Reg. No. :

Question Paper Code: 44305

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

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

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

2. The standard deviation value for the data given below is

    X_1=49.7 ; X_2= 50.1 ; X_3= 50.2; X_4=49.6 ; X_5= 49.7

    (a) 0.27   (b) 1.26   (c) 0.22   (d) 1.27

3. The Instrument that can measure both power as well as energy is

    (a) Voltmeter   (b) Multimeter
    (c) Trivector Meter   (d) None of these

4. 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

5. The primary current in a CT is dictated by _____

    (a) The secondary burden   (b) The core of the transformer

    (c) The load current   (d) None of the above

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

    (a) Inductance   (b) Capacitance

    (c) Low resistance   (d) High resistance

7. Lissajous pattern obtained on the screen of a CRO can be used to determine_____

    (a) Phase shift   (b) Amplitude distortion

    (c) Voltage amplitude   (d) None of the above

8. The recording head in a magnetic tape responds to _____

    (a) Electrical signal and creates a magnetic signal

    (b) Thermal signal and creates a magnetic signal

    (c) Magnetic signal and creates an electrical signal

    (d) Thermal signal and creates an electrical signal

9. The linear variable differential transformer transducer is

    (a) Inductive transducer   (b) Non-inductive transducer

    (c) Capacitive transducer   (d) Resistive transducer

10. 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

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 the standardization of potentiometer?

14. List the components of a magnetic tape recorder.

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

PART - C (5 x 16 = 80 Marks)

16. (a) (b) Discuss the different types of standard of measurement.   (16)

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(ii) The Expected value of the current through a resistor is 20 *mA*. However the measurement yields a current value of 18 *mA*. Calculate

       (i) absolute error   (ii) % error

       (iii) relative accuracy   (iv) % accuracy.   (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)

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

18. (a) Describe the circuit of Maxwell bridge used for measurement of capacitance   (16)

(b) Describe the circuit of Kelvin double bridge used for measurement of low resistance.   (16)

19. (a) Explain the construction and its working principle of X-Y Recorder.   (16)

(b) (i) Explain the working principle of CRT.   (10)

     (ii) Explain the digital storage oscilloscope with neat diagram.   (6)

20. (a) Explain the construction and working principle of Linear Variable Differential Transducer(LVDT).   (16)

(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)

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