

AMIETE – ET (Current & New Scheme)

Time: 3 Hours

June 2018

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)

- In a CRO which of the following is not a part of electron gun
(A) cathode (B) grid
(C) accelerating anode (D) X - Y plates
- In a strain measuring device using a strain gauge, the output quantity is
(A) voltage (B) resistance
(C) impedance (D) Either (A) or (B)
- Kelvin's double bridge is used to measure low resistances because
(A) it has high sensitivity
(B) there is no thermoelectric emf
(C) resistance variation due to temperature
(D) effect of contact and lead resistances is eliminated
- LVDT is a
(A) pressure transducer (B) displacement transducer
(C) velocity transducer (D) acceleration transducer
- Which of the following is not correct?
(A) Voltmeter should have a very high resistance
(B) An ammeter should have a very low resistance
(C) A shunt should have a very low resistance
(D) An electronic voltmeter draws appreciable current from source
- Accuracy of a measuring instrument indicates the
(A) Closeness of the output reading to the true value
(B) Ratio of output value to the input value
(C) Change in output with each change in input
(D) Degree of freedom from random errors
- In an Anderson bridge, the unknown inductance is measured in terms of
(A) known inductance and resistance
(B) known capacitance and resistance
(C) known resistance
(D) known inductance

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- h. The material used to coat inside the face of CRT is
 (A) Silicon (B) Carbon
 (C) Phosphorous (D) Sulphur
- i. In strip chart recorders, the self balancing potentiometers plot emf as a function of
 (A) Another emf (B) Frequency
 (C) Time (D) Pressure
- j. A thermo-couple instrument can be used for the measurement of
 (A) Direct current only
 (B) Alternating current only
 (C) Both direct current and alternating current
 (D) dc/ac voltage only

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

- Q.2** a. Draw and explain the block diagram of a function generator. (8)
 b. Write short notes on X-Y recorders. (8)
- Q.3** a. Explain the principle of operation of a CRO. (8)
 b. Discuss in detail the Bolometer method of power measurement? (8)
- Q.4** Explain a digital multimeter in detail. (16)
- Q.5** a. How to measure inductance using an Anderson Bridge? Discuss in detail. (8)
 b. A Maxwell inductance bridge uses a standard capacitor of $C_3 = 0.1\mu\text{F}$ and operates at a supply frequency of 100Hz. Balance is achieved when $R_1=1.26\text{ k}\Omega$, $R_3=470\ \Omega$ and $R_4=500\ \Omega$. Calculate the inductance and resistance of the measured inductor and determine its Q factor. (8)
- Q.6** a. The resistance of a circuit is found by measuring current flowing and the power fed into the circuit. Find the limiting error in the measurement of resistance when the limiting errors in the measurement of power and current are $\pm 1.5\%$ and $\pm 0.5\%$. (8)
 b. Explain the working of a digital frequency meter with the help of a block diagram. (8)
- Q.7** Explain the different stages in which the signal has to undergo during the process of Data Acquisition. (16)
- Q.8** a. What are the techniques used for reducing measurement errors. (8)
 b. Explain with the help of a neat diagram the working of dual slope integrated type DVM and derive the equation for calculating V_{in} . (8)
- Q.9** a. Explain Heterodyne Wave Analyzer. (8)
 b. What are the advantages of Magnetic tape recorders? (8)