International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Examination Spring-2018
Course Code: EEE- 4827
Time: 2 hours 30 minutes

Program: B.Sc. Engg. (EEE)
Course Title: Measurement and Instrumentation
Full Marks: 50

Use separate script for each part. Figures in the right margin indicate full marks.

Part A

[Answer any ***two*** sets of question from the followings]

1(a). What are the types of flow meter? **2**

1(b). Explain how LVDT can be used for measurement of pressure. **4**

1(c). Write the advantages & disadvantages of Electromagnetic type flow meter. Describe how an Ultrasonic flow transducer works. **4**

2(a). Explain current telemetering system using force balance system with proper diagram. **3**

2(b). For amplitude modulated wave, show that the maximum total power $P_t=1.5\ P_c$. **4**

2(c). A broadcast A.M. transmitter radiates 50 kw of carrier power. What will be the radiation power at 85% of modulation? **3**

3(a). Describe the basic construction and working principles of an electromagnetic flow meter. **4**

3(b). Describe the method of measuring liquid level by resistive method. **3**

3(c). What is the bandwidth required for an F.M signal in which the modulating frequency is 2 kHz and the maximum deviation is 10 kHz? **3**

Part B

[Answer any ***three*** sets of question from the followings]

4(a). Define noise and classify them. Also define SNR. **3**

4(b). Describe the operating principle of potentiometric A/D converter. **4**

4(c). For thermal noise, show that the noise voltage is, $V_n=\sqrt{(4kTBR)}$, where the symbols represent their usual meaning. **3**

5(a). Design a D/A converter with a value of k=1, showing the internal circuitry of the converter. **4**

5(b). Define resolution and percentage resolution. A 10-bit DAC has a step size of 10 mV. Determine the full-scale output voltage and the percentage resolution. **4**

5(c). What do you understand by the term "data acquisition" of a computer system? **2**

6(a). With proper example, explain the successive approximation ADC. 4

6(b). Draw the basic block diagram of a computer controlled and monitored system with any type of physical variable. 3

6(c). What is the largest value of output voltage from an eight-bit DAC that produces 1.0 V for a digital input of 00110010? 3

7(a). What is noise factor? Show that the noise factor, $F = 1 + \frac{N_a}{A_p N_i}$, where the symbols represent their usual meaning. 3

7(b). Draw a simple Digital-Ramp ADC circuit. 3

7(c). Assume the following values for a digital ramp ADC: 4

Clock frequency= 1 MHz

$V_T = 0.1$ mV

DAC has full scale output = 10.23 V and a 10-bit input.

Determine the following values:

a) The digital equivalent obtained for $V_A = 3.728$ V

b) The conversion time.