ROLL NO. _____

Code: DE59 Subject: ELECT. INSTRUMENTATION & MEASUREMENT

DipIETE – ET

Time: 3 Hours **JUNE 2014** **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. Resolution of an indicating instrument is _____

(A) the smallest change in the output reading due to drifting of pointer
(B) the smallest change in applied stimulus which will indicate a detectable change in deflection
(C) the difference between various readings for the same applied stimulus
(D) none of these

b. Threshold of sensitivity with respect to measuring instrument is _____

(A) the maximum signal which can be measured
(B) the value of sensitivity on the highest scale
(C) the value of sensitivity on the lowest scale
(D) the smallest signal which results in a detectable output

c. The main function of LVDT is _____

(A) converts linear motion into electrical signal
(B) translates electrical signal into linear motion
(C) helps in measuring temperature
(D) can be used to sense angular displacement

d. A CRO helps in measuring the value(s) of an ac voltage in _____

(A) R.M.S. value **(B)** peak value
(C) average value **(D)** All of these

e. An Anderson's Bridge _____

(A) requires a standard inductor in terms of which the loss angle of the capacitor is expressed
(B) is applicable for precise measurement of capacitances
(C) is applicable for precise measurement of self-inductance over a wide range of values
(D) requires a standard resistors in terms of which the self inductance is expressed

f. The function of zero-adjust control in a multimeter is to _____

(A) conduct the current
(B) change the sensitivity of the meter
(C) to correct the zero point
(D) to tighten up the moving parts to the casing

g. A DVM measures _____

(A) peak value **(B)** R.M.S. value
(C) peak to peak value **(D)** average value

h. Accuracy of a digital voltmeter is specified as _____

(A) percentage of the actual reading
(B) percentage of the full scale reading
(C) number of least significant digits
(D) all of these

i. Transducer is a device which _____

(A) converts one form of power into another
(B) converts one form of energy into another
(C) helps in measuring electrical signal
(D) is similar to transformer

j. Balometric measurement are well suited to the measurement of _____

(A) low and medium powers **(B)** high and medium powers
(C) high powers **(D)** none of these

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

Q.2 a. Give all the three classification of instruments and explain. **(8)**

b. What are standards? Explain classification of standards. **(8)**

Q.3 a. Explain Kelvin's double bridge method of measurement of low resistance with the help of neat diagram. **(8)**

b. Kelvin double bridge's each of the ratio arms has P=Q=p=q =1000 ohms. The emf of the battery is 100V and a resistance of 5 ohms is included in the battery circuit. The galvanometer has a resistance of 500 ohms and the resistance of the link connecting the unknown resistance to the standard resistance may be neglected. The bridge is balanced when the standard resistance S = 0.001 ohms. Determine
(i) the value of unknown resistance.
(ii) the current (approximate value) through the unknown resistance R at balance. **(8)**

Q.4 a. Explain the effect of frequency on calibration? **(9)**

b. Calculate the value of the multiplier resistor for a 10V r m s range on the voltmeter as shown in Fig.1

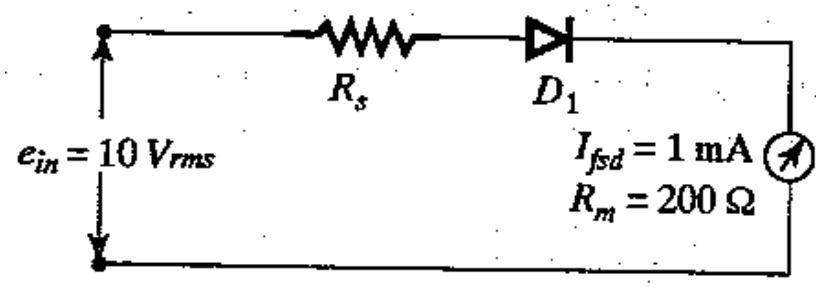

Fig.1 **(7)**

Q.5 What is electronic counter? What are the different modes of operation of electronic counter? Explain in brief. **(4+12)**

Q.6 a. What is function generator? Explain its function with the help of block diagram. **(8)**

b. Draw the block diagram of sampling oscilloscope and explain its operation with the help of input and output waveforms. **(8)**

Q.7 a. What is basic wave analyzer? Explain with the help of circuit diagram. **(8)**

b. What is bolometer? Describe its functions. **(8)**

Q.8 a. What are the different types of null recorders? Describe the working of bridge type recorder. **(8)**

b. What are the advantages of a magnetic recorder? What are the basic components of a tape recorder? **(8)**

Q.9 a. Explain the working principle of Inductive transducer? **(8)**

b. What are the objectives of Data Acquisition System (DAS)? Name the two methods of signal conditioning. **(8)**