



বাংলাদেশ আর্মি ইন্টারন্যাশনাল ইউনিভার্সিটি অব সায়েন্স অ্যান্ড টেকনোলজি (বিএআইইউএসটি) কুমিল্লা  
Bangladesh Army International University of Science and Technology (BAIUST) Comilla

Mid-Term Examination, Spring 2023

Department of Electrical & Electronic Engineering

Level-2, Term-II

Course Code: EEE 209

Course Title: Measurement and Instrumentation

Time : 1 hr.

**Notes:**

- a. Each question carries 30 marks.  
b. Figure on the right of each question indicate marks for respective question.

**Full Marks : 60**

**Answer any two questions including Question No 3.**

01. a. What is measurement? Mention the basic requirements to make a measurement system meaningful. 07  
b. What is the rationale for the growing importance of electronic instruments over electrical and mechanical instruments? 15  
c. What is meant by analog and digital mode of operation? Which one is better and why? 08
02. a. Why does PMMC instruments are used for DC only? 05  
b. Derive the torque equation of an PMMC type instrument with proper circuit representation. 15  
c. Differentiate between null type and deflection type of instrument. 10
03. a. Specify the most common error that occurs in Ammeter and Voltmeters. 05  
b. Draw the circuit diagram for multirange ammeter using an Ayrton shunt. Explain the circuit arrangement for each range selection. 10  
c. Multiplier has a negligible temperature coefficient of resistance, prove the statement by solving the situation below- 15  
A moving-coil instrument whose resistance is  $25\Omega$  gives a full-scale deflection with a voltage of 25 mV. This instrument is to be used with a series multiplier to extend its range to 10 V.  
Calculate the error caused by  $20^\circ\text{C}$  rise in temperature. The temperature coefficient of copper is  $0.004 \Omega/\Omega^\circ\text{C}$  and that of manganin  $0.00015 \Omega/\Omega^\circ\text{C}$