Printed Pages: 02 **Sub Code: KEC-057**

Roll No. | | | | | | | | | | |

B.TECH
(SEM V) THEORY EXAMINATION 2022-23
ELECTRONIC INSTRUMENTATION & MEASUREMENTS

Time: 3 Hours ***Total Marks: 100***

Note: **1.** Attempt all Sections. If require any missing data; then choose suitably.
2. Any special paper specific instruction.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

(a) Calculate the maximum percentage error in the difference of two measured voltage when $v_1 = 100 \pm 1\%$ and $v_2 = 80 \pm 5\%$
(b) Define swamping resistance used in PMMC instrument.
(c) What is mean by calibration in measuring instrument?
(d) Define 1:1 & 20 :1 probes.
(e) Discuss the balance equation of Wheatstone bridge.
(f) What is mean by residual resistance and inductance in the Q meter?
(g) What is the role of time base circuit in CRO?
(h) Define the interpolation in oscilloscope system.
(i) Define force transducer in measurement system.
(j) Draw the block diagram of data acquisition systems.

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

(a) Explain the DC ammeter and DC voltmeter in measurement system.
(b) Explain the different type of digital multimeter system using proper diagram.
(c) A Hay bridge operating at a supply frequency of 100 Hz is balanced when the components are $C_3 = 0.1$microfarad, $R_1 = 1.26$ Kohms, $R_3 = 65$ ohm and $R_4 = 600$ Ohms. Calculate the inductance and resistance of measured inductor. Also , the Q factor of the coil.
(d) Draw the block diagram and waveform of D.S.O with its unique application.
(e) Describe the hall-effect transducers with their application.

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Explain the working principle of PMMC type equipment using torque equation.
(b) The following values were obtained from the measurements of the values of 41.7,42.0, 41.7, 42.0, 42.1, 41.6, 42.0, 41.9, 42.5 & 41.8 calculate:
(i) The arithmetic mean
(ii) The standard deviation
(iii)The probable error of one reading.
(iv)The probable error of mean
(v) Range.

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) What are the different types of probes used in measurement? Draw and explain with using proper circuit diagram.

(b) Explain the working principle of AC electronics voltmeter circuits using proper circuit diagram.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) Derive the equation for Maxwell bridge and solve a Maxwell inductance bridge uses a standard capacitor C_3 = 0.1 micro farad and operate at a supply frequency of 100Hz.Balance is achieved when R_1= 1.26 kohms, R_3 = 470 Ohms, and R_4 = 500 Ohms. Calculate the inductance and resistance of the measured inductor, and determine its Q factor.

(b) Explain method of measuring low resistance using Kelvin double bridge and derive the balance conditions

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain the working principle, block diagram and waveform of sampling Oscilloscope.

(b) Draw the block diagram and waveform diagram of Dual trace oscilloscopes.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) What is transducer? Explain the various type of transducers used in measurement.

(b) Where are thermocouple used? Explain various types of thermocouple in detail.