Roll No. | | | | | |

INDIAN SCHOOL SALALAH

FINAL EXAMINATION, FEBRUARY 2026 (AY-2025-26)

MATHEMATICS (041)

Class: XI **Date: 10-02-2026**

Duration: 3 hours **Maximum Marks: 80**

General Instructions:

a) This Question paper contains - five sections A, B, C, D and E. Each section is compulsory. However, there are internal choices in some questions.

b) Section A has 18 MCQ's and 02 Assertion-Reason based questions of 1 mark each.

c) Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.

d) Section C has 6 Short Answer (SA)-type questions of 3 marks each.

e) Section D has 4 Long Answer (LA)-type questions of 5 marks each.

f) Section E has 3 source based/case based/passage based/integrated units of assessment of 4 marks each with sub-parts.

NO	SECTION A	MARKS
1	Let A = set of all points inside the square, B = the set of points inside the triangle and C = the set of points inside the circle. If the triangle and circle intersect each other and are contained in a square. Then (a) $A \cap B \cap C = \phi$ (b) $A \cup B \cup C = C$ (c) $A \cup B \cup C = A$ (d) $A \cup B = A \cap C$	1
2	Two finite sets have m and n elements. The number of subsets of the first set is 112 more than that of second set. The values of m and n are respectively: (a) 4, 7 (b) 7, 4 (c) 4, 4 (d) 7, 7	1
3	If S = { x | x is a positive multiple of 3 less than 100} and P ={ x | x is a prime number less than 20}. Then, n(S) + n(P) is equal to: (a) 34 (b) 31 (c) 33 (d) 41	1

4	Range of the function f (x) = $\frac{2}{x+2}$ is (a) R (b) R – {0} (c) R – {2} (d) R – {–2}	1
5	Let n(A) = 4 and n(B) = 2. Then the total number of non-empty relations that can be defined from A to B is (a) 256 (b) 8 (c) 255 (d) 6	1
6	If R $= \{(x, y) : x, y \in Z, x^2 + y^2 \leq 16\}$ is a relation on Z, then the domain of R is: (a) {0, 1, 2, 3, 4} (b) {0, –1, –2, –3, –4} (c) {–4, –3, –2, –1, 0, 1, 2, 3, 4} (d) None of these	1
7	If $\tan A = \frac{1}{2}$ and $\tan B = \frac{1}{3}$, then $\tan(2A + B)$ is equal to (a) 1 (b) 2 (c) 3 (d) 4	1
8	The value of $\sin 50^\circ - \sin 70^\circ + \sin 10^\circ$ is (a) 1 (b) 0 (c) $\frac{1}{2}$ (d) 2	1
9	If 5 is added to each observation of a data set, the mean of the data (a) Remains Unchanged (b) Decreases by 5 (c) Increases by 5 (d) Becomes double	1
10	If $\left(\frac{1+i}{1-i}\right)^x$ = 1, then which of the following is correct? (a) $x = 2n$ (b) $x = 2n + 1$ (c) $x = 4n$ (d) $x = 4n + 1$	1
11	If x is a real number and | x | < 3, then x lies between: (a) $x \geq 3$ (b) $x \leq -3$ (c) $-3 \leq x \leq 3$ (d) $-3 < x < 3$	1
12	Total number of words formed by 2 vowels and 3 consonants taken from 4 vowels and 5 consonants is equal to (a) 60 (b) 120 (c) 7200 (d) 720	1

