

Prabhu Jagatbandhu College

Internal Assessment [Mathematics, CC2]

Full Marks: 10

Time: 30 Minutes

Answer all Questions:

1. The value of  $\log(-\sqrt{3} + i)$  is

(a)  $\ln 3 + \left(\frac{5}{6} + 2n\right)\pi i$ , (b)  $\ln 2 + \left(\frac{5}{6} + 2n\right)\pi i$ , (c)  $\ln 5 + \left(\frac{2}{3} + 2n\right)\pi i$ , (d)  $\ln 2$ , where  $n$  is an integer.

2. The value of  $\sinh 2z$  is

(a)  $2\sinh z \cosh z$ , (b)  $2\sinh z \cos z$ , (c)  $2\sinh z \cos z$ , (d)  $2\sinh z \cosh z$

3. The roots of the equation  $4x^4 - 20x^3 + 33x^2 - 20x + 4 = 0$  are given by

(a) 2, 2, 1/3, 1/3, (b) 2, 2, 1/2, 1/2, (c) 1, 1, 1/2, 1/2, (d) 2, 2, 3, 3

4. If  $R$  and  $S$  are equivalence relation on a set  $X$ , then which of the following result is true?

(a)  $R \cup S$  is an equivalence relation, (b)  $R \cap S$  is an equivalence relation

(c) both  $R \cup S$  and  $R \cap S$  are equivalence relation

(d) neither  $R \cup S$  nor  $R \cap S$ , an equivalence relation.

5. Let  $a$  and  $b$  be two nonzero real numbers. Define  $f: \mathbb{R} \rightarrow \mathbb{R}$  by  $f(x) = ax/(x+b)$ . Then

(a)  $f$  is surjective but not injective, (b)  $f$  is injective but not surjective, (c)  $f$  is bijective, (d) none of these.

6. The rank of the matrix  $A = \begin{pmatrix} 0 & 0 & 1 & 2 & 1 \\ 1 & 3 & 1 & 0 & 3 \\ 2 & 6 & 4 & 2 & 8 \\ 3 & 9 & 4 & 2 & 10 \end{pmatrix}$  is

(a) 1, (b) 2, (c) 3, (d) 4.

7.