INDIAN SCHOOL AL WADI AL KABIR

Unit Test Model Paper (2025-2026)

Class: XII | Sub: MATHEMATICS (041) | Max Marks: 30

Date: 11.05.2025 | Time: 1 hr.

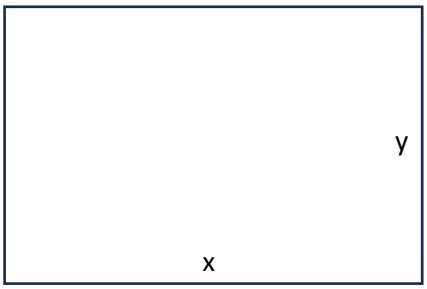
General Instructions:

1. This question paper is divided in to 4 sections- A, B, C and D.
2. Section A comprises of 7 questions of 1 mark each.
3. Section B comprises of 3 questions of 2 marks each.
4. Section C comprises of 3 questions of 3 marks each.
5. Section D comprises of 2 case study-based question.
6. Internal choice has been provided.

SECTION A

Q.1.	If $\begin{bmatrix} x+y+z \\ x+y \\ y+z \end{bmatrix} = \begin{bmatrix} 6 \\ 4 \\ 3 \end{bmatrix}$, then the value of (2x + y – z) is :								1
	A	1	B	2	**C**	3	**D**	5	
Q2.	Let R be the relation in the set N given by R = {(a, b) : a = b – 3, b > 6}, then								1
	A	(2,5) ∈ R	B	(6,3) ∈ R	**C**	(5,8) ∈ R	**D**	(1,4) ∈ R	
Q3.	The value of $\cot^{-1}\sqrt{3} + \cos^{-1}\left(-\frac{1}{\sqrt{2}}\right)$ is equal to								1
	A	π	B	$\frac{11\pi}{12}$	**C**	$-\frac{\pi}{12}$	**D**	$\frac{13\pi}{12}$	
Q4.	$\sin\left\{2\cos^{-1}\left(-\frac{3}{5}\right)\right\}$ is equal to								1
	A	$\frac{6}{25}$	B	$\frac{24}{25}$	**C**	$\frac{4}{5}$	**D**	$-\frac{24}{25}$	
Q5.	For two square matrices of same order, which is true?								1
	A	$(AB)^{-1} = A^{-1}B^{-1}$	**B**	AB= BA	**C**	$(AB)^T = B^T A^T$	**D**	$(A+B)(A-B) = A^2 - B^2$	
Q6.	Let A = {1, 2, 3} and consider the relation R = {(1, 1), (2, 2), (3, 3), (1, 2)}. Then R is								1
	A	only reflexive	**B**	reflexive but not transitive	**C**	symmetric and transitive	**D**	Neither reflexive nor symmetric, nor transitive	

Q7	**In the following question 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.**	1
	Assertion (A): $cos^{-1}\left(cos\frac{13\pi}{6}\right)=\frac{\pi.}{6}$ **Reason (R):** The range of principal value branch of $\cos^{-1}x$ is $[0, \pi]$	
	SECTION B	
Q8.	Compute the indicated product**:** $\begin{bmatrix}3 & 2\\1 & 4\\5 & 3\end{bmatrix}\begin{bmatrix}3 & -2\\1 & 4\end{bmatrix}$	2
Q9.	**A=** $[a_{ij}]\ where\ A\ is\ 2X2\ matrix\ and\ a_{ij}=\frac{i-2j}{2}$, then write all elements of A. Or Sketch the graph of $f(x)=cos^{-1}x$, f: [-1, 1] to $[0,\pi]$	2
Q10.	Prove that the relation R on the set N X N defined by (a, b) R (c, d), if $a+d=b+c$, for all (a, b), (c, d) ϵ N X N is an equivalence relation.	2
	SECTION C	
Q11.	If $A=\begin{bmatrix}5 & 3\\-1 & -2\end{bmatrix}$ then prove $A^2-3A-7I=0$. Hence find A^{-1}	3
Q12.	**If** A=$\begin{bmatrix}1 & 0 & 2\\1 & 4 & 3\\1 & 3 & 3\end{bmatrix} find A^{-1}$ **OR** Solve using matrices: $x+y+z=8\,;2x-y=10;x-y+2z=11.$	3
Q13.	Show that the function $f(x)=\frac{x-2}{x-3}, f: R-\{3\} to\ R-\{1\}\ is\ both\ one\ to\ one\ and\ onto.$	3

	SECTION D Case study-based questions	
Q14	An architect is developing a plot of land for a commercial complex. When asked about the dimensions of the plot, he said that if the length is decreased by 25 m and the breadth is increased by 25 m, then its area increases by 625 m^2. If the length is decreased by 20 m and the breadth is increased by 10 m, then its area decreases by 200 m^2. 	
	(i) Formulate the linear equations in x and y to represent the given information. (ii) Find the dimensions of the plot of land by matrix method	2 2
Q15	Hari visited an exhibition along with his family. The exhibition had a huge swing. Hari found that the swing traced the path of a Parabola as given by $f(x) = x^2 + 1$ Answer the following questions based on the above informations 	
	i) What is the range of $f(x) = x^2 + 1$ ii) If $f(x) = x^2 + 1, if\ x \geq 0, then\ find\ the\ preimage\ of\ 9$. iii) a) Show that f(x) = sinx, f: R to R is neither one to one nor onto OR b) Determine whether $h(x) = x^2 + 2x + 1, f: [0, \infty) to\ [0, \infty)\ is\ onto$. If not modify the codomain so that h(x) becomes an onto function.	1 1 2 2

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ANSWER

Q1	D	Q2	C	Q3	A
Q4	D	Q5	C	Q6	A
Q7	A	Q8	$\begin{bmatrix} 11 & 2 \\ 7 & 14 \\ 18 & 2 \end{bmatrix}$	Q9	$\begin{bmatrix} \frac{-1}{2} & \frac{-3}{2} \\ 0 & -1 \end{bmatrix}$
Q12	$\begin{bmatrix} 3 & 6 & -8 \\ 0 & 1 & -1 \\ -1 & -3 & 4 \end{bmatrix}$ OR $x = 5, y = 0, \quad z = 3$	Q14	100m, 50 m	Q15	$i)\ [1, \infty)$ $ii)\ 2\sqrt{2}$ iii)b. [2, , ∞)

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