USN | | | | | | | | | | |

18RA45

Fourth Semester B.Tech. Degree Examination, July/August 2022
Instrumentation and Measurements

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1   a.   Describe applications of measurements systems.   **(08 Marks)**
    b.   Discuss mechanical, electrical and electronic instruments.   **(06 Marks)**
    c.   Explain functions of instruments and measurement systems.   **(06 Marks)**

OR

2   a.   Explain deflection and null type instruments in measurement system.   **(06 Marks)**
    b.   Describe Bourdon tube pressure gauge with block diagram.   **(08 Marks)**
    c.   Discuss two methods of measurements used in measuring instruments.   **(06 Marks)**

Module-2

3   a.   Explain Ramp Type Dum with block diagram.   **(08 Marks)**
    b.   A $4\frac{1}{2}$ digit voltmeter is used for voltage measurements :
         i)   Find its resolution
         ii)   How would 12.98V be displayed on a 10V range?
         iii) How would 0.6973 be displayed on 1V and 10V ranges.   **(04 Marks)**
    c.   Discuss principle of operation of time base selector with diagram.   **(08 Marks)**

OR

4   a.   Describe the working of Dual slope Type Dum.   **(08 Marks)**
    b.   Discuss general specifications of Dum.   **(06 Marks)**
    c.   Explain digital frequency meter with block diagram.   **(06 Marks)**

Module-3

5   a.   With block diagram of oscilloscope, explain function of each block.   **(08 Marks)**
    b.   Explain the working principle of Dual trace oscilloscope.   **(08 Marks)**
    c.   Discuss in detail the CRT features.   **(04 Marks)**

OR

6   a.   Explain the function of sweep generator with diagram.   **(08 Marks)**
    b.   With block diagram, explain CRT.   **(06 Marks)**
    c.   Describe the principle operation of Dual beam oscilloscope.   **(06 Marks)**

Module-4

7   a.   Derive an expression for deflection current in galvanometer for unbalanced whetstones bridge.   **(10 Marks)**
    b.   An inductance comparison bridge is used to measure the inductance impedance at a frequency of 5KHz. The bridge constants at balance are $L_3 = 10mH$, $R_1 = 10K\Omega$, $R_2 = 40K\Omega$, $R_3 = 100K\Omega$. Find the equivalent series circuit of unknown impedance.   **(04 Marks)**
    c.   Derive an expression for frequency of Wien's bridge.   **(06 Marks)**

OR

8 a. Derive an expression for equality facts for Maxwell's bridge.   **(08 Marks)**
   b. Discuss Wagner's earth (ground) connection with diagram.   **(08 Marks)**
   c. Find the equivalent parallel resistance and capacitance that cause Wein's bridge to null with following component values $R_1 = 3.1K\Omega$, $C_1 = 5.2\mu F$, $f_2 = 25K\Omega$, $f = 2.5KHz$, $R_4 = 100K\Omega$.
                                                                                        (04 Marks)

Module-5

9 a. List the advantages of electrical transducers.   **(06 Marks)**
   b. Explain the working principle of resistance thermometer.   **(08 Marks)**
   c. Write short notes on Liquid Crystal Display (LCD).   **(06 Marks)**

OR

10 a. Describe construction and working principle of LUDT.   **(10 Marks)**
   b. Explain piezoelectric transducer with diagram.   **(06 Marks)**
   c. Discuss the advantage of LED.   **(04 Marks)**

* * * * *