13	The number of terms in the expansion of $(1-2x+x^2)^{20}$ is (a) 41 (b) 42 (c) 43 (d) 44	1
14	While shuffling a pack of 52 playing cards, 2 are accidentally dropped. The probability that the missing cards are to be of different colours is (a) 29/52 (b) 1/2 (c) 26/51 (d) 27/51	1
15	The distance between the parallel lines 3x − 4y + 7 = 0 and 3x − 4y + 5 = 0, is (a) 3/7 (b) 2/5 (c) 7/5 (d) 3/5	1
16	If the distance between the points (a, 0, 1) and (0, 1, 2) is √27, then the value of a is (a) 5 (b) ± 5 (c) -5 (d) None of these	1
17	The value of $\lim_{x\to 0}\left(\frac{\tan^2 3x}{x^2}\right)$ is (a) 0 (b) 3 (c) ∞ (d) 9	1
18	A single letter is selected at random from the word 'PROBABILITY'. The probability that it is a vowel is (a) 1/3 (b) 4/11 (c) 2/11 (d) 3/11	1
	ASSERTION-REASON BASED QUESTIONS **In the following questions 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.** (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 but (R) is true.	
19	**Assertion (A):** The first term of a GP is 1. The sum of third and fifth term is 90, then the common ratio is 3 or –3. **Reason (R):** Common ratio of GP $a_1, a_2, a_3, \ldots$ is given by $a_2 - a_1 = a_3 - a_2$ = ...	1

20	**Assertion (A):** The value of cos (–750°) sin (–240°) is $\frac{3}{4}$. **Reason (R):** The value of sin is negative in the third and cos is positive in the first quadrant.	1
	SECTION B	
21	A) Let U = {1,2,3,4,5,6,7,8,9,10}, X = {5, 6, 7, 8}, Y = {7, 8, 9, 10} and Z = {3, 4, 5, 6}. Find: (a) $\left((X \cap Y) \cup Z\right)'$ (b) $(X \cup Y') - Z$ **OR** B) If U = {x : $x \leq 10$, $x \in$ N}, A = {x : $x \in$ N, x is prime}, B = {x : $x \in$ N, x is even}, write A ∩ B′ in roster form.	2
22	Determine the domain and range of R = $\{(x, y): y = \lvert x - 1\rvert, x \in Z$ and z $\lvert x\rvert \leq 3\}$.	2
23	If $\sin x + \sin^2 x = 1$, show that $\cos^2 x + \cos^4 x = 1$.	2
24	A) In how many ways can final eleven be selected from 15 cricket players if one of them, who is in bad form, must always be excluded. **OR** B) Evaluate: ${}^{15}C_8 + {}^{15}C_9 - {}^{15}C_6 - {}^{15}C_7$	2
25	If $y = \sqrt{x} + \frac{1}{\sqrt{x}}$, then show that $2x\frac{dy}{dx} + y = 2\sqrt{x}$.	2
	SECTION C	
26	A) i) Find the domain and the range of the function: $f(x) = \sqrt{9 - x^2}$ ii) If $f(x) = \frac{x-1}{x+1}$, $x \neq -1$, show that $f(f(x)) = -\frac{1}{x}$, $x \neq 0$ **OR** B) Let A = {1, 2, 3, 4, 5, 6}. Define a relation R from A to A by R = {(x, y): y = x – 1}. Write R in roster form. Write down the domain and range of R.	3
27	If $(\cos\theta - i\sin\theta)^2 = x - iy$, prove that $x^2 + y^2 = 1$.	3
28	Solve: 2 (2x – 7) –3 (2x + 3) ≤ 0 and 2x + 19 ≤ 6x + 40 and represent the solution on number line.	3
29	A) Using Binomial theorem, find the value of $(0.98)^4$ upto 3 places of decimal. **OR** B) By using binomial theorem expand the expression $\left(\frac{x}{3} + \frac{1}{x}\right)^5$.	3

