Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

IV SEMESTER B.TECH (MECHATRONICS ENGINEERING)

END SEMESTER EXAMINATIONS, JULY 2016

SUBJECT: MEASUREMENTS AND INSTRUMENTATION [MTE 2204]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A. Explain how a capacitive sensor can be used as: **3**
a. Differential pressure sensor
b. Proximity sensor

1B. Explain with a neat diagram any one gauge that can be used for the measurement of vacuum pressure. **3**

1C. What is drift? Explain the different types of drifts with sketches of input-output relationships in each case. **4**

2A. Current was measured during a test as 30.4A, flowing in a resistor of 0.105Ω. It was discovered later that the ammeter reading was low by 1.2% and the marked resistance was high by 0.3%. Find the true power as a percentage of the power that was originally calculated. **2**

2B. Explain briefly the main operating forces involved in electromechanical indicating instruments? **3**

2C. Derive an equation to measure an unknown capacitance with the help of D'Sauty's bridge. What are the limitations of this bridge and how are they overcome using a modified form of De Sauty's bridge? **5**

3A. A moving coil instrument gives full scale deflection with 20mA. The resistance of the coil is 4Ω. **4**

a. Convert this instrument into an ammeter to read upto 2A specifying the required change in the construction.

b. Determine the required resistance for the given instrument to read 40V.

3B. Explain the Loss of Charge method for the measurement of high resistances with supporting equations. **6**

4A.	Explain how a resolver works to provide the coordinates corresponding to a particular position.	**3**
4B.	Industrial heavy machines like compressors and motors requires constant condition monitoring. An important aspect of condition monitoring is ‘vibration monitoring’. State and explain the working of a sensor that can be used for the purpose.	**2**
4C.	Describe the different types of surface texture and explain the direct instrument type of surface finish measurement.	**5**
5A.	What is aliasing? How can aliasing be prevented in a DAQ system?	**3**
5B.	Describe how a thermistor can be used as an indicator for liquid level.	**3**
5C.	Explain the phenomenon of vortex shedding and working of the flowmeter based on this phenomenon.	**4**