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 **Reg. No. :**

**Question Paper Code: 44035**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Fourth Semester

Electrical and Electronics Engineering

14UEE405 - ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

 (Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. A 0-150 *V* voltmeter has an accuracy of 1*%* of full scale reading. The voltmeter measured by this instrument is 75 *V*. The limiting error is \_\_\_\_­­­­­\_\_\_\_\_\_

(a) 1 *%* (b) 2 *%*  (c) 2.5 *%* (d) 3 *%*

2. The ratio of change in output to the change in the input is called

(a) Precision (b) Resolution  (c) Sensitivity (d) Repeatability

3. The Sensitivity of a Multimeter which has full deflection current of 1 *mA* is

 (a)100 *Ω / V*  (b)1000 *Ω/ V* (c)10 *Ω/ V* (d) 1 *Ω / V*

4. The damping torque must operate only when the moving system of the indicating instrument is

 (a) Actually moving (b) Stationary (c) Just starting to move (d) Near its full deflection

5. Wheatstone bridge is used to measure

 (a) Voltage (b) Current (c) Power (d) Resistance

6. Kelvin double bridge is best suited for the measurement of

 (a) Inductance (b) Capacitance (c) Low resistance (d) High resistance

7. A Recorder is an instrument used for

 (a) Recording (b) Indicating (c) Display (d) Measurement

8. Which part is called as heart of CRO?

 (a) CRT (b) Sweep generator (c) Trigger circuit (d) Amplifier

9. What is a reading of 0.5245 on 1 *V* range in four and a half digit voltmeter displayed as

(a) 0.5245 (b) 00.524 (c) 000.52 (d) 0000.5

10. A binary ladder is constructed by using resistors having

(a) Only one value (b) Only two values (c) Individual values (d) None of these

 PART - B (5 x 2 = 10 Marks)

11. **Define the term “Gross error”.**

12. State the advantages of a DVM over an analog meter.

13. What is called a volt-ratio box?

14. Name three methods of magnetic tape recording.

15. Mention any four types of analog to digital converter.

 PART - C (5 x 16 = 80 Marks)

16. (a) (i) Discuss the various dynamic characteristics of an instrument in detail. (8)

 (ii) A voltmeter reading 70V on its 100V range and an ammeter reading 80 mA on

its 150 mA range are used to determine the power dissipated in a resistor. Both these instruments are guaranteed to be accurate within + or – 1.5% at full scale deflection. Determine the limiting error of the power. (8)

 Or

(b) Draw the block diagram showing the basic functional elements of an instrument and

 explain the functions of each. (16)

17. (a) (i) Derive the construction and working of PMMC instrument and also derive its torque equation. (8)

 (ii) Write short note on any two adjustments required in energy meters. (8)

Or

 (b) Explain and Working principle of measurement of phase. (16)

18. (a) Explain in details about the measurement of frequency by Wien Bridge. (16)

 Or

 (b) (i) Analyze with a diagram how Maxwell’s bridge can be used to measure unknown inductance. (10)

 (ii) Discuss about thelimitations and applications of wheatstonebridge. (6)

19. (a) Discuss in detail about dot matrix displays. (16)

Or

 (b) Explain the principle of working of a X-Y recorder with neat diagram. Also mention some example. (16)

20. (a) With neat diagram explain the construction and principles of dual slope ADC. (16)

Or

(b) (i) Explain in detail about the various elements of data acquisition system with necessary block diagram. (10)

 (ii) For a 5 bit ladder, if the input levels are 0 = 0 *V* and 1 = + 10 *V*. What are the output voltages for each bit? (6)