

AMIETE – ET (Current & New Scheme)

Time: 3 Hours

June 2019

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. The smallest change in a measured variable to which an instrument will respond is
(A) accuracy (B) resolution
(C) sensitivity (D) precision
- b. The difference between the indicated value and the true value of a quantity is
(A) gross error (B) absolute error
(C) relative error (D) dynamic error
- c. Which one of the following bridges will be used for the measurement of very low resistance?
(A) Kelvin bridge (B) Maxwell's bridge
(C) Wheatstone bridge (D) Hay's bridge
- d. Measurement of flow, thermal conductivity and liquid level using thermistors make use of
(A) resistance decrease with temperature
(B) resistance increase with temperature
(C) Change of resistivity
(D) self-heating phenomenon
- e. The purpose of providing acquadag in CRT is to
(A) increase fluorescene (B) increase phosphorescene.
(C) protect burning of screen (D) remove electrostatic charge accumulation
- f. Which of the following instruments are useful in measuring the signal levels of individual harmonics in an unknown waveform?
i) Distortion analyser
ii) Wave analyser
iii) Spectrum analyser
(A) i and ii (B) ii and iii
(C) i and iii (D) i, ii and iii

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- g. Galvanometer type recorders use
(A) vibration galvanometer (B) ballistic galvanometer
(C) D'Arsonval galvanometer (D) tangent galvanometer
- h. A DVM measures
(A) peak value (B) rms value
(C) peak-to-peak value (D) average value
- i. In an LVDT, there are two secondary coils which are connected for a single output. Which one of the following is correct?
(A) The coils are in series and in phase opposition.
(B) The coils are in parallel and in phase opposition.
(C) The coils are in series and in the same phase.
(D) The coils are in parallel and in the same phase.
- j. Data acquisition systems are usually of
(A) analog type (B) integrating type
(C) hybrid type (D) digital type

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

- Q.2** a. Differentiate between deflection type and null type of instruments by giving suitable examples. Discuss about their accuracy and sensitivity. (4)
- b. Distinguish between the following with suitable examples (6)
(i) accuracy and precision (ii) reliability and repeatability
(iii) static error and relative error
- c. Define the following in respect of Second Order System. (6)
(i) Overdamped system (ii) Critically damped system
(iii) Underdamped system
- Q.3** a. List the factors that may lead to inaccuracies in measurement by AC bridges. (4)
- b. Draw the circuit diagram of a bridge used for the measurement of low inductance and derive its null condition. (4)
- c. Draw the circuit diagram of low voltage Schering bridge and derive the equation of balance. What are the modifications required for it to be used at high voltages. (8)
- Q.4** a. Explain the working of dc voltmeter with direct coupled amplifier. (8)
- b. Explain the construction and principle of operation of a thermocouple type true rms AC ammeter. (8)

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- Q.5** a. Explain the working of integrating type DVM for the measurement of current and resistance. (8)
- b. Explain the principle of operation of a digital frequency meter with the help of functional block diagram. (8)
- Q.6** a. How the phase of an unknown signal can be determined from the Lissajous patterns appearing on the screen of a CRO? Explain. (4)
- b. Differentiate between the following (6)
- (i) Signal generator and an ordinary oscillator.
- (ii) Square wave and pulse generators.
- c. Explain the principle of electrostatic focussing in a CRO. (6)
- Q.7** a. What is total harmonic distortion? How many types of harmonic analysers are there? Explain the concept of tuned circuit harmonic analyser. (8)
- b. Explain the circuit for the measurement of power at radio frequencies. (8)
- Q.8** a. Explain the role of recorders in measurement system. (4)
- b. Explain the working of X-Y recorder with suitable diagram. (6)
- c. Describe the working principle of a digital tape recorder. Mention its applications. (6)
- Q.9** a. Give classification of transducers. (4)
- b. What is the basic principle of strain gauge based measurements? What are the different types of strain gauges? List the applications of strain gauges. (6)
- c. Explain objective of data acquisition system. (6)