Reg.No.

# MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL (A constituent unit of MAHE, Manipal)

## THIRD SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.) **END SEMESTER EXAMINATIONS, DECEMBER - 2018**

ELECTRICAL AND ELECTRONICS MEASUREMENTS [ICE 2102]

#### Time: 3 Hours

#### Max. Marks:50

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### **Instructions to Candidates:**

- Answer **ALL** the questions.
- Missing data may be suitably assumed.
- Discuss the resultant error in calculations involving quantities with stated accuracies when the 3 **1**A quantities are a) Added /Subtracted b) Multiplied/divided c) the quantity is raised to the power of the other.
- **1B** With the help of circuit diagram explain how capacitance can be measured by the use of a 4 Schering bridge. Draw the phasor diagram under balance condition.
- Draw the circuit diagram for the measurement of energy in a 3 phase 3 wire system using 2 **1C** 3 element energy meter.
- 2A A 470 $\Omega$ ,  $\pm 10\%$  resistor has a potential difference of 12V across its terminals. If the voltage is 2 measured with an accuracy of  $\pm 6\%$ , determine the power dissipation and the accuracy of the result.
- **2B** A single phase energy meter makes 500 revolutions per kWh. It is found on testing as making 2 40 revolutions in 58.1 seconds at 5kW full load. Find the percentage error.
- Explain potentiometric digital voltmeter with schematic and timing diagram. **2**C
- **2D** Draw the circuit and equivalent circuit of attenuator probe and explain its working.
- With necessary block and timing diagram explain alternate and CHOP mode of dual trace 3A 4 display.
- **3B** Draw the schematic arrangement and explain low impedance measurement using Q meter. Also 4 derive the expression for unknown resistance and reactance. Comment on identifying nature of reactance.
- **3**C A digital frequency meter uses a time base consisting of a 1.5MHz clock generator frequency 2 divided by 3 decade counters. Determine the meter indication when the input frequency is 5KHz and time base output is at third decade counter.
- **4**A Explain with necessary figure and waveform, frequency ratio measurement using digital 3 frequency meter. 3
- Explain the basic principle of magnetic recording. **4B**
- The voltage across capacitor in the basic Q meter circuit is 5V, when a coil is in resonance. If 2 **4**C the coil has R=3.3Ohms and  $X_L$  =66Ohms at resonance, Calculate Q of the coil and the supply voltage.
- Write a note on causes and remedy for low frequency and high frequency distortion in pulse **4D** 2 measurements using CRO.
- 5A Explain the construction, working and characteristics of LCD. Compare it with LED Display. 3 4
- With a circuit diagram, explain the operation of emitter follower voltage regulator. **5B**
- With a block schematic, explain functional elements of a digital spectrum analyser. **5**C

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