

DipIETE – ET (NEW SCHEME)

Time: 3 Hours

JUNE 2012

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 the above
- b. In measurement system, which of the following are undesirable static characteristics?
- (A) Drift (B) sensitivity
(C) reproducibility (D) drift and static error
- c. Which instrument has the highest frequency range with accuracy?
- (A) Moving iron (B) Electrodynamometer
(C) Thermocouple (D) Rectifier
- d. Wheatstone bridge cannot be used for precision measurements because errors are introduced into on account of
- (A) resistance of connecting leads (B) contact resistance
(C) thermo-electric emfs (D) all of the above.
- e. Maxwell's inductance-capacitance bridge is used for measurement of inductance of
- (A) low Q coils. (B) high Q coils.
(C) medium Q coils. (D) Both (A) and (C).

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- f. A vertical amplifier for a CRO can be designed for
- (A) only a high gain. (B) only a broad bandwidth.
(C) a constant gain times bandwidth product. (D) none of the above
- g. Which is not a component of heterodyne wave analyser
- (A) Oscillator. (B) Attenuator
(C) Active filter. (D) Rectifier.
- h. Thermocouples are
- (A) Passive transducers (B) Active transducers.
(C) Output transducers. (D) None of the above.
- i. X-Y recorder is an instrument which gives graphic record of the relationship between
- (A) one quantity & time (B) two variables.
(C) two quantities & time. (D) all of the above.
- j. Which is not a component of Analog Data-Acquisition system?
- (A) Amplifiers (B) Transducers.
(C) Analog recorders. (D) High speed cameras.

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

- Q.2** a. Discuss the following in brief
- (i) advantages of electronic instruments
(ii) characteristics of instruments (5×2)
- b. A 0-150 V voltmeter has a guaranteed accuracy of 1% of full scale reading. The voltage measured by this instrument is 75 volt. Calculate the limiting error in %.
- (6)
- Q.3** a. Write the name of various methods used to measure medium resistance. Discuss Wheatstone bridge method. (8)
- b. Find expressions for unknown resistance and inductance in Anderson's bridge. Write its advantages. (8)
- Q.4** a. Discuss working principle of the following: (i) Multimeter (ii) Digital multimeters. (10)

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- b. Design a multirange dc milliammeter using a basic movement with an internal resistance $R_m=50\Omega$ and full scale deflection current $I_m=1\text{mA}$. The range required are 0-10 mA and 0-500 mA. (6)
- Q.5** a. Draw and explain the block diagram of integrating type DVM (voltage to frequency conversion) (8)
- b. Draw circuit diagram of Q meter. Write its working and applications. (8)
- Q.6** a. Explain the CRT features. (8)
- b. Discuss function of storage and sampling in oscilloscope. How it is different from an ordinary CRO. (8)
- Q.7** a. Draw block diagram and write applications as well as limitations of the following:
(i) Heterodyne wave analyzer
(ii) Harmonic distortion analyzer. (10)
- b. Compare performance of unbalanced and self balancing Bolometer bridge circuits. (6)
- Q.8** a. Explain the following:
(i) requirement of data recording
(ii) selection of recorder for specified application. (8)
- b. Write advantages of magnetic tape recorders and discuss its basic components. (8)
- Q.9** a. Discuss working principle and applications of the following:
(i) Load cell
(ii) Capacitive transducer (Pressure) (10)
- b. Compare single and multi channel data acquisition system. (6)

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