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**Presidency University**

**Bengaluru**

**SCHOOL OF ENGINEERING**

**MAKEUP EXAMINATION-JAN 2023**

**Course Code**: MAT 106

**Course Name**: Calculus, Differential Equations and Complex Variable

**Program** : B.Tech – All Programs

**Date**: 20-JAN-2023

**Time**: 01.00PM TO 04.00PM

**Max Marks**: 100

**Weightage**: 50%

**Instructions:**

1. *Read all the questions carefully and answer accordingly.*
2. *Scientific and non-programmable calculators are permitted.*

**Part A [Memory Recall Questions]**

**Answer all the Questions. Each question carries ONE mark. (10Q x 1M = 10M)**

1. The complementary factor of  is \_\_\_\_\_\_\_\_\_\_\_\_ (C.O.No.2) [Knowledge]
2. The particular integral of  is \_\_\_\_\_\_\_\_\_\_\_\_ (C.O.No.2) [Knowledge]
3.  is called \_\_\_\_\_\_\_\_\_\_\_\_ (C.O.No.1) [Knowledge]
4.  then I.F = \_\_\_\_\_\_\_\_\_\_\_\_ (C.O.No.1) [Knowledge]
5. The integral value of \_\_\_\_\_\_\_\_\_\_\_\_ (C.O.No.3) [Knowledge]
6. A vector field  is said to be solenoidal if \_\_\_\_\_\_\_\_\_\_\_\_ (C.O.No.3) [Knowledge]
7. If in polar form is analytic then is\_\_\_\_\_\_\_\_\_\_\_\_ (C.O.No.4) [Knowledge]
8. A function u is harmonic if and only if \_\_\_\_\_\_\_\_\_\_\_\_ (C.O.No.4) [Knowledge]
9. If is analytic at all points inside and on a simple closed curve C then by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ we have  (C.O.No.5) [Knowledge]
10. If is analytic inside and on a simple closed curve C and if a is any point within C then

= \_\_\_\_\_\_\_\_\_\_\_\_ (C.O.No.5) [Knowledge]

 **Part B [Thought Provoking Questions]**

**Answer all the Questions. Each question carries TEN marks. (5Q x 10M = 50M)**

1. Solve  (C.O.No.1) [Comprehension]
2. Solve  (C.O.No.2) [Comprehension]
3. Evaluate (C.O.No.3) [Comprehension]
4. Show that  is analytic also find its derivatives. (C.O.No.4) [Comprehension]
5. (a) Evaluate  over . (C.O.No.5) [Comprehension]

 (b) Evaluate  where c is the circle .

**Part C [Problem Solving Question]**

**Answer the following Question. It carries TWENTY marks. (2Q x 20M = 40M)**

16. (a) Solve  (C.O.No.1) [Application]

 (b) Solve  by the method of variation of parameter. (C.O.No.2) [Application]

17. (a) Show that  is both solenoidal and irrotational (C.O.No.3) [Application]

 (b) Show that is harmonic and its conjugate

 (C.O.No.4) [Application]