

# International Islamic University Chittagong (IIUC)

## Department of Electronic and Telecommunication Engineering

### Semester End Examination

Program: **B.Sc (Engg.)**  
 Course Code: **ETE-3645**  
 Total Marks: **50**

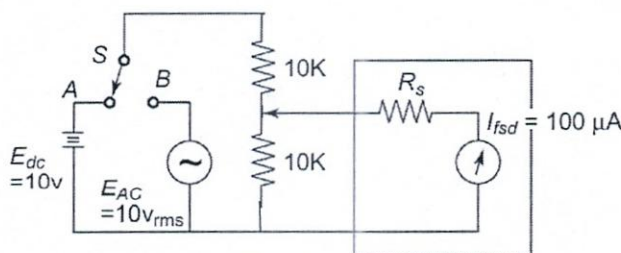
Semester: **Autumn 2024**  
 Course Title: **Electronic Measurement & Instrumentation**  
 Time: **2 Hours 30 Minutes**

|                                                                                             |                                                                                                                                                                             |            |       |         |          |        |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------|---------|----------|--------|
| (i) Answer all the questions. The figures in the right-hand margin indicate full marks.     |                                                                                                                                                                             |            |       |         |          |        |
| (ii) Course Learning Outcomes (COs) and Bloom's Levels are mentioned in additional Columns. |                                                                                                                                                                             |            |       |         |          |        |
| Course Learning Outcomes (CLOs) of the Questions                                            |                                                                                                                                                                             |            |       |         |          |        |
| CLO1                                                                                        | Apply theoretical knowledge to familiarize with various measuring instruments & techniques, generators and recorders and utilize appropriate tools for measurement purpose. |            |       |         |          |        |
| CLO2                                                                                        | Understand the performance characteristics, errors and different parameters associated with measuring instruments and analyze them.                                         |            |       |         |          |        |
| Bloom's Levels of the Questions                                                             |                                                                                                                                                                             |            |       |         |          |        |
| Letter Symbols                                                                              | R                                                                                                                                                                           | U          | Ap    | An      | E        | C      |
| Meaning                                                                                     | Remember                                                                                                                                                                    | Understand | Apply | Analyze | Evaluate | Create |

#### Part A

Answer any Two of the following Questions.

- Q1.** a) Draw and describe the True RMS Reading Voltmeter. Write the function of measuring and balancing the thermocouple in the True RMS Reading voltmeter. **CLO2 An 6**
- b) Determine the reading obtained with a dc voltmeter in the circuit **Fig. 1**, when the switch is set to position **A**, then set the switch to position **B** and determine the reading obtained with a half-wave rectifier and full-wave rectifier ac voltmeter. All meters use a 100  $\mu$ A full scale deflection meter movement and are set on 10 V dc or rms ranges. **CLO1 Ap 4**



**Fig. 1**

- Q2.** a) State the advantages of a DVM over an analog meter. How are DVMs classified? **CLO2 U 2**
- b) Describe with a diagram the operation of ramp type DVM. State limitations of a ramp type DVM and how it is overcome. **CLO2 An 5**
- c) Describe with the help of a block diagram the operation of integrating type digital voltmeter. **CLO2 R 3**

**OR**

- Q2.** a) Draw the basic block diagram of an oscilloscope and state the functions of each block. **CLO2 U 4**
- b) Describe with diagram the operation of a dual beam CRO. **CLO2 An 3**

- c) Explain the operation of a digital storage CRO with a block diagram.

CLO2 U 3

### Part B

Answer any Three of the following Questions.

- Q3. a) Describe with the help of a neat block diagram the working of a standard signal Generator. CLO1 U 4  
 b) Explain the operation of an AF sine and wave generator. CLO1 U 3  
 c) Explain with the help of a block diagram the operation of a function generator. CLO1 U 3
- Q4. a) Describe the methods of measuring power at audio frequencies. CLO2 R 4  
 b) Explain with help of a block diagram the operation of a spectrum analyzer. Also, mention the applications of a spectrum analyzer. CLO2 An 6
- Q5. a) Define a transducer. Write the advantages of an Electrical transducer. CLO1 R 3  
 b) Describe with the diagram the operations of a piezo-electric transducer. CLO1 U 4  
 c) State the differences between photo emissive, photo conductive and photo voltaic transducers. CLO1 An 3

OR

- Q5. a) Mention the name of different optical sources and detectors. CLO1 R 2  
 b) Explain with a diagram the operation of a photo multiplier tube. CLO1 U 4  
 c) The relay of **Fig. 2(a)** is to be controlled by a photo conductive cell with the characteristics shown in **Fig. 2(b)**. The potentiometer delivers 10 mA at a 30 V setting when the cell is illuminated with about 400  $\text{l/m}^2$  and is required to be de-energised when the cell is dark. Calculate (i) the required series resistance, and the (ii) dark current level. CLO1 Ap 4

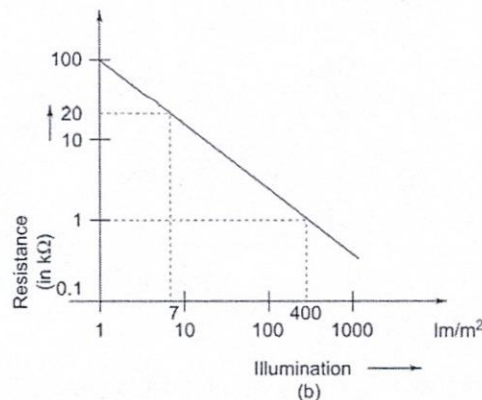
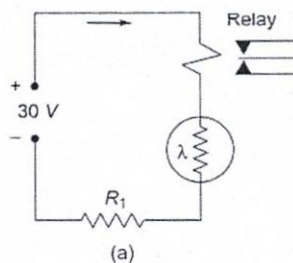


Fig. 2