

AMIETE – ET (OLD 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. Three resistances have the following ratings $R_1 = (150 \pm 5\%) \Omega$, $R_2 = (100 \pm 5\%) \Omega$ and $R_3 = (200 \pm 5\%) \Omega$ when all three are connected in series the percentage error is

- (A) $\pm \frac{5}{3}\%$ (B) $\pm 5\%$
 (C) 15% (D) +5%

- b. A measure of reproducibility of measurements is known as

- (A) Accuracy (B) Fidelity
 (C) Precision (D) Resolution

- c. The principle of operation of Q-meter is based on

- (A) self inductance (B) mutual inductance
 (C) series resonance (D) parallel resonance

- d. The time base signal in a CRO is

- (A) Rectangular wave form
 (B) High frequency sinusoidal wave form
 (C) Square wave form
 (D) High frequency sawtooth wave form

- e. Hall effect pick up is used to measure

- (A) magnetic flux
 (B) current in metals
 (C) electron density in semi conductors
 (D) all of above

Code: AE12

Subject: INSTRUMENTATION AND MEASUREMENT

- f. Which of the following is the fastest A/D converter?
- (A) Comparator type (B) Counter type
(C) Dual slope (D) Successive approximation
- g. A thermal RF meter reads 84 mW when 15 dB of attenuation is used, the applied power is
- (A) 2.7 W (B) 3.4 W
(C) 8 W (D) 84 mW
- h. Error which is not related to frequency counters
- (A) Gating error (B) Creeping error
(C) Time base error (D) Trigger level error
- i. Which of the following is not a part of harmonic analyzer?
- (A) Mixer (B) Oscillator
(C) Active Filter (D) D/A converter
- j. Tachometer is
- (A) Angular velocity transducer (B) linear velocity transducer
(C) both (A) & (B) (D) None of the above

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

- Q.2** a. Define various static performance characteristics related to measurement system. (8)
- b. Write the need of calibration and explain process of calibration. (8)
- Q.3** a. Compare features of digital and analog voltmeters based on advantages and applications. (8)
- b. Consider the wheatstone bridge as shown in Fig.1. Calculate the deflection of a galvanometer caused by the $5\ \Omega$ unbalanced in arm BC, if galvanometer sensitivity is $10\text{mm}/\mu\text{A}$ and resistance is $100\ \Omega$. (8)

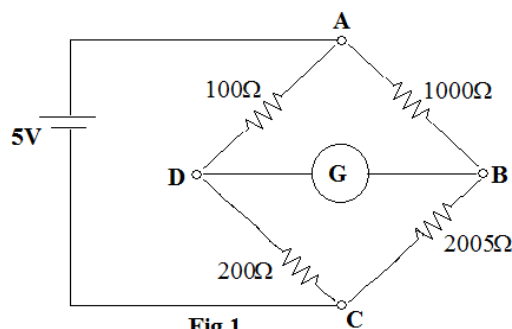


Fig.1

Code: AE12**Subject: INSTRUMENTATION AND MEASUREMENT**

- Q.4** a. Discuss principle of sustained oscillations and draw circuit diagram of sine wave generator. (8)
- b. Discuss 'gating error' in frequency counter and explain why sometimes it is preferable to measure frequency by period measurement. (8)
- Q.5** a. Discuss the following:
(i) Deflection sensitivity in CRO.
(ii) Delay line. (8)
- b. Write applications of the following:
(i) CRO
(ii) Spectrum Analyser. (8)
- Q.6** a. What is hysteresis loop? How it is obtained by DC and AC methods? (8)
- b. Discuss working of Thermocouple RF Ammeter, voltmeter method to determine RF power. (8)
- Q.7** a. Explain the Quieting method to measure sensitivity of communication receivers. (8)
- b. Discuss the method of measurement of RF power using bolometer. (8)
- Q.8** a. Explain working principle and write applications of the following:
(i) Strain gauge
(ii) Piezoelectric transducer (8)
- b. Explain working principle of LVDT. Write its applications. (8)
- Q.9** a. What is data acquisition system? Compare analog and digital data acquisition system. (8)
- b. Draw circuit diagram of successive approximation A/D converter and discuss its working. (8)