বাংলাদেশ আর্মি ইন্টারন্যাশনাল ইউনিভার্সিটি অব সায়েন্স এন্ড টেকনোলজি, কুমিল্লা সেনানিবাস
BANGLADESH ARMY INTERNATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY (BAIUST), COMILLA CANTONMENT

Department of Electrical and Electronic Engineering
Mid Term Examination, Fall 2015

Course Code: Math-159
Course Title: Calculus-II

Notes:

a. Answer any 03 (three) of the following 5 questions.
b. Each question carries 20 marks.
c. Figure on the right of each question indicate marks for respective question.

Time: 1 hr
Full Marks: 60

1. (a). Define Complex Conjugate. 02

(b). Show that the triangle inequality holds in complex number **C**. 06

(c). Describe geometrically the region of the inequality: $\left|\frac{z-3}{z+3}\right|>3$. 12

2. (a). Define a Single valued and a Multiple valued of complex function. 03

(b). If $\lim_{z\to z_0} f(z)$ exist, prove that it must be unique. 07

(c). Define Uniform Continuity. 02

(d). Prove that $f(z)=1/z$ is not uniformly continuous in the region $|z|<1$ 08

3. (a). State the necessary condition of Cauchy-Riemann Equation. 02

(b). Show that the function $f(z)=\bar{z}$ is non-analytic. 08

(c). State the Cauchy-Integral Formula for the higher derivatives of an Analytic Function. 02

(d). Show that $\oint_c \frac{e^{tz}}{z^2+1}dz = 2\pi i \sin t$, where c is the circle $|z|=3$ and $t>0$. 08

4. (a). Expand $f(z)=\cos z$ in Taylor's series at $z=\pi/2$. 08

(b). Prove that the series, $1+\frac{a.b}{1.c}z+\frac{a(a+1)b(b+1)}{1.2.c(c+1)}z^2+\cdots$ has a unit radius of convergence. 12

5. (a). Find the singular points of the function $\frac{z^2}{(z+1)^2}\sin(\frac{1}{z-1})$ and determine their nature. 08

(b). Find residue of $f(z)=\frac{z^2}{z^2+a^2}$ of the poles. 12