B.E. DEGREE EXAMINATIONS: NOVEMBER 2009

Third Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U07EC304: Measurements and Instrumentation

Three hours   Maximum Marks: 100

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

The basic type of units in science & engineering is

   A. Fundamental & CGS units   B. Fundamental & Derived units

   C. SI & derived units   D. Fundamental & SI units

The type of AC bridge is

(8)

   A. Hay bridge   B. Kelvin's bridge

(6)

   C. Kelvin's Double bridge   D. Wheatstone bridge

RF voltage is measured by .... the alternating voltage & .... the resulting dc o/p.

(9)

   A. Amplifying, Rectifying   B. Rectifying, Modifying

(5)

   C. Modifying, Amplifying   D. Rectifying, Amplifying

The type of the transistor used in an electronic multimeter is

       i. FET   ii. UJT   iii. BJT   iv. MOSFET

(8)

   A. Both i & ii   B. Both i & iii   C. Both ii & iii   D. Both iii & iv

(6)

The frequency range of function generator is,

   A. 0.01 Hz to 100 KHz   B. 0.1Hz to 100 Hz

(9)

   C. 0.01 KHz to 100 KHz   D. 0.1 KHz to 100 KHz

(5)

The total Harmonic Distortion or Distortion factor is defined as

   A. $D2^2 + D3^2 + D4^2 + \ldots\ldots\ldots$

   B. $D1^2 + D2^2 + D3^2 + D4^2 + \ldots\ldots\ldots$

   C. Square root of $D1^2 + D2^2 + D3^2 + D4^2 + \ldots\ldots\ldots$

   D. Square root of $D2^2 + D3^2 + D4^2 + \ldots\ldots\ldots$

The basic movement of the multimeter has a full-scale current of ... and an internal resistance of ....

   A. $10\mu A$, 1000Ω B. 50mA, 2000Ω C. 10 mA, 1000Ω D. $50\mu A$, 2000Ω

The frequency counter operates on the principle based on

   A. Gating   B. Counting   C. accumulating   D. Sensing.

9. Data Acquisition system often use

    A. Electronic Tape Recorder   B. Magnetic Tape Recorder

    C. Digital Recorder   D. Analog Recorder

10. Fiber Optic transmission is dependent on the phenomenon

    A. Total Internal Reflection   B. Attenuation

    C. Refraction Index   D. Diffraction Pattern

PART B (10 x 2 = 20 Marks)

11. What is the necessity of errors in measurements? List the types of errors.

12. Draw the schematic diagram of Maxwell bridge for inductance measurements.

13. State the advantages and applications of vector voltmeter.

14. What do you mean by deflection sensitivity of a CRT?

15. What is direct synthesis?

16. What are the applications of Spectrum Analyzer?

17. State the principle of Digital Voltmeter.

18. What is prescaler? Give the frequency of it.

19. List the functions included in Digital Acquisition system.

20. What is the necessity of conversion of voltage from frequency?

PART C (5 x 14 = 70 Marks)

21 (a) Explain the principle of working of a moving coil instrument and derive an expression for its deflection and give its errors. How can the range of the instrument be extended?

(OR)

(b) (i) What are the two conditions to be satisfied to make an AC bridge balanced? (2)

    (ii) Explain how Schering Bridge is used for the measurement of unknown capacitor. Derive its balanced equation.

                                             (12)

22 (a) Explain how the Q-meter can be used for the measurement of Q-factor and effective resistance and discuss the source of error.

(OR)

(b) (i) Briefly explain about sampling oscilloscope.   (7)

    (ii) Write notes on an Electronic multimeter.   (7)

(a) With necessary diagrams explain the function of Frequency synthesizer.

(OR)

(b) Explain the Working of Wave Analyzer in detail.

(a) Discuss in detail the working principle of the following DVM:

      (i) Ramp-type

      (ii) Successive Approximation   (7)

         (7)

(OR)

(b) Discuss the technique of extending the frequency range of the counter.

25 (a) (i) Explain in detail about IEEE488 Instrumentation bus.   (10)

    (ii) Draw and elaborate the pin assignments for IEEE 488 Instrumentation bus. (4)

(OR)

(b) Explain briefly the working principle of Optical Time Domain Reflect meter.

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