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Question Paper Code : 51248

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

Fifth Semester

Electronics and Communication Engineering

EI 1306 — MEASUREMENTS AND INSTRUMENTATION

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the reasons for the occurrence of gross errors while taking readings using a voltmeter.

2. Define the dynamic range of a spectrum analyser.

3. State the advantages of a digital voltmeter over its analog counterpart.

4. What are the sources of error in a digital frequency meter?

5. What are the conditions to be satisfied for an ac bridge to be balanced?

6. In a Q meter, at 1.5 mHz, C_1 = 550 pf. At 3 mHz, C_2 = 110 pf. Determine the unknown values of self capacitance and inductance.

7. State any two specific features of IEEE 488 bus.

8. What are the advantages of storage oscilloscopes?

9. Arm AB of Maxwell's bridge comprises a 720 Ω resistor, CD has a 300 Ω resistor. In arm AD, a 1.2 kΩ resistor is in parallel with a 0.525 μf capacitor. Determine unknown inductance and resistance.

10. Derive an expression for the unknown frequency which could be determined using a Wien's bridge.

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PART B — (5 × 16 = 80 marks)

11. (a) A moving coil instrument gives full scale deflection for a current of 20 mA with a potential difference of 200 mV across it. Determine.

(i) The shunt resistance required to use it as an ammeter to get a range of 0 – 200 A.

(ii) Multiplier required to use it as a voltmeter of range 0 – 500 V.

Or

(b) With a schematic diagram explain the functioning of attraction and repulsion type of moving iron instruments.

12. (a) With suitable derivations, explain the theory of working of a Q meter. Explain a method to determine unknown capacitance using the same.

Or

(b) Explain the important features and applications of vector voltmeters.

13. (a) (i) The amplitudes of fundamental, second and third harmonics of an ac wave are 1 V, 0.5 V and 0.25 V respectively. Calculate the percentage total harmonic distortion.

(ii) State the foremost requirements of a lab type signal generator.

Or

(b) (i) State and define any five typical important specifications of a function generator.

(ii) Define the important function selection switches in a spectrum analyser. How are they programmed for a particular display?

14. (a) With a block schematic explain a method to measure unknown time interval. Explain how it is possible to increase the frequency range of the above instrument.

Or

(b) (i) Explain with a schematic how to measure frequency ratio using a frequency counter.

(ii) Explain the working of a digital frequency meter.

15. (a) Explain in detail, a method to measure the unknown power using a fiber optic device.

Or

(b) Write about the main features of a pc based data acquisition system. Include suitable figures wherever mandatory.

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