The LNM Institute of Information Technology
Jaipur, Rajasthan

Part-1, Ist Mid Semester Exam

MATH-III, 5^{th} September 2013
Section:
Time: 20 minutes, Maximum Marks: 14

Name:_____ Roll No.:_____

Note: Each objective type question has four alternative answers (A, B, C, D) of which only one is correct. Encircle/Tick the **correct** answer. Each question carry 2 marks for correct answer and carry a **negative marking of 1 mark for wrong answer**. **Use the space given below to each question for rough work.**

1. **The set of all singular points of the function** $\dfrac{\mathbf{Log}(2z+5)}{(2z+5)(z+2)}$ **is given by**

   (A) $\{-5/2, -2, y = 0(x < -5/2)\}$ (B) $\{-5/2, -2\}$
   (C) $\{-5/2, -2, y = 0(x < -2)\}$ (D) $\{y = 0(x < -5/2)\}$

2. **The number of singularities of** $\tan z$ **in the circle** $|z| = 2$ **is**

   (A) 0 (B) 1 (C) 2 (D) 3

3. **Which of the following formula is false:**

   (A) $e^{z+iw} = e^z(\cos w + i \sin w)$ (B) $e^{\pi i} = -1$ (C) $|e^z| = e^{|z|}$ (D) $e^z = 1 + z + \dfrac{z^2}{2!} + \ldots$

4. **If** n **is a positive integer, then** $(1+i)^n + (1-i)^n =$

   (A) $2^{n/2} \sin \dfrac{n\pi}{4}$ (B) $2^{n/2} \cos \dfrac{n\pi}{4}$ (C) $2^{(n+2)/2} \sin \dfrac{n\pi}{4}$ (D) $2^{(n+2)/2} \cos \dfrac{n\pi}{4}$

5. **If** u **is a harmonic function then** $g = u^2$ **is not a harmonic function unless** u **is**

   (A) constant (B) non-constant (C) not necessarily constant (D) none of these

6. **Let** $f(z) = \cos z$ **and** $g(z) = \cos z^2$**, for** $z \in \mathbb{C}$**. Then**

   (A) f and g both are bounded on $\mathbb{C}$ (B) f is bounded but g is not bounded on $\mathbb{C}$
   (C) g is bounded but f is not bounded on $\mathbb{C}$ (D) f and g both are bounded on real axis

7. **The upper bound of the function** $\left|\dfrac{z^2+3}{z^2-z-6}\right|$**, when** $|z| = 1$ **is**

   (A) 2 (B) $\dfrac{2}{3}$ (C) $\dfrac{1}{3}$ (D) none of these