Reg. No. : | | | | | | | | | | |

Question Paper Code: 41034

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2015.

Fourth Semester

Electrical and Electronics Engineering

01UEE405 - ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. How are the absolute and relative errors expressed mathematically?
2. Define calibration.
3. An energy meter is designed to make 100 revolutions of disc for one unit of energy. Calculate the number of revolutions made by it when connected to load carrying 40 *A* at 230*V* and 0.4 power factor for an hour.
4. Define burden of an Instrument transformer.
5. What is meant by Transformer Ratio Bridge?
6. List the sources of electrostatic interference.
7. Give the functional difference between Strip chart recorder and *X* - *Y* recorder.
8. What are the functions of data logger?
9. Differentiate sensor from transducer.
10. What are optical detectors?

PART - B (5 x 16 = 80 Marks)

11. (a) (i) What are the basic blocks of a generalized instrumentation system? Draw the various blocks and explain their functions (8)

(ii) Enumerate the main dynamic characteristics of measuring instruments and explain them. (8)

Or

(b) (i) The following 10 observations were recorded when measuring a voltage: 41.7, 42.0, 41.8, 42.0, 42.1, 41.9, 42.0, 41.9, 42.5, and 41.8 volt.

Find (1) the mean (2) the standard deviation (3) range (8)

(ii) What is standard? Classify the standards of measurement (8)

12. (a) (i) How the range of DC ammeter and DC voltmeter can be extended? Derive the expressions to calculate shunt resistance and multiplier resistance. (6)

(ii) With a neat diagram, explain the construction, working principle of single phase Wattmeter. What is the importance of deflection torque in these instruments? (10)

Or

(b) (i) Explain the different methods of determination of B –H curve. (8)

(ii) Explain the construction and working principle of Weston type frequency meter. (8)

13. (a) (i) With fundamentals distinguish between DC and AC potentiometers, and give any two specific applications for each. (8)

(ii) Explain the working principle of Anderson's bridge and also derive its balance equations. (8)

Or

(b) (i) Describe about the multiple earth and earth loops. (8)

(ii) Explain the grounding techniques in detail to reduce the ground loop interference signal. (8)

14. (a) (i) Describe the direct and frequency modulation magnetic tape recording types. Give its merits and demerits. (10)

(ii) Briefly explain the difference between digital plotters and printers. (6)

Or

(b) (i) Explain the block diagram of a general purpose oscilloscope and also describe about the observation of waveform on CRO. (10)

(ii) Explain with a neat sketch about Dot matrix display. (6)

15. (a) (i) Explain the resistive transducer with respective to potentiometer. (4)

(ii) Explain the capacitive transducer. (6)

(iii) Describe the piezoelectric transducer and give the formula for coupling coefficient. (6)

Or

(b) (i) Explain schematic block diagram of a general data acquisition system (DAS) and give its objectives. (6)

(ii) Explain R-2R ladder type D/A converter. (6)

(iii) 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? (4)

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