

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

Term-End Examination

00207

June, 2016

**BIEL-029 : ELECTRONIC MEASUREMENT AND
INSTRUMENTS**

Time : 2 hours

Maximum Marks : 70

*Note : Attempt any **five** questions. Question no. 1 is
compulsory. All questions carry equal marks.
Missing data, if any, may be assumed.*

1. Objective Type Questions (Fill in the blanks/Choose the best/State true or false) : $7 \times 2 = 14$
- (a) In measurement systems, which one of the following static characteristics is desirable ?
- (i) Accuracy
 - (ii) Sensitivity
 - (iii) Reproducibility
 - (iv) All of the above

- (b) The input resistance of a CRO is of the order of _____ .
- (c) A quantity whose magnitude has a definite repeating cycle is called transient.
[True/False]
- (d) The deviation of the true value from the desired value is called _____ .
- (e) The frequency range of moving iron instruments is
- (i) 20 Hz to 20 kHz
 - (ii) 10 Hz to 30 kHz
 - (iii) 20 Hz to 300 kHz
 - (iv) 0 to 125 Hz
- (f) In a CRT, the focusing anode is located before pre-accelerating anode. [True/False]
- (g) An oscilloscope has an input capacitance of 50 pF and a resistance of 2 M Ω with a voltage divider ratio of 10. The parameters of high impedance probe are
- (i) $C_1 = 5.55 \text{ pF}$, $R_1 = 18 \text{ M}\Omega$
 - (ii) $C_1 = 3.33 \text{ pF}$, $R_1 = 9 \text{ M}\Omega$
 - (iii) $C_1 = 11.1 \text{ pF}$, $R_1 = 18 \text{ M}\Omega$
 - (iv) $C_1 = 5.55 \text{ pF}$, $R_1 = 9 \text{ M}\Omega$

2. What do you mean by the terms static characteristics and dynamic characteristics of an instrument ? Explain in brief the various static and dynamic characteristics of an instrument. 4+10=14

3. (a) Give the circuit diagram of a general rectifier type AC voltmeter and explain the operation of the same. 3+4=7

(b) What is the function of a multiplier in a basic D'Arsonval movement converted DC voltmeter ? Prove that the value of the multiplier (R_s) required is given as

$$R_s = \frac{V}{I_m} - R_m,$$

where V = full range voltage of the instrument, I_m = full scale deflection current, R_m = internal resistance of movement. 3+4=7

4. What are digital voltmeters (DVMs) ? List the operation and performance characteristics of a DVM. Explain the operation of a Ramp-type DVM with the help of a neatly labelled block diagram and also list their advantages and disadvantages. 2+6+6=14

5. Give the block diagram of a general purpose Cathode Ray Oscilloscope (CRO). List the functions of various blocks. What is the advantage of using a negative high voltage supply ?

5+5+4=14

6. (a) Explain the operation of a passive voltage probe having high impedance. Give its circuit diagram and prove that

$$V_{\text{out}} = \frac{R_{\text{in}}}{R_{\text{in}} + R_1} \times V_{\text{in}}. \quad 4+3=7$$

- (b) Explain the operation of a Spectrum Analyzer with the help of a neatly labelled block diagram.

7

7. Write technical notes on any **two** of the following :

2×7=14

- (a) Digital Phase Meter
- (b) Analog Multimeter
- (c) AF Signal Generator
- (d) Vertical Deflection System