Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B. Tech.

Branch	**: ECE**	**Semester**	**: IV**
Title of the Course	**: Electronics Measurement and Instrumentation**	**Course Code**	**: ECB 254**

Time: 3 Hours **Maximum Marks: 50**

Note : Attempt all questions from Section-A, any four questions from Section-B and any two questions from Section-C.

SECTION- A [10 X 1 = 10 MARKS]

A.1 Define precision of the instrument with example.

A.2 What is drift in instrument measurement system?

A.3 A Wheatstone bridge requires a change of 8 ohm in the unknown arm of the bridge to produce a change in deflection of 4 mm of the galvanometer. Determine the sensitivity and deflection factor.

A.4 What is dynamic range of any instrument?
If a voltmeter can read minimum 2V and maximum 18V with resolution of 1mV, then find the dynamic range of the instrument.

A.5 What are the factors to be considered while selecting the transducer?

A.6 A resistance wire strain gauge uses a soft iron wire of small diameter. The gauge factor is 4.24. Neglecting the piezoresistive effects, calculate Poisson's ratio.

A.7 What are the major physiological sub-systems?

A.8 Define the deflection sensitivity of the CRT.

A.9 Discuss about the principle of working of RVDT.

A.10 Figure A.10 shows the Lissajous patterns for case where voltages of same frequency out of different phase are connected to Y and X plates of the oscilloscope. Find the phase difference in each case.

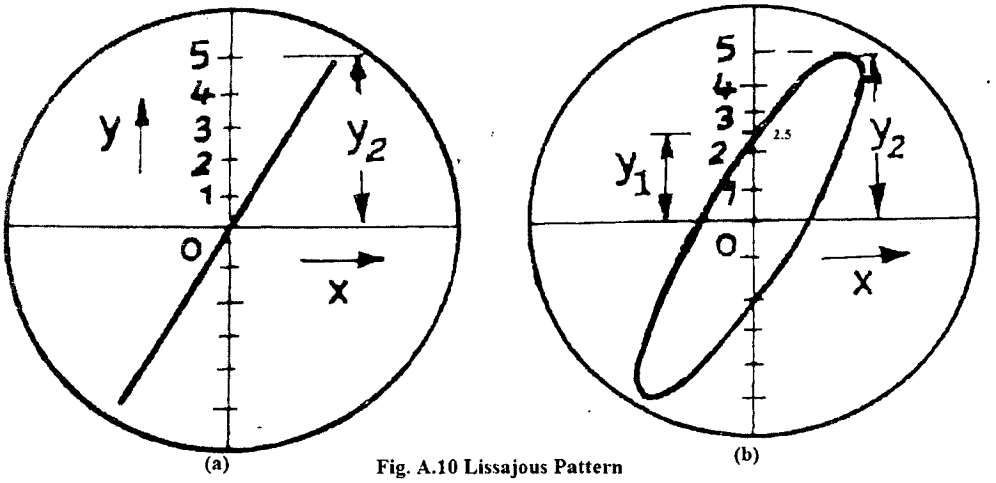

Fig. A.10 Lissajous Pattern

SECTION- B [4 X 5 = 20 MARKS]

B.1 Discuss about the Basic components of Biomedical Instrumentation (man instrumentation system) with block diagram.

B.2 Write down the different types of transducers used in Bio-medical with principle of operation and application.

B.3 Discuss about the measurement of phase and frequency using Lissajous pattern with suitable diagram.

B.4 What are the different types of static errors in measurement system? Explain.

B.5 What is Load Cell? Explain with suitable diagram. Explain, how a compressive force can be measure with the help of load cells and strain gauges?

SECTION- C [2 X 10 = 20 MARKS]

C.1 What is ECG? Sketch the basic waveform of normal electrocardiogram and write down normal values for amplitudes and durations of important parameters. Explain the principle part of ECG recorder with suitable Diagram.

C.2 Explain the basic principle of operation of Digital Storage Oscilloscopes with suitable block diagram. Discuss about the effect of low sampling frequency with signal waveforms. Also discuss about the waveform reconstruction in Digital Storage Oscilloscopes.

C.3 What are the Thermistors? Explain their different forms of construction. Draw and explain the resistance-temperature charecteristics of Thermistor. Describe their applications.