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BIEL-029

DIPLOMA – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (DECVI) / ADVANCED LEVEL CERTIFICATE COURSE IN ELECTRONICS AND COMMUNICATION ENGINEERING (ACECVI)

00087

Term-End Examination

June, 2014

BIEL-029 : ELECTRONIC MEASUREMENT AND INSTRUMENTS

Time : 2 hours *Maximum Marks : 70*

Note : *Question no. 1 is compulsory. Attempt any* ***four*** *questions from the remaining. All questions carry equal marks.*

1. (a) The equation for the developed torque, derived from the basic law for electromagnetic torque is 2

(i) $T = B \times N$

(ii) $T = A \times I$

(iii) $T = B \times A \times I$

(iv) $T = B \times A \times I \times N$

(b) The approximate power requirements of the D'Arsonval Galvanometer movement are 2

(i) 25 μW to 200 μW
(ii) 30 μW to 800 μW
(iii) 800 μW to 1000 μW
(iv) 200 μW to 600 μW

(c) When the oscilloscope has not been triggered, the electron beam in the CRT is 2

(i) Turned off
(ii) Turned on
(iii) Turned on and then off
(iv) Turned off and then on

(d) In an oscilloscope application, the typical resolution for A/D conversion is 2

(i) 7 or 8 bits
(ii) 8 or 9 bits
(iii) 6 or 7 bits
(iv) 5 or 6 bits

(e) In LC tuned circuit, the resonant frequency of the circuit is given by 2

(i) $f = \frac{1}{\pi\sqrt{LC}}$

(ii) $f = \frac{2}{\pi\sqrt{LC}}$

(iii) $f = \frac{1}{2\pi\sqrt{LC}}$

(iv) $f = \frac{2\pi}{\sqrt{LC}}$

(f) A PIN diode is a viable attenuator at audio frequencies. 2

(i) True

(ii) False

(g) The dual slope type of A/D is a very popular method for digital voltmeter applications. 2

(i) True

(ii) False

2. (a) What are IEEE standards ? How do these standards differ from those maintained by national standards laboratories ? 7

(b) A voltmeter, having a sensitivity of 1,000 Ω/V, reads 100 V on its 150-V scale when connected across an unknown resistor in series with a milliammeter. When the milliammeter reads 5 mA, calculate (i) the apparent resistance of the unknown resistor (ii) the actual resistance of the unknown resistor (iii) the error due to the loading effect of the voltmeter. 7

3. (a) Explain d'Arsonval movement with working principle and construction. 7

(b) A 1-mA meter movement with an internal resistance of 100 Ω is to be converted into a 0 – 100 mA ammeter. Calculate the value of the shunt resistance required. 7

4. Explain Dual Slope type DVM and Ramp type DVM with block diagram and waveforms. 14

5. (a) How does the digital storage oscilloscope differ from the conventional storage oscilloscope using a storage cathode ray tube ? What are the advantages of each ? 7

(b) Explain the working of an active probe. Why is an attenuator probe used ? 7

6. (a) Explain the vertical deflection system of an oscilloscope. 7

(b) What is the minimum distance, L, that will allow full deflection of 4 cm at the oscilloscope screen with a deflection factor of 100 V/cm and with an accelerating potential of 2,000 V ? 7

7. (a) Explain the basic elements of function generation with the help of block diagram. 7

(b) Draw the circuit of a transistorized astable multivibrator. Explain the working of circuit by showing waveform. 7

8. Write short notes on any ***four*** of the following :

$4 \times 3\frac{1}{2} = 14$

(a) Classification of errors

(b) Digital meters

(c) Oscilloscope

(d) Signal Generator

(e) Digital to analog converter

(f) Spectrum and logic analyzer