PAPER CODE- 54010

University Institute of Engineering & Technology

(Recognised Under Section 2(f) and 12B of UGC)

Kurukshetra University, Kurukshetra

Roll No. -

THEORY EXAMINATION –	
B.TECH -	SEMESTER - IV

TIME – 3 Hrs.

M.M. - 75

COURSE NO. – ECE-204	COURSE TITLE - Electronic Measurement and Instruments

Note: All questions in Part-A and Part-B are compulsory. Attempt any four questions from Part-C selecting at least one from each unit.

PART-A (15 Marks)

Q. No. – 1 Answer the following questions. **15x1=15**

(i)	A Zero to 300V voltmeter has a guaranteed accuracy of 1% full scale reading. The voltage measured by the instrument is 83 V. Calculate the percent limiting error.
(ii)	Define Absolute Error.
(iii)	A Wheatstone bridge requires a change of 6 ohms in the unknown arm of the bridge to produce a change in deflection of 3 mm of the galvanometer. Calculate the sensitivity of the instrument.
(iv)	Which method is used to measure Medium Resistance?
(v)	Name the bridge used to measure dielectric loss of capacitance.
(vi)	A metal strain gauge has a gauge factor of two. Its normal resistance is 120Ω. If it undergoes a strain of 10^{-5}, then what will be the value of change of resistance in response to the strain?
(vii)	Define the X-Y recorder?
(viii)	A CRO screen has ten divisions on the horizontal scale. If a voltage signal $5\sin(314t+45^{o})$ is examined with a line base setting of 5msec/div, the number of cycles of signal displayed on the screen will be?
(ix)	An op-amp has open-loop gain 100000 and the open-loop upper cut-off frequency is 20Hz. The unity- gain frequency of the op-amp is?
(x)	In a Q-meter, an inductor tunes to 2MHz with 450 pF and to 4MHz with 90 pF. The distributed capacitance f the inductor is?
(xi)	Name the various digital indicating instruments?
(xii)	A Digital Voltmeter has a read-out range from 0 to 9999 counts. When full scale reading is 9.999V, the resolution of the full scale reading is?

(xiii)	Digital measuring instruments use the following three types of A to D converters: 1. Dual Slope Type 2. Counter Type 3. Flash Type Write the correct sequence for these converters in decreasing order of their speed (fastest to slowest).
(xiv)	What is the aperture time of an A to D converter?
(xv)	Explain basic principle of resistance thermometer.

PART-B (20 Marks)

	UNIT-I	
2	Explain how will you measure insulation resistance using 3-wire DC live main.	**5**
	UNIT-II	
3	What are the main features to be considered for making choice of a particular Galvanometer.	**5**
	UNIT-III	
4	Discuss the principal of operation of Wave Analyzer.	**5**
	UNIT-IV	
5	Write brief note on spatial encoders.	**5**

PART-C (40 Marks)

	UNIT-I	
6	Discuss the role of functional elements of a measuring instrument. Explain the features of an instrument. Also explain the errors encountered in measurements.	**10**
7	Explain with the help of a connection diagram. How you would determine the value of low resistance shunt by Kelvin's Double Arm bridge method? What are the important precautions that are to be taken in such an experiment?	**10**
	UNIT-II	
8	Describe how Sharing bridge can be used for measurement of an unknown capacitance and its loss angle? Derive the conditions for balance and draw the phasor diagram of the bridge circuit under conditions of balance.	**10**
9	Discuss the working of the following:- a) Magnetic Tape Recorder b) Cathode Ray Tube.	**10**

	UNIT-III	
10	Draw a practical Q-meter circuit and discuss the various controls involved in Q-meter Measurements.	**10**
11	Explain the principal of frequency measurement using digital techniques.	**10**
	UNIT-IV	
12	Explain the difference between a transducer and a sensor. Discuss the classification of transducers. Explain semiconductor strain gauge and its applications.	**10**
13	Mention the various D/A and A/D converters. Explain the 4 bit A/D (Succesive Approximation) converter.	**10**