged if the i. word starts with P and ends with S? ii. vowels are all together? iii. there are always 4 letters between P and S?	4
37.	In a highly secure local area network (LAN), 8 computer nodes are numbered using $N = \{1,2,3,4,5,6,7,8\}$. A routing algorithm establishes a direct communication link from node 'a' to node 'b' (denoted by aRb) if and only if their node members $(a + b)$ is a multiple of 3. iv. Find the domain and range of this communication relation R. v. If an arrow diagram is drawn to represent the connections from set N to set N, which specific node (s) in the domain will have maximum number of arrows originating from them? State the number of arrows originating from these nodes. vi. Suppose a continuous signal. strength function $f(x) = \frac{1}{\sqrt{9-x^2}}$ is applied to the network nodes. If $x \in R$, what is the theoretical domain of $f(x)$?	4
38.	During a physics experiment, a highly elastic rubber ball is dropped from a balcony situated 20 metres above the ground. Due to gravity and air resistance, each time the ball hits the ground, it rebounds to exactly 80% or $\left(\frac{4}{5}\right)$ of the height from which it just fell. vii. What maximum height does the ball reach after its 3rd bounce? viii. Write the sequence of the rebound heights after the 1st, 2nd and 3rd bounces. State whether it forms an AP or GP and write its common ratio/difference. ix. Calculate the total vertical distance travelled by the ball from the moment it is dropped until the instant it hits the ground for the 4th time.	4

'The End'