Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

THIRD SEMESTER B.TECH (INSTRUMENTATION & CONTROL ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: ELECTRICAL & ELECTRONIC MEASUREMENTS [ICE 2102]

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A.	Derive the expressions for unknown inducatance, its series internal resistance, quality factor and power factor using Anderson's bridge. Also draw the phasor diagram under balance condition.	**5**
1B.	Two wattmeters are connected to measure power of a 440V, 3 phase balanced system gave readings of 5000W and 1000W. The latter reading being obtained after reversing the current coil connection of the wattmeter. Determine the total power and power factor of the system. Which type of load makes whole power to be read by the first wattmeter and also determine the load impedance for this case. Assume star connected load and frequency is 50 Hz.	**3**
1C.	With an example illustrate accuracy and sensitivity of any analog meter.	**2**
2A.	With neat block diagram and timing diagram explain the working of Sampling oscilloscope.	**5**
2B.	The four arms of an AC bridge network are as follows: Arm AB: a capacitor and series resistance representing loss in capacitor Arm BC: a non- inductive resistor of 1000 Ω. Arm CD: a non-inductive resistor of 100 Ω in parallel with a capacitor of 0.01 μF. Arm AD: a standard capacitor of 1000 pF. The AC supply is connected across terminals A,C and the supply frequency is 50 Hz. If the bridge is balanced with the above values, determine the components of the unknown impedance.	**3**
2C.	A voltmeter having a sensitivity of 1000Ω/V reads 100V on its 150V scale. This is connected across an unknown resistor. A milli ammeter is connected in series with the resistor reads 5mA. Calculate the %error in the measured value of the resistance.	**2**
3A.	Describe how Q factor of a coil is determined using a LCR meter	**3**
3B.	With the block diagram and timing diagram explain the working of dual slope Integrating type DVM. Mention its advantages over ramp type DVM.	**3**
3C.	With necessary equations explain the working of single phase induction type energy	**2**

meter.

3D.	With the help of neat circuit, explain the method of measurement of unknown frequency using Z modulation technique.	**2**
4A.	With neat figure explain the construction and working of LCD. List advantages and disadvantages of LCD and LED display.	**3**
4B.	With the help of necessary figures explain magnetic recording.	**3**
4C.	Describe the working of 3X5 dot matrix LED display. Mention its merits.	**2**
4D.	Illustrate how the time base and range changing work in DFM.	**2**
5A.	With neat diagram explain the working of OPAMP based regulated power supply, whose output voltage is greater than zener reference voltage and is also variable.	**4**
5B.	Explain the working of swept tuned radio frequency spectrum analyzer with a block schematic. How is it different from a CRO?	**4**
5C.	Explain the working of a 10:1 attenuator Probe.	**2**

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