Paper Code: EC-403	**Roll No.**									

B.Tech.
(SEM IV) EVEN SEMESTER EXAMINATION, 2015-16
ELECTRONICS MEASUREMENTS & INSTRUMENTATION

[Time: 3 hrs.] **[Max. Marks: 100]**

Note- Attempt All Questions. All Questions carry equal marks.

1. Attempt any FOUR parts of the following:- **[5x4=20]**

   (a) Explain gross errors, systematic errors and random errors.

   (b) The accuracies of five precision resistors are checked by comparing each of them to a 1.000 Ω. Standard resistor. The measured resistances are as follows: R_1=1.001Ω, R_2=1.002Ω, R_3=0.999Ω, R_4=0.998Ω and R_5=1.000Ω. Calculate the average measured resistance and the average deviation.

   (c) An 820 Ω resistance known to be accurate to ±10% carries a 10 mA current. The current was measured on the 25 mA range of an analog ammeter that has an accuracy of ±2% of full scale. Calculate the power dissipated in the resistor and determine the accuracy of the result.

   (d) Draw a diagram to show the basic construction of PMMC instrument. Explain the instrument operation.

   (e) A galvanometer has a 1m light-beam pointer and a coil with N=400, l=d= 2 cm. the air gap flux density is B=200mT, and the control constant is K=0.03X10^{-6}Nm/degree. Calculate the displacement constant, coil current when the on-scale deflection is 100 mm, and the current sensitivity.

   (f) Define the terms :
   - *(i) Accuracy*
   - *(ii) Precision*
   - *(iii)Resolution*
   - *(iv) Threshold*
   - *(v) loading effect*

2. Attempt any FOUR parts of the following:- **[5x4=20]**

   (a) Explain the working of FET-input Voltmeter with neat diagram.

   (b) Draw circuit diagram and explain working offollowing AC electronic voltmeters
   - *(i) Precision Rectifier voltmeter*
   - *(ii) Low level voltmeter*

   (c) How High Voltage Probe and High Current Probe extend the ranges of measurement of multimeters. Explain with diagram.

   (d) What are various types of digital voltmeters? With a neat sketch explain the working principle of any one type of digital voltmeter.

   (e) Describe the construction and working principle of Digital Frequency Meter.

   (f) Discuss different types of Digital Multimeters.

3. Attempt any TWO parts of the following:- **[10x2=20]**

(a) Discuss briefly how Maxwell's Inductance Capacitance Bridge can be used for the measurement of unknown inductance, by providing all required derivations. Draw circuit configuration and Phasor diagram also.

(b) Discuss the circuit diagram and working of
(i) Wheatstone bridge
(ii) Q-Meter

(c) Write short note on:
(i) Schering Bridge
(ii) Any one type of low resistance measurement method

4. Attempt any TWO parts of the following:- **[10x2=20]**

(a) Draw the basic block diagram of an oscilloscope and explain the function of each block.

(b) What is the role of Time Base Generator? Discuss any one type of Time Base Generator with the help of proper diagram.

(c) Explain the working of Digital Storage Oscilloscope with the help of block diagram. Mention the advantages.

5. Attempt any TWO parts of the following:- **[10x2=20]**

(a) Sketch circuits to show how dc voltmeters and ammeters should be calibrated using standard instruments. Explain the calibration procedure.

(b) Sketch circuits to show how dc potentiometer should be used for calibrating dc ammeters. Briefly explain.

(c) Sketch the mechanical system of a potentiometric X-Y recorder. Explain its operation.