

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