CBCS SCHEME

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 $4\frac{1}{2}$ 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 $C_3 = 100$µF, $R_1 = 10K\Omega$, $R_2 = 50K\Omega$ 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)**

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