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Question Paper Code: 51532

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Third Semester

Electronics and Instrumentation Engineering

15UEI302 - ELECTRICAL AND ELECTRONIC MEASUREMENTS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. An ammeter has a current range of 0-5 A, and its internal resistance is 0.2Ω . In order to change the range to 0-25 A, we need to add a resistance of
 - (a) 0.8Ω in series with the meter
 - (b) 1.0Ω in series with the meter
 - (c) 0.04Ω in parallel with the meter
 - (d) 0.05Ω in parallel with the meter
2. The bridge method commonly used for finding mutual inductance is
 - (a) Heaviside Campbell bridge
 - (b) Schering bridge
 - (c) De Sauty bridge
 - (d) Wien bridge
3. The pressure coil of a dynamometer type Wattmeter is
 - (a) Highly inductive
 - (b) Highly resistive
 - (c) Purely resistive
 - (d) Purely inductive
4. The major cause of creeping in an energy meter is
 - (a) Over compensation for friction
 - (b) Excessive voltage across potential coil
 - (c) Mechanical vibrations
 - (d) Stray magnetic field

5. The transfer instrument which is used for standardization of a polar type AC potentiometer is

(a) An electrostatic instruments	(b) A moving coil instruments
(c) A dynameter instruments	(d) A thermal instruments
6. Current transformers and potential transformers are used to increase the ranges of

(a) DC ammeter and DC voltmeter	(b) AC ammeter and DC voltmeter
(c) AC ammeter and AC voltmeter	(d) DC ammeter and AC voltmeter
7. The Q-meter works on the principle of

(a) mutual inductance	(b) self inductance
(c) series resonance	(d) parallel resonance
8. In a ramp type DVM, the multi vibrator determines the rate at which the

(a) clock pulses are generated	(b) measurement cycles are initiated
(c) It oscillates	(d) Its amplitude varies
9. In CRO saw tooth voltage is applied at the

(a) vertical deflecting plates	(b) horizontal deflecting plates
(c) accelerating anode	(d) cathode
10. X-Y recorders is the type of

(a) Graphic recorders	(b) Oscillosgraphic recorders
(c) Magnetic tape recorders	(d) Digital recorders

PART - B (5 x 2 = 10 Marks)

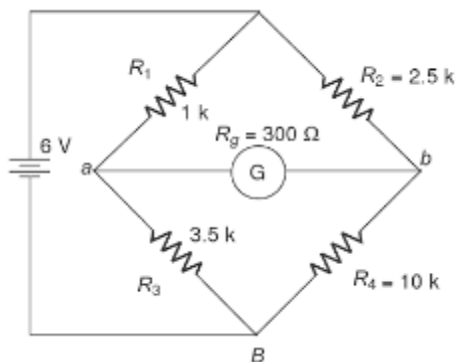
11. Name the sources of errors in AC bridge measurements.
12. Define Phantom loading.
13. Classify AC potentiometers. Also give its applications.
14. List out the essential parts of the ramp type DVM.
15. State the principle of sampling oscilloscope.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Elucidate the working principle of PMMC instruments with neat diagram. (10)
- (ii) Write a note on sources and detectors used for AC bridges. (6)

Or

- (b) (i) Explain the theory and working principle of Wheatstone's bridge. Derive an expression to find unknown resistance. (10)
- (ii) An unbalanced Wheatstone bridge is given in below figure. Calculate the current through the galvanometer. (6)



17. (a) With a neat diagram, explain the construction and working principle of dynamometer type Wattmeter. (16)

Or

- (b) (i) Elaborate the constructional details and principle of working of single phase induction type energy meter. (10)
- (ii) With necessary figures, explain the calibration of single phase energy meter. (6)
18. (a) Describe the construction and working of a co-ordinate type AC potentiometer. How is it standardized? Explain how an unknown voltage can be measured with it. (16)

Or

- (b) (i) Draw the equivalent circuit and phasor diagram of a current transformer. Derive the expression for ratio and phase angle errors. (10)
- (ii) A current transformer of nominal ratio 1000/5 A, is operating with total secondary impedance $0.4+j0.3\Omega$. At rated current the components of the primary current associated with the core-magnetizing and core loss effects are respectively 6A and 1.5A. The primary winding has 4 turns. Calculate the ratio error and phase angle at rated primary current if the secondary winding has 800 turns. (6)

19. (a) Discuss the operation of micro processor based DMM with auto ranging and self diagnostic features, with relevant diagram. (16)

Or

- (b) With a neat block diagram explain the following:

(i) Dual slope integrating type DVM. (8)

(ii) Ramp type DVM. (8)

20. (a) With a neat block diagram, elaborate the construction and working principle of general purpose oscilloscope. (16)

Or

- (b) Write short notes on

(i) Magnetic tape recorders (8)

(ii) X-Y recorder (8)
