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

Question Paper Code : 40489

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Fourth Semester

Electrical and Electronics Engineering

EE8403 — MEASUREMENTS AND INSTRUMENTATION

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate Reproducibility and Repeatability.
2. Distinguish between air friction damping and fluid friction damping.
3. Specify the effects of creeping in energy meter.
4. How the iron loss is measured?
5. How Kelvins double bridge differ from wheatstone bridge.
6. Specify the purpose of Wagner Earthing device.
7. How far the Lissajous patterns are effective in frequency measurement.
8. Specify the application of data loggers.
9. Mention the electrical phenomena used in piezoelectric transducers.
10. List the elements of DAQ system.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Elucidate the functional elements of an instrument with bourdon tube as an example.

(ii) List out the errors in measurement.

Or

(b) Enumerate the torque equation of the moving iron instrument and prove that its scaling is non-uniform.

12. (a) State blondel's theorem and explain how the power measurement using two wattmeter method.

Or

(b) Illustrate about the instruments used for measurement of frequency.

13. (a) Derive the expressions for measurement of smaller value of unknown resistance with a neat bridge circuit.

Or

(b) Derive the expression for measurement of unknown inductance using Hays bridge.

14. (a) Illustrate about the various types of recorders in detail.

Or

(b) Compare in detail about the LED and LCD displays.

15. (a) Specify the types of inductive transducers and illustrate the LVDT method in detail.

Or

(b) Elucidate the construction and working of different types of digital transducers.

PART C — (1 × 15 = 15 marks)

16. (a) The inductance of a moving iron ammeter with a full scale deflection of 90° at 1.5 A, is giyeo by the expression $L = (200+40\theta - 40\theta^2 - \theta^3)\,\mu H$, where θ is the deflection in radian from the zero position. Estimate the angular deflection of the pointer for a current of 1.0 A

Or

(b) A correctly adjusted, single phase, 240 V induction watthour meter has a meter constant of 600 revolutions per kWh. Determine the speed of the disc, for a current of 10 A at a power factor of 0.8 lagging. If the lag adjustment is altered so that the phase angle between voltage flux and applied voltage is 86°. Calculate the error introduced at (i) unity p.f. (ii) 0.5 p.f. lagging.

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