Date: 27 July 2023

Bangladesh Army University of Engineering & Technology (BAUET)
Department of Computer Science and Engineering
Second Year Fourth Semester (14th Batch), Summer-2023
Course Code: MATH - 2247
Course Title: Complex Variable and Laplace Transformation

Class Test-01

Full Marks: 15 **Time: 35 Minutes**

N.B: Answer all the questions and the figures shown in the right margin indicate full marks.

1. What do you mean by absolute value of a complex Variable? What is the use of complex number in engineering? Evaluate the absolute value of the complex number defined by **5**

$$\frac{-7i^{(\text{last one digit of your ID})}+6i^{3.(\text{last one digit of your ID})}}{8i^{2.(\text{last one digit of your ID})}-2i} \text{ if possible.}$$

2. Applying the De-Moivre's theorem, evaluate the indicated roots of $z^5=-32$ and locate them graphically. **6**

3. Sketch and analyze the region in z-plane represented by the following relation $|z+1-i|>|z-1+i|$. **4**

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Class Test-02

Full Marks: 15 **Time: 20 Minutes**

2. When a function is said to satisfy Laplace's equation? If possible, prove that **3+8+4**

$u = -\frac{y}{x^2 - y^2}$ and $v = \frac{x^2 + y^2}{y}$ both satisfies the Laplace's equation and analyze that $u + iv$ is analytic or not?

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Class Test-03

$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Full Marks: 15 **Time: 20 Minutes**

1. State Cauchy's integral theorem. Evaluate $\int_C \frac{z+9}{z^2-2z+7} dz$ where C is the circle $|z-1|=i$. **2+5**

2. State Cauchy's integral formula. Evaluate $\int_C \frac{z^2+9z-7}{z^2-9} dz$ where C is the circle $|z-2|=3$. **2+6**

Date: 01 October 2023

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Course Title: Complex Variable and Laplace Transformation

Class Test-04 (A)

Full Marks: 15 **Time: 25 Minutes**

1. Explain the Laplace transformation for a function $G(t)$. Evaluate the Laplace transformation of $6t^3 - 4e^{3t} + 3\sin 2t + e^{-2t}\cos 3t + t^2 e^{5t}$. **2+8**

2. Applying the Laplace transform of fourth derivative, verify that $L\{\sin 23t\} = \frac{23}{s^2 + 529}$, $s > 0$ if possible. **5**