

Code: D-11 Subject: ELECTRONIC INSTRUMENTATION & MEASUREMENTS**Time: 3 Hours****December 2005****Max. Marks: 100****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.**
 - **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.**
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Q.1 Choose the correct or best alternative in the following: (2x10)

a. A set of readings has wide range and therefore it has:

- (A) Low precision (B) High precision
(C) Low accuracy (D) High accuracy

b. Thermocouple instruments can be used for a frequency range:

- (A) up to 100 Hz (B) up to 5000 Hz
(C) up to 1 Hz (D) 50 MHz and above

c. Electrostatic type instruments are primarily used as :

- (A) Ammeter (B) Watt meter
(C) Voltmeter (D) Ohmmeter

d. Frequency can be measured by using:

- (A) Maxwell's bridge (B) Schering's bridge
(C) Hay's bridge (D) Wien's bridge

e. An aquadag is used in a CRO to collect:

- (A) Primary electrons (B) Secondary emission electrons
(C) Both primary and secondary emission electrons (D) None of the above

f. The Q factor of a coil at the resonant frequency of an RLC series circuit is 150. The bandwidth is :

- (A) 225 MHz (B) 1.06 MHz
(C) 10 KHz (D) None of the above

- g. Piezo electric transducers are:
- (A) Passive transducers (B) Active transducers.
 (C) Inverse transducers. (D) (B) and (C).
- h. If a transducer has an output impedance of $1\text{K}\Omega$ and a load resistance of $1\text{K}\Omega$, it behaves as :
- (A) a constant current source (B) a constant voltage source
 (C) a constant impedance. (D) none of the above
- i. For a radio receiver, its sensitivity indicates:
- (A) a response which is spurious
 (B) the ability to reject an unwanted signal
 (C) the measure of noise produced
 (D) the receiver's ability to pick up weak signal
- j. An 8 bit converter is used for a d.c. range of 0-10 V. Find the weight of LSB
- (A) 39 mV (B) 78 mV
 (C) 39.2 mV (D) None of the above

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

- Q.2** a. Explain the following terms
- (i) Accuracy (ii) Precision
 (iii) Hysteresis (iv) Dead band (8)
- b. What are different types of errors in measurement? Explain each briefly. (8)
- Q.3** a. State the advantages and disadvantages of thermoelectric instruments. (8)
- b. Explain how Wien's bridge can be used for experimental determination of frequency. Derive the expression for frequency in terms of bridge parameters. (8)
- Q.4** a. What is a function generator? Explain its working with the help of a block diagram. (8)
- b. Discuss different types of oscilloscope probes. (8)
- Q.5** a. Describe principle of working of digital oscilloscope using a block diagram. (8)

b. A Lissajous pattern on an oscilloscope is stationary and has 5 horizontal tangencies and two vertical tangencies. The frequency of horizontal input is 1000Hz. Determine the frequency of the vertical input. **(8)**

Q.6 a. Explain the principle of period and time interval measurement. **(8)**

b. Describe reciprocating or period measurement method used in low frequency measurement. **(8)**

Q.7 a. Explain measurement of Flux Density by induced EMF. **(8)**

b. Explain how power can be measured at high frequency using the Bolometer method. **(8)**

Q.8 a. Explain the following terms used for Arm receivers:

(i) Sensitivity.

(ii) Selectivity.

(iii) Dynamic range.

(iv) Noise range. **(8)**

b. Describe the principle of working of a Hall Effect transducer. Give its applications. **(8)**

Q.9 a. Draw the block diagram of a Data Acquisition system and explain its working. **(8)**

b. Explain analog and digital multiplexing used in data acquisition systems. **(8)**