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Total Number of Pages : 02

B.Tech.
PET4I103

4th Semester Regular / Back Examination 2017-18
ELECTRICAL AND ELECTRONICS MEASUREMENT
BRANCH : ECE, ETC
Time : 3 Hours
Max Marks : 100
Q.CODE : C1013

Answer Part-A which is compulsory and any four from Part-B.

The figures in the right hand margin indicate marks.

Answer all parts of a question at a place.

Part – A (Answer all the questions)

Q1 Answer the following questions :

(2 x 10)

- a) A reading is recorded as 23.90°C. The reading has number of significant figures _____.
a. 4 b. 3 c. 2 d. 1
- b) A 0-10A ammeter has a guaranteed accuracy of 1% of full scale deflection. The limiting error while reading 2.5 A is:
a. 1% b. 4% c. 2% d. none of the above
- c) Find multiplying power of a shunt of 200Ω resistance used with a galvanometer of 1000Ω resistance.
a. 4 b. 6 c. 5 d. 4.5
- d) In a 3-phase power measurement by using 2-wattmeter method, both the meters give equal readings, find the power factor of the load.
a. 0.7 b. 0 c. 0.5 d. 1
- e) Standardization of potentiometer is done in order that, they become
a. accurate and precise b. accurate and direct reading
c. Precise d. accurate
- f) A Wheatstone bridge can not be used for precision measurements, because errors are introduced into on account of,
a. Resistance of connecting leads b. Thermo electric emfs
c. Contact resistances d. All the above
- g) A current transformer has a rating of 100/5A. Its magnetizing and loss component of the exciting current are 1A and 0.6A respectively and secondary winding burden is purely resistive, its transformation ratio at rated current is
a. 20.12 b. 20.2 c. 200.2 d. None of the above
- h) Electronic voltmeters which use rectifiers employ negative feedback. This is done
a. To increase the overall gain b. To improve stability
c. To overcome non-linearity of diodes d. None of the above
- i) Post acceleration is needed in a CRO, if the frequency of the signal is
a. <1Mhz b. >1Mhz c. >10Mhz d. >10kHz
- j) Hay's bridge is used to measure
a. Resistance b. Inductance c. Capacitance d. Frequency

Q2 Answer the following questions: Short answer type: (2 x 10)

- a) What is dead time and dead zone?
- b) State the types of error in measurement system.
- c) What is logarithmic decrement?
- d) Discuss the effect of temperature changes in voltmeter.
- e) Discuss the errors found in current transformers.
- f) What are the advantages and disadvantages in PMMC instruments?
- g) What are the considerations in selecting an analog voltmeter?
- h) Write some of the applications of CRO.
- i) What is the effect of beam transit time on deflection sensitivity?
- j) What is total harmonic distortion?

Part – B (Answer any four questions)

- Q3 a)** Derive the equation for balance in case of Maxwell's inductance bridge. Draw the phasor diagram for balanced condition. **(10)**
- b)** The ratio arms of a kelvin bridge are 100Ω each. The galvanometer has an internal resistance of 500Ω and a current sensitivity of $200 \text{ mm}/\mu\text{A}$. The unknown resistance is 0.1002 and the standard resistance is set at 0.1000Ω . A d.c. current of 10 A is passed through the standard and unknown resistance from a 2.2V battery in series with a rheostat. Calculate the deflection of the galvanometer, neglect the resistance of the link. Find also the resistance unbalanced to produce a deflection of 1mm . **(5)**
- Q4 a)** Describe the working of Schering bridge. Derive the equations for capacitance and dissipation factor, draw the phasor diagram under balanced condition. **(10)**
- b)** The coil of a ballistic galvanometer has a resistance of 150Ω and an undamped period of 7.5s . A steady emf of 3.5 mV produces a deflection of 210mm . Determine the quantity of electricity discharged from a capacitor if the deflection produced is 750mm . The relative damping is 0.8 . **(5)**
- Q5 a)** Derive the torque equation for an electro-dynamometer type wattmeter. **(10)**
- b)** Draw the block diagram of a ramp type DVM. **(5)**
- Q6 a)** Explain theory and principles of operation of Gall-Tinsley co-ordinate type AC potentiometer. **(10)**
- b)** Explain loss of charge method. **(5)**
- Q7 a)** Discuss advantage and disadvantage of analogue and digital type of oscilloscope. **(10)**
- b)** Explain the working of a differential amplifier using two FETs. **(5)**
- Q8 a)** Discuss the basic circuit of a spectrum analyser. **(10)**
- b)** Describe the circuit diagram and operation of a true rms reading voltmeter using thermocouples. **(5)**
- Q9 a)** Describe the constructional details and principle of operation of a d'Arsonval galvanometer. Derive the expression for steady state deflection. **(10)**
- b)** Write short notes on Q-meter. **(5)**