** Bhartiyam International School**

**Pre – Mid Term Assessment (2022-23)
Subject: Mathematics**

**Class: XII**

**Date: 12/07/2022 Max. Marks: 40
Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Roll No: \_\_\_\_\_\_ Duration: 90 mins.**

**General Instructions**:

1. This question paper contains **four sections*–* A, B, C, and D**. Each part is compulsory.
2. **Section - A** has 6 **very short answer type (VSA) questions** of 1 marks each.
3. **Section *-* B** has 5 **short answer type (SA1) questions** of 2 marks each.
4. **Section *-* C** has 3 **short answer type (SA2) questions** of 3 marks each
5. **Section - D** has 3 **long answer type questions (LA)** of 5 marks each.

**SECTION – A**

1. Find the domain of the function $sin^{-1}\left(2x-1\right).$ 1
2. Evaluate the value of $cos^{-1}\left[\cos(\left(\frac{4π}{3}\right))\right].$ 1
3. Prove that Identity Function is an injective Function. 1
4. How many reflexive relations in $A×A$ can be formed for a set A if n(A) =2? 1
5. A and B are symmetric matrices of the same order. What type of matrix is $(AB^{}-BA^{})$.1
6. What are the number of bijective functions from set A to itself when A contains 106

elements? 1

**SECTION – B**

1. $A=\left[\begin{matrix}1&-1\\2&-1\end{matrix}\right] $ and $B=\left[\begin{matrix}x&1\\y&-1\end{matrix}\right] $ and $(A+B)^{2}=A^{2}+B^{2},$ then find $x+y. $ 2
2. If A is a square matrix such that $A^{2}$ = I, then $(A-I)^{3}+(A+I)^{3}-7A$ is. 2
3. Solve the following: $sin^{-1}\left(-\frac{1}{2}\right)+cos^{-1}\left(-\frac{1}{2}\right)+sec^{-1}\left(-1\right).$ 2
4. Show that the relation R in the set of integers (Z) given by R= {(a, b) : 2 divides a-b} is equivalence relation. 2
5. If $A=\left[\begin{matrix}1&3\\3&4\end{matrix}\right] $ and $A^{2}-kA-5I=0,$ then find k. 2

**SECTION – C**

1. **Let A = R – {3} and B = R- {1}. Consider the function of f: A** $\rightarrow $**B defined by
f(x) =**$\frac{x-2}{x-3}$**is one – one and onto function. 3**

1. Let $A=\left[\begin{matrix}2&-1\\3&4\end{matrix}\right], B=\left[\begin{matrix}5&2\\7&4\end{matrix}\right], C=\left[\begin{matrix}2&5\\3&8\end{matrix}\right]$ ,find a matrix D such that $CD-AB=0.$ 3
2. Check whether the relation R defined in the set {1, 2, 3, 4, 5, 6} as R ={(a, b): b = a+1, a,b є A} is reflexive, symmetric or transitive.3

**SECTION – D**

1. If $A=\left[\begin{matrix}0&-tan\frac{α}{2}\\tan\frac{α}{2}&0\end{matrix}\right]$ and I is the identity matrix of order 2 $× $2. Show that I + A= (I – A) $\left[\begin{matrix}\cos(α)&-\sin(α)\\\sin(α)&cosα\end{matrix}\right]$. 5
2. Consider f : R+ → [– 5, ∞) given by f (x) =$9x^{2}+6x$-5. Show that f is bijective. Also find inverse of f(x). 5
3. Express the matrix B = $\left[\begin{matrix} 4& 2&4\\ 1&-3& 4\\ 2& 2&3\end{matrix}\right]$ as the sum of a symmetric and a skew symmetric matrix. 5