

DipLETE – ET

Time: 3 Hours

DECEMBER 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. Horizontally mounted moving iron instruments use
- (A) Eddy current damping (B) Electromagnetic damping
(C) Fluid friction damping (D) Air friction damping
- b. In measurement system, which of the following are undesirable static characteristics?
- (A) Sensitivity and accuracy
(B) Drift, static error and dead zone
(C) Non linearity
(D) Drift, static error, dead zone and non-linearity
- c. The units whose sizes cannot be chosen independently are called.
- (A) Derived units (B) Fundamental units
(C) Absolute units (D) None of these
- d. High resistances are provided with a guard terminal. This guard terminal is used to
- (A) bypass the leakage current
(B) guard the resistance against stray electrostatic fields
(C) guard the resistance against overloads
(D) none of these
- e. Maxwell's inductance-capacitance bridge is used for measurement of inductance of
- (A) low Q coils. (B) medium Q coils.
(C) high Q coils. (D) all of these

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- f. In electronic ohmmeter, an op-amp is used as a
- (A) Summer (B) Multiplier
(C) Buffer Amplifier (D) Integrator
- g. Triangular wave shape is obtained
- (A) by integrating the square wave (B) by differentiating the square wave
(C) by differentiating a sine wave (D) by integrating a cosine wave
- h. A strip chart recorder is
- (A) An active transducer (B) An inverse transducer
(C) An output transducer (D) Both (B) & (C)
- i. A resistance potentiometer is a
- (A) First order instrument (B) Zero order instrument
(C) Second order instrument (D) None of these
- j. A metal wire bolometer is referred to as
- (A) Thermistor (B) Barreter
(C) Resistance (D) Thermocouples

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

- Q.2** a. Discuss Limiting errors and relative limiting errors. (8)
- b. A voltage has a true value of 1.50V. An analog indicating instrument with a scale range of 2.50V shows a voltage of 1.46 V.
- (i) What are the values of absolute error and correction?
(ii) What is the error as a function of the true value and as a % of full scale deflection? (8)
- Q.3** a. What are the various methods used to measure medium resistance? Explain anyone method in brief. (8)
- b. Explain working of Anderson's bridge with the help of phasor diagram. Also derive the relation for self inductance of a coil. (8)
- Q.4** a. What are the general requirements of a shunt? (4)
- b. A 100 μ A meter movement with an internal resistance of 500 Ω is to be used in a 0-100 mA Ammeter. Find the value of the required shunt. (4)

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- c. Explain working of AC voltmeter using rectifiers. (8)
- Q.5** a. Discuss the working principle and applications of the following: (12)
(i) Universal counter
(ii) Voltage to frequency conversion using integrating type DVM.
- b. Write the working principle and applications of Q meter. (4)
- Q.6** Explain the working of the following using block diagram. (16)
(i) VHF sampling oscilloscope
(ii) Standard Signal Generator
- Q.7** a. Draw the block diagram of Spectrum Analyser and explain its working. (8)
- b. Explain in brief Self Balancing Bolometer Bridge with the help of a diagram. (8)
- Q.8** Discuss working principle of the following and write their applications.
(i) Magnetic Recorders (8)
(ii) Galvanometer type Recorder (8)
- Q.9** a. Write applications of the following (8)
(i) Differential output transducer
(ii) Capacitive transducer
(iii) Strain Gauges
(iv) Resistive transducers
- b. Explain single channel Data Acquisition System (DAS) in brief. (8)