



KC-8089

B. E. II (Sem. III) (EL) Examination
November/December – 2012
Electrical & Electronics
Measuring Instruments : Paper - III

Time : 3 Hours]

[Total Marks : 100

Instructions :

(1)

नीचे दृशांवेव निशानीवाणी विगतो उत्तरवडी पर अवश्य लपवी.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
B. E. II (Sem. III) (EL)

Name of the Subject :
Electrical & Electronics Measuring Instruments - P.3

Subject Code No. : **8 0 8 9** Section No. (1, 2,.....): **Nil**

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) Figure to the right indicate full marks.

- 1 (a) Answer in short : (each two marks) **10**
- (i) Derive the dimensions of (a) magnetic flux density
(b) electric flux density in L.M.T.I. system of dimensions.
- (ii) A meter reads 127.50 V and the true value of the voltage is 127.43 V. Determine the static error.
- (iii) Define : (a) sensitivity (b) resolution
- (iv) What is function of synchroscope ?
- (v) Comparison between attraction type and repulsion type instrument.
- (b) Describe construction and working of a ballistic galvanometer. Explain the difference in constructional details of a ballistic galvanometer and d'Arsonval galvanometer. **10**
- 2 (a) Derive torque equation of a d'Arsonval galvanometer. **8**
- (b) Explain the construction and working principle of Weston frequency meter. **7**

OR

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[Contd...

- 2 (a) Derive general torque equation of moving iron instrument. 8
- (b) A PMMC instrument has a coil of dimensions 15 mm × 12 mm. The flux density in the air gap is 1.8×10^{-3} Wb/m² and the spring constant is 0.14×10^{-6} Nm/rad. Determine the number of turns required to produce an angular deflection of 90 degrees when a current of 5 mA is flowing through the coil. 7
- 3 Attempt any three : 15
- (i) Describe the construction and characteristics of an unsaturated Weston cells used as an emf standard.
- (ii) Explain phase sequence indicators.
- (iii) Explain Advantages and Disadvantages of PMMC instruments.
- (iv) Explain Thermocouple instruments.
- (v) Explain with a neat diagram working of Merz price maximum demand indicator.
- 4 (a) State 'True' or 'False' for the following statements. 5
- (i) A potentiometer is basically a null type instrument.
- (ii) Series magnet is wound with few turns of thick wire in case of single phase induction type energy meter.
- (iii) The input impedance of electronic voltmeters should be as high as possible to avoid loading effect.
- (iv) A true rms reading voltmeter uses two thermocouples in order to increase sensitivity.
- (v) One kilowatt hour is equal to one unit.
- (b) Answer the following questions :
- (i) Write three applications of Dc Potentiometer. 3
- (ii) Why does the rotating disc of an induction type energy meter carry a small hole ? 2
- (c) List advantages of Electronics voltmeter and explain any three in detail. 10
- 5 (a) Explain the principle and construction of single phase induction type energy meter. 8
- (b) Discuss effect of p.f. on Wattmeter Reading. 7

OR

- 5 (a) Explain the various factors which are taken into consideration while selecting an electronic type analog voltmeter. 8
- (b) Explain AC electronic voltmeter using rectifiers. 7
- 6 Attempt any three : 15
- (i) Write a short note on digital tachometer.
- (ii) Derive the expression of deflecting torque in single phase induction type energy meter.
- (iii) Explain calibration of d.c. voltmeter with d.c. potentiometer.
- (iv) Write a short note on Electronic Energy meter.
- (v) A sawtooth voltage has a peak value of 80 V and a time period of 2.0 s as shown in fig. 1. Find the error when measuring this voltage with average reading voltmeter calibrated in terms of r.m.s. value of sine-wave.

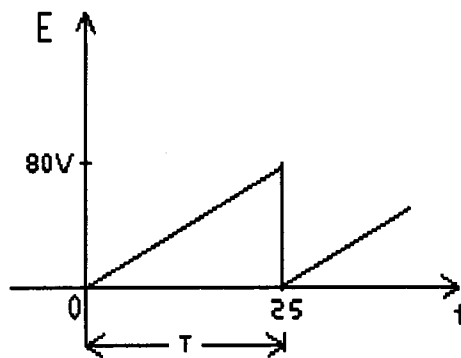


Fig.