<table>
<tr><td>30</td><td>A) If p is the length of perpendicular from the origin to the line whose intercepts on the axes are a and b, then show that $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$.
OR
B) If the lines $2x + y - 3 = 0$, $5x + ky - 3 = 0$ and $3x - y - 2 = 0$ are concurrent, find the value of k.</td><td>3</td></tr>
<tr><td>31</td><td>Find the equation of the set of points which are equidistant from the points (1, 2, 3) and (3, 2, –1).</td><td>3</td></tr>
<tr><td></td><td>SECTION D</td><td></td></tr>
<tr><td>32</td><td>A) If cot $x = -\frac{5}{12}$, x lies in second quadrant, find the values of other five trigonometric functions.
OR
B) i) Prove that $3\sin\left(\frac{\pi}{6}\right)\sec\left(\frac{\pi}{3}\right) - 4\sin\left(\frac{5\pi}{6}\right)\cot\left(\frac{\pi}{4}\right) = 1$
ii) Prove that $\cos 2x \cos\frac{x}{2} - \cos 3x \cos\frac{9x}{2} = \sin 5x \sin\frac{5x}{2}$</td><td>5</td></tr>
<tr><td>33</td><td>Let S be the sum, P the product and R the sum of reciprocals of n terms in a G.P. Prove that $P^2R^n = S^n$.</td><td>5</td></tr>
<tr><td>34</td><td>A) i) By using first principle of derivative find the derivative of $\tan x$.
ii) Evaluate: $\lim_{x\to 0} \frac{\tan x - \sin x}{x^3}$
OR
B) i) Find $\frac{dy}{dx}$ if $y = \frac{\sin x}{1+\sin x}$
ii) Evaluate: $\lim_{\theta\to 0} \frac{1-\cos 4\theta}{1-\cos 6\theta}$</td><td>5</td></tr>
<tr><td>35</td><td>Find the mean, standard deviation and variance for the following data.
<table>
<tr><td>Wages (in ₹)</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td></tr>
<tr><td>Number of workers</td><td>9</td><td>6</td><td>8</td><td>7</td><td>8</td><td>7</td><td>5</td></tr>
</table></td><td>5</td></tr>
<tr><td></td><td>SECTION E</td><td></td></tr>
<tr><td>36</td><td>Case Study.1:
A school wants to form a committee of 10 students to organize its annual event. There are 8 boys and 4 girls eligible for selection. The committee must be formed following specific rules regarding the number of boys and girls.</td><td></td></tr>
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	 Based on the given informations answer the following questions. a) In how many ways can the committee of 10 students be formed if there are no restrictions on the number of boys or girls? b) The committee must include exactly 3 girls. In how many ways can the committee be formed? c) i) The committee must have more boys than girls**.** How many ways can this be done? **OR** ii) The committee must have at least 2 girl and no more than 8 boys**.** In how many ways can the committee be formed?	1 1 2
37	**Case Study.2:** Thakur, the student of class XI was studying in his house. He felt hungry and found that his mother was not at home. So, he went to the nearby shop and purchased a packet of chips. While eating the chips, he observed that one piece of the chips is in the shape of hyperbola.  Consider the vertices of hyperbola at (±6, 0) and foci at (±8, 0).	

	Based on the given informations answer the following questions. a) Find the equation of hyperbolic curve formed by given piece of chips. b) Find the length of latus rectum of hyperbolic curve formed by given piece of chips. c) i) Calculate the area of the rectangle formed by the transverse axis and conjugate axis of given curve formed by given piece of chips. **OR** ii) If a point lies on the hyperbola such that its x-coordinate is 7, find the point(s).	1 1 2
38	**Case Study.3:** Two students, Arjun and Rahul, appeared in a highly competitive entrance examination. Arjun has been preparing for the exam while balancing his college studies, which has limited his preparation time. Rahul, on the other hand, has been consistently studying but finds certain advanced topics challenging.  Based on their preparation and past academic records, the probability that Arjun qualifies the examination is 0.12, and the probability that Rahul qualifies is 0.18. Further, assuming their performances are independent, the probability that both Arjun and Rahul qualify the examination is 0.06. Based on the given informations answer the following questions. a) Find the probability that at least one of the two students, Arjun or Rahul, qualifies the examination. b) Find the probability that only one of them will qualify the exam.	 2 2