Printed Pages : 4

TEC-303

PAPER ID : 3075   Roll No.

B. Tech.

(SEM. III) EXAMINATION, 2008-09
ELECTRONICS MEASUREMENTS & INSTRUMENTATION

Time : 3 Hours]   [Total Marks : 100

Note :   (1)   Attempt **all** questions.
          (2)   Each question carries equal marks.
          (3)   Be precise in your answer.

1   Attempt any **four** parts of the following :   5×4=20

    (a)   Explain the difference with example between
           (i)   Accuracy and precision
           (ii)   Static and Dynamic error in instruments.

    (b)   Explain the following by suitable example :
           (i)   Gross errors
           (ii)   Systematic errors
           (iii) Random errors.

    (c)   An ammeter reads 6.7 A and the true value of
           current is 6.54 A. Determine the error and the
           correction for this instrument.

    (d)   Differentiate between the active and passive
           transducers with suitable examples.

3075]   1   [Contd...

(e) Describe the construction and working of thermocouple.

(f) Describe the different modes of operation of Piezo-electric transducers and explain the application of piezo-electric transducer.

2   Attempt any **four** parts of the following :   5×4=20

(a) Describe the working of Hays Bridge for measurement of inductance.

(b) **Fig. 1** shows the connection of a bridge for measuring the inductance **L** and resistance **R** of a coil. Find **R** and **L** if balance is obtained when

$$Q = S = 1\,k\Omega, \; P = 500\,\Omega, \; r = 100\,\Omega \; \text{and}$$
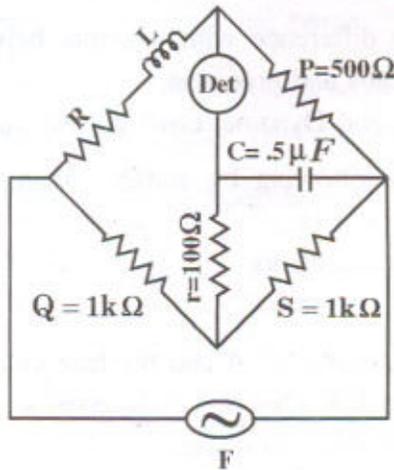
$$C = 0.5\,\mu F.$$

Fig. 1

(c) Describe AC voltmeter using rectifier with diagram.

(d) Write a short note on true RMS reading voltmeter.

(e) Describe the working principle of Q meter.

(f) A $3\frac{1}{2}$ Digit DVM has an accuracy specification of 1.5% of reading ± 1 digit. What is the possible error in volt, when the instrument is reading 5.00 V on the 10 V range ?

3   Attempt any **two** parts of the following :   10×2=20

(a) Explain the theory and working of an LED. Describe the advantages of LCDs.

(b) Explain the following terms as applied to digital displays :
   (i)   Resolution
   (ii) Difference between $3\frac{1}{2}$ Digits and 4 digits displays.
   (iii) Sensitivity of digital meters
   (iv) Accuracy specification.

(c) Draw and explain the circuit of a digital frequency meter.

4   Attempt any **two** parts of the following :   10×2=20

(a)   Discuss briefly, the basic block diagram of Cathode Ray Oscilloscope.

(b)   Write a short note on :
    (i)   Storage type oscilloscope
    (ii)   Ramp type digital voltmeter.

(c)   Describe how the following measurement can be made with the use of a CRO :
    (i)   Frequency
    (ii)   Phase angle.

5   Attempt any **two** of the following :   10×2=20

(a)   What are Heterodyne Wave Analyzers ? Explain the theory of a RF Heterodyne wave analyzer for 0 – 20 MHz RF range.

(b)   Explain the working of a function generator in detail using blocks, relations and waveforms.

(c)   With the help of block diagram, explain spectrum analyzer.

_____