

**DIPLOMA IN ELECTRICAL ENGINEERING
(DELVI)**

Term-End Examination

December, 2017

00709

**BIEE-039 : ELECTRICAL MEASUREMENTS
AND INSTRUMENTS**

Time : 2 hours

Maximum Marks : 70

*Note : Attempt **five** questions including question no. 1 which is **compulsory**. Missing data may be assumed suitably. Use of scientific calculator is permitted.*

1. Choose the correct answer :

$7 \times 2 = 14$

(a) The multimeter can measure

- (i) Current
- (ii) Voltage
- (iii) Resistance
- (iv) All of the above

(b) An instrument used for measuring current of an electrical circuit is called

- (i) Voltmeter
- (ii) Ammeter
- (iii) Potentiometer
- (iv) None of the above

- (c) Sensitivity of voltage is expressed as
- (i) volt/ohm
 - (ii) ohm/volt
 - (iii) ohms volt
 - (iv) $\text{ohms}^{-1} \text{ volt}^{-1}$
- (d) A CRO uses
- (i) Electromagnetic focussing
 - (ii) Electrostatic focussing
 - (iii) Both (i) and (ii)
 - (iv) Focussing technique not required
- (e) A CRO can display
- (i) AC signal
 - (ii) DC signal
 - (iii) Both (i) and (ii)
 - (iv) Time invariant signal
- (f) An oscilloscope indicates
- (i) Peak to peak value of voltage
 - (ii) DC value of voltage
 - (iii) R.M.S. value
 - (iv) Average value

(g) An ammeter is connected in _____ with the circuit element whose current we wish to measure.

- (i) parallel
- (ii) series
- (iii) series or parallel
- (iv) None of the above

2. (a) Classify different types of electrical measuring instruments. 7

(b) What are the essentials of torques required for indicating instruments ? 7

3. (a) In a CRO, the distance of screen from centre of deflection plate is 0.04 m, the effective length of deflection plate is 0.020 m and the distance between deflection plates is 0.10 m. The deflection voltage is 3 V while the acceleration voltage is 5 V. Calculate the following : 9

- (i) Deflection on screen
- (ii) Deflection sensitivity
- (iii) Deflection factor

(b) Write the application of digital multimeters. 5

4. (a) Explain the construction and working principle of moving iron instruments. 7
- (b) Explain different types of errors in measuring instruments. 7
5. (a) Explain the construction and working principle of a single-phase energy meter. 7
- (b) Write the merits and demerits of single-phase energy meter and three-phase energy meter. 7
6. With the help of circuit and phasor diagram and using usual notations, show that the total power in a 3- ϕ , 3-wire Y-connected balanced load can be measured with the help of only one wattmeter. 14
7. Write short notes on any *two* of the following : $2 \times 7 = 14$
- (a) Digital Multimeter
- (b) Instrument Transformers
- (c) Synchroscope
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