International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Assessment of Autumn-2020 | Program: B.Sc. Engg. (EEE)
Course Code: **EEE-4827** | Course Title: **Measurement and Instrumentation**
Time: **5 hours** (Writing - **4 hours 30 minutes** + **30 minutes** submission time) | 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-A

1(a).	Explain the inductive method for liquid level measurement. Compare this method with capacitive method in terms of usability, advantages and efficiency.	**CO2**	**An**	**02**
1(b).	For measuring the fluid flow rate, compare ultrasonic flow meter with electromagnetic flow meter.	**CO2**	**An**	**02**
1(c).	Compare three-lead method and four-lead method for temperature measurement.	**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 50kw of carrier power. What will be the radiation power at 90% 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 the power of thermal noise? Why it 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 $negative$ value? If not, then why? If so, how it has a $negative$ value?	**CO3**	**An**	**02**
3(c).	What is noise factor? A signal with $50kw$ power has a noise of $0.5kw$. It is amplified with an amplifier having an amplification factor of 50 and $0.25kw$ of its own noise. Calculate the noise factor.	**CO3**	**R, E**	**02**
4(a).	Design a 4-bit D/A converter circuitry with $V_{ref} = 30V$.	**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 4 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 $Vout = 1.5\,V$ for a digital input of 00000101. Using only input weight and weighted sum method, find the value of $Vout$ 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**

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 200-kHz 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**