ROLL NO. _____

**Code: DE59 Subject: ELECT. INSTRUMENTATION & MEA ENT**

## 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.**

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**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)**.

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.

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

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**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)**

b. Design a multirange dc milliammeter using a basic movement with an internal resistance $R_m=50\,\Omega$ and full scale deflection current $I_m=1$mA. The range required are 0-10 mA and0-500 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)**