

# SUNDARBAN MAHAVIDYALAYA

## INTERNAL EXAMINATION 2020

Subject : MTMA , Paper : CC4

Full Marks : 20

Time : 2 hours

Chose the correct option from the following question:

2X10=20

- 1) In a group  $(G, \circ)$ , for all  $a, b$  in  $G$ , The unique solution of the equation  $a \circ x = b$  is
  - a)  $a \circ b^{-1}$
  - b)  $a^{-1} \circ b$
  - c)  $x \circ a^{-1}$
  - d)  $a \circ b$
- 2) Which is the following statement being true?
  - a)  $(\mathbb{Q}, \cdot)$  is a group
  - b)  $(\mathbb{Q}, \cdot)$  is a Commutative monoid
  - c)  $(\mathbb{Q}, \cdot)$  is a Commutative Gorup
  - d) None of this
- 3) Define a binary composition  $' \circ '$  on  $\mathbb{Z}$  by  $a \circ b = a + b - ab \ \forall a, b \in \mathbb{Z}$ . if  $(\mathbb{Z}, \circ)$  is a monoid. Then the identity element of that monoid is
  - a) 0
  - b) 1
  - c) a
  - d) b
- 4) Let  $H = \left\{ \begin{pmatrix} a & b \\ -b & a \end{pmatrix} : a \in \mathbb{R}, b \in \mathbb{R} \text{ and } a^2 + b^2 = 1 \right\}$  then with respect to matrix multiplication
  - a)  $H$  is a monoid but not a Group.
  - b)  $H$  is a Group but not Commutative
  - c)  $H$  is a Commutative group
  - d)  $H$  is Commutative but not a group
- 5) The order of the alternating group  $A_3$  is
  - a) 1
  - b) 0
  - c) 2
  - d) 3
- 6) If  $x \circ (1, 2, 3) = (2, 4, 3)$  then the value of  $x$  is
  - a)  $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 4 & 3 \end{pmatrix}$
  - b)  $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 2 & 4 & 3 \end{pmatrix}$
  - c)  $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \end{pmatrix}$
  - d)  $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 2 & 3 & 4 \end{pmatrix}$
- 7) The Order of the permutation  $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 4 & 6 & 3 & 5 & 1 & 2 \end{pmatrix}$  is
  - a) 6
  - b) 5
  - c) 4
  - d) 2
- 8) Let  $S = \{1, i, -1, -i\}$  then one of the generator of the group  $(S, \cdot)$  is
  - a) 1
  - b) -1
  - c)  $i$
  - d) 0
- 9) let  $G = \langle a \rangle$  be a cyclic group of order  $n$ . If  $m$  is a positive divisor of  $n$ , Then the order of the subgroup  $\langle a^m \rangle$  is
  - a)  $\frac{m}{n}$
  - b)  $mn$
  - c)  $\frac{n}{m}$
  - d) 1
- 10) Let  $G = S_3, H = A_3$ . Then the Value of  $[G:H]$  is
  - a) 2
  - b) 3
  - c) 1
  - d) 4