USN ☐☐☐☐☐☐☐☐☐☐   **17EC32**

Third Semester B.E. Degree Examination, Dec.2018/Jan.2019
Electronic Instrumentation

Time: 3 hrs.   Max. Marks: 100

**Note: Answer any FIVE full questions, choosing
ONE full question from each module.**

Module-1

1 a. Define the following terms:
   i)   Accuracy and precision
   ii) Grass error and systematic error.   **(06 Marks)**
   b. Draw the block diagram of a true RMS volt meter and explain its operation. **(07 Marks)**
   c. Calculate series connected multiplier resistance with a D'Arsonval movement with an internal resistance of 50Ω and full scale deflection current of 2mA in to a multi range d.c. voltmeter with range from $0 - 10V$, $0 - 50V$, $0 - 100V$ and $0 - 250V$.   **(07 Marks)**

OR

2 a. State different types of thermocouple used for RF current measurement and explain each one of them in brief.   **(07 Marks)**
   b. Sketch and explain the operation of a Multirange Ammeter and Aryton shunt. **(07 Marks)**
   c. The expected value of the voltage across a resistor is 75V, But measurement gives a value of 74V, calculate:
   i)   Absolute error
   ii) % error
   iii) Relative accuracy and
   iv) % of accuracy.   **(06 Marks)**

Module-2

3 a. Describe with a diagram the operation of a successive approximation type DVM.
                                                                                (07 Marks)
   b. Explain with a diagram the working of digital pH meter.   **(07 Marks)**
   c. A 4½ digits DVM is used for voltage measurements. Find:
   i)   Resolution
   ii) How would 67.50V be displayed on 5V range
   iii) How would 0.716V be displayed on 10V range.   **(06 Marks)**

OR

4 a. Describe with the help of a diagram the operation of universal counter.   **(07 Marks)**
   b. Explain with block diagram digital phase meter operation.   **(06 Marks)**
   c. With the block diagram, explain the digital frequency meter.   **(07 Marks)**

Module-3

5 a. Draw the basic block diagram of a oscilloscope and explain the function of each block.
                                                                                (08 Marks)
   b. Sketch the block diagram and explain AF Sine and square wave generator.   **(07 Marks)**
   c. Discuss the important features of Cathode Ray Tube (CRT).   **(05 Marks)**

OR

6 a. With block diagram, explain the working of DSO and list the advantages of it. (08 Marks)
   b. Explain the function generator with suitable diagram. (07 Marks)
   c. Discuss frequency measurement with Lissajous figure. (05 Marks)

Module-4

7 a. With circuit diagram, explain Q-meter and mention its application. (06 Marks)
   b. Draw the circuit of a Wheatstone's bridge and explain how it can be used to measure unknown resistance. (06 Marks)
   c. Draw the circuit diagram and obtain the balance condition for Maxwell's bridge. If bridge contents are $C_1 = 0.5$ μF, $R_1 = 1200\Omega$, $R_2 = 700\Omega$ and $R_3 = 300\Omega$ find resistance and inductance of the coil. (08 Marks)

OR

8 a. What is Meggar? Explain the basic Meggar circuit. (08 Marks)
   b. With neat diagram, explain the working of Wien's bridge? How it can be used as oscillator. (08 Marks)
   c. A capacitance comparison bridge is used to measure a capacitive impedance at a frequency of 2kHz the bridge constants at balance are $C_3 = 100\mu F$, $R_1 = 10K\Omega$, $R_2 = 50K\Omega$ and $R_3 = 100K\Omega$. Find the equivalent series circuit of the unknown impedance. (04 Marks)

Module-5

9 a. List the factors to be considered while selecting transducers. (06 Marks)
   b. Explain principle operation of resistive position transducer. (06 Marks)
   c. Derive an expression for gauge factor for Bonded resistance wire strain gauges. (08 Marks)

OR

10 a. Explain the construction and operation of LVDT show the characteristic curve. (08 Marks)
    b. Explain Piezoelectric transducer. (06 Marks)
    c. Explain semiconductor photo diode and photo transistor. (06 Marks)

* * * * *