Code: DE11 **Subject: ELECTRONIC INSTRUMENTATION & MEASUREMENTS**
Time: 3 Hours **Max. Marks: 100**

JUNE 2011

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 Minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: **(2×10)**

a. Systematic errors are

(A) Instrumental errors. **(B)** Environmental errors.
(C) Random errors **(D)** Both **(A)** & **(B)**

b. The wheat stone bridge method of resistance measurement is ideally suitable for the measurement of resistance values in the range of

(A) 0.001 Ω to 1 Ω **(B)** 0.1 Ω to 100 Ω
(C) 100 Ω to 10 k Ω **(D)** 100 kΩ to 10 M Ω

c. In a CRO the quantity to be measured is applied across

(A) Focussing electrodes **(B)** Cathode
(C) Y –plates **(D)** X-plates

d. The Lissajous pattern with equal voltages of equal frequency and phase shift by 90° is

(A) Straight line **(B)** Circle
(C) Ellipse. **(D)** Dot

e. DAC

(A) Stands for digital to analog converter.
(B) Referred to an encoding device
(C) Is considered as a decoding device
(D) Both **(A)** & **(C)**

f. The bridges suitable for the measurement of an unknown inductance in terms of a capacitance would include

(A) Maxwell and Hay **(B)** Maxwell and Schering
(C) Hay and Schering **(D)** Maxwell, Hay and Schering.

g. Hysteresis in an measuring instrument means

(A) The change in the same reading when input is first increased and then reduced.
(B) The reliability of the instrument.
(C) The repeatability of the instrument.
(D) The inaccuracy due to change in temperature.

h. The frequency meter that can be used for measurement of radio frequency is

(A) Weston. **(B)** Electrical resonance
(C) Heterodyne **(D)** Vibrating reed.

i. Which of the following can be measured with the help of piezoelectric crystal?

(A) Force **(B)** Temperature
(C) Acceleration **(D)** All the these

j. The strain gauge factor G is given by

(A) $G = \frac{\Delta R / R}{\Delta l / l}$ **(B)** $G = \frac{\Delta l / l}{\Delta R / R}$

(C) $G = \frac{\Delta R / R}{\Delta D / D}$ **(D)** None of the above

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Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Explain Gross Errors and Systematic Errors. **(8)**

b. Distinguish between Primary sensors and transducers. **(8)**

Q.3 a. Explain the basic block diagram of a microprocessor based ramp type digital voltmeter. **(8)**

b. How does Hay's bridge differ from Maxwell Bridge? Also derive the condition for calculating the unknown resistance and inductance. **(8)**

Q.4 a. Explain the function of delay line used in a CRO. **(8)**

b. Distinguish between passive and active probes of CRO. **(8)**

Q.5 a. Explain the working of a sweep generator with a suitable block diagram. **(8)**

b. Draw the block diagram of a signal generator and explain its working. **(8)**

Q.6 a. Explain any one method for the measurement of sensitivity and selectivity of a receiver. **(8)**

b. Explain working of Harmonic Distortion Analyser using bridged T- network. **(8)**

Q.7 a. Draw the circuit of an R-2R type of D/A converter and explain its operation. **(8)**

b. For a 5 bit resistive divider, determine the following:
(i) The weights assigned to the LSB
(ii) The weights assigned to the 2^{nd} and 3^{rd} LSB.
(iii) The change in output voltage due to change in the LSB, 2^{nd} LSB and 3^{rd} LSB.
(iv) The output voltage for a digital input of 11011 and 10110. (Assuming 0=0V and 1 =+10V) **(8)**

Q.8 a. Describe the working of Hall effect displacement transducers. **(8)**

b. Explain working principle of Piezoelectric transducers and photoelectric transducer **(8)**

Q.9 Write short notes on any **TWO** of the following:

(i) Measurement of flux by induced emf method.
(ii) Bolometer method of power measurement.
(iii) Digital frequency counter. **(2×8)**