

International Islamic University Chittagong

Department of Electrical and Electronic Engineering

Final Assessment of Autumn-2020

Course Code: **EEE-4827**

Time: **5 hours** (Writing - **4 hours 30 minutes** + **30 minutes** submission time)

Program: B.Sc. Engg. (EEE)

Course Title: **Measurement and Instrumentation**

Full Marks: **50** (Written 30 + Viva/Viva-Quiz-20)

[Answer **each of the** questions from the followings; Figures in the right margin indicate full marks. **Answer script must be submitted through online method within 5 hours from starting time. Also, write down the Q. Set on the front page of your answer script**]

Q. Set-C

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|--|-----|----------|----|
| 1(a). Compare capacitive method and inductive method for pressure measurement. | CO2 | An | 02 |
| 1(b). For measuring the fluid flow rate, compare ultrasonic flow meter with electromagnetic flow meter. | CO2 | An | 02 |
| 1(c). Explain the inductive method for liquid level measurement. Compare this method with capacitive method in terms of usability, advantages and efficiency. | CO2 | An | 02 |
| 2(a). What are the primary considerations in case of land line telemetry? In what cases, RF telemetry is chosen over it? | CO3 | An | 01 |
| 2(b). Evaluate the total power of an AM signal. A broadcast A.M. transmitter radiates 40kw of carrier power. What will be the radiation power at 95% of modulation? | CO3 | E | 03 |
| 2(c). Briefly explain the importance of telemetry in measurement system. For relatively larger distance which method is preferred between voltage telemetry and current telemetry and why? | CO3 | R,
An | 02 |
| 3(a). What is 1/f noise? Why thermal noise is a white noise? Model thermal noise source as a Thevenin voltage source. | CO3 | R,
An | 02 |
| 3(b). Why SNR is measured in dB? Can the SNR of a system have <i>negative</i> value? If not, then why? If so, how it has a <i>negative</i> value? | CO3 | An | 02 |
| 3(c). What is noise factor? A signal with 50kw power has a noise of 0.35kw. It is amplified with an amplifier having an amplification factor of 150 and 0.3kw of its own noise. Calculate the noise factor. | CO3 | R,
E | 02 |
| 4(a). Design a 4-bit D/A converter circuitry with $V_{ref} = 15V$. | CO2 | E | 02 |
| 4(b). A computer-controlled motor is using a DAC with current output. The current output is varied from 0 mA to 2 mA while the motor runs from 0 to 1000 rpm. How many bits should be used if the computer is to be able to produce a motor speed that is within 5 rpm of the desired speed? | CO2 | E | 01 |
| 4(c). How the conversion accuracy can be improved in DAC? An 8-bit D/A converter produces $V_{out} = 1.5 V$ for a digital input of 00000101. Using only input weight and weighted sum method, find the value of V_{out} for an input of X. (X= 8-bit binary representation of the last two digit of your student ID) | CO2 | R,
E | 03 |
| 5(a). What is data acquisition? What are the general applications of ADC? | CO2 | R | 02 |

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|--------------|--|------------|-----------|-----------|
| 5(b). | Compare the maximum conversion times of a 20-bit digital ramp analog-to-digital converter and a 20-bit successive-approximation analog-to-digital converter if both utilize a 1-MHz clock Frequency. | CO2 | An | 02 |
| 5(c). | Between successive-approximation analog-to-digital converter and digital-ramp analog-to-digital converter, which one is faster and why? | CO2 | An | 02 |
| 6. | Viva/Viva-Quiz: The time of viva/viva-quiz will be declared in Google classroom. | | | 20 |