ROLL NO. _____

Code: DE59 Subject: ELECTRONIC INSTRUMENTATION & MEASUREMENT

DipIETE – ET

Time: 3 Hours **JUNE 2013** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

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. A null type of instrument as compared to a deflection type instrument has ____

(A) a higher accuracy **(B)** a lower sensitivity
(C) a faster response **(D)** all of these

b. An 0-10 A ammeter has a guaranteed accuracy of 1% of full scale deflection. The limiting error while reading 2.5 A is _____

(A) 1% **(B)** 2%
(C) 4% **(D)** None of these

c. A wheatstone bridge cannot be used for precision measurement because the errors are introduced into an account of _____

(A) resistance of connecting leads **(B)** thermo-electric emfs
(C) contact resistance **(D)** all of these

d. Total Harmonic Distortion is

(A) $\frac{E_H}{E_T}$ **(B)** $\frac{E_H}{E_T}\times 100$

(C) $\frac{E_T}{E_H}\times 100$ **(D)** None of these

e. In circuits of RF Voltmeter _____

(A) vacuum tube diodes are used
(B) conventional P-N Jn diodes are used
(C) point contact type diodes are use
(D) all of these

f. In a CRT, the focusing anode is located _____

(A) between preaccelerating and accelerating anodes
(B) after accelerating anode
(C) before pre-accelerating anode
(D) none of these

g. The effective resistance of a coil at high frequencies is more than its dc resistance on account of _____

(A) skin effects **(B)** proximity effects
(C) eddy current losses **(D)** all of these

h. Digital instruments have input impedance of the order of _____

(A) Ohm **(B)** Kilo ohm
(C) Mega ohm **(D)** Milli ohm

i. Dummy strain gauges are used for_____

(A) compensation of temperature changes
(B) compensating for different expansion
(C) calibration of strain gauges
(D) all of these

j. X-Y recorder is used to record _____

(A) regulation curve of power supply
(B) magnitude of low frequency signals
(C) B-H curve
(D) all of these

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

Q.2 a. Draw block diagram of generalized measurement system and discuss the function of its components. **(8)**

b. Three resistors have the following ratings:
$R_1 = 37\Omega \pm 5\%$, $R_2 = 75\Omega \pm 5\%$, $R_3 = 50\Omega \pm 5\%$.
Determine the magnitude and limiting error in ohm and in percent of resistance of these resistance connected in series. **(8)**

Q.3 a. Write special features of High Voltage Schering Bridge. **(8)**

b. Derive an expression for the sensitivity of Wheatstone bridge. **(8)**

Q.4 Discuss the working & applications of the following: **(8+8)**

(i) Multirange Ammeters
(ii) Digital Multimeters

Q.5 a. Write applications of the following: **(8)**

(i) Dual slope Integrating type DVM
(ii) Digital Capacitance meter
(iii) Phase meter
(iv) Continuous Balanced DVM

b. Discuss working principles of the following with the help of suitable diagrams: **(8)**

(i) Digital Tachometer
(ii) Digital pH meter

Q.6 a. Explain the working principle of square & pulse wave generator with the help of a block diagram. Mention its applications. **(8)**

b. Draw the block diagram of CRO & discuss the functions of the following: **(8)**

(i) CRT
(ii) Vertical amplifier

Q.7 Discuss features & applications of the following: **(4×4)**

(i) Heterodyne wave analyzers
(ii) Spectrum analyzer
(iii) Bolometer method of power measurement
(iv) Measurement of RF power

Q.8 a. Explain the requirements and selection of Recorders. **(8)**

b. Discuss features and working principle of the X-Y recorder. What are its applications? **(8)**

Q.9 Write short notes on the following: **(4×4)**

(i) Electrical transducers
(ii) Flow measurement transducers
(iii) LVDT
(iv) Thermistor