2014

Electronic Measurement & Instrumentation

Time Alloted : 3 Hours *Full Marks : 70*

The figure in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable

GROUP - A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any ten of the following 10x1=10

i) Which one is not an integrating instrument?

a) Ampere-Hour meter b) Watt-Hour meter
c) Voltmeter d) All of these

ii) Which type of instrument cannot be used for both ac and dc measurements?

a) Dynamometer type b) Electrostatic type
c) Induction type d) None of these

iii) Frequency can be measured by using

(a) Maxwell's bridge (b) Schering bridge
(c) Wien's bridge (d) Anderson bridge

iv) Moving iron type instrument can be used as

(a) standard instrument for calibration of other instruments
(b) transfer - type instruments
(c) indicator - type instruments ad on panels
(d) all of these

v) A dual trace CRO uses

a) One electron gun c) Two pair of VDPs
b) Two electron guns d) Two pair of HDPs

vi) A Wein's bridge oscillator is suitable for

a) RF Generator b) Function Generator
c) Pulse generator d) AF generator

vii) The comparator used in a function generator produces

a) Square wave b) Triangular wave
c) Sine wave d) Swatooth wave

viii) A spectrum analyzer works in

a) Time Domain c) Amplitude
b) Frequency domain d) Phase

ix) The scale of PMMC instrument is

a) Uniform c) Cramped at the ends
b) Cramped d) None of these

x) The time base of a CRO is developed by

a) Square Wave b) Swa tooth wave
c) Pulses d) Sine wave

xi) A true rms voltmeter uses two thermocouples in order to

a) Increase the sensitivity
b) That the second thermocouple cancels out the non-linear effects of the first thermocouple
c) Prevent the drift in the dc meter
d) All of the above

xii) The 3 - 1/2 digit meter displays a maximum value of

a) 999 b) 9999
c) 1999 d) 2000

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. 3x5=15

2. Expla' 'h circuit diagram how low current can be measured by elec' '*meter.
(5)

3. F :xample the successive approximation type DVM.
(5)

4. What is chopper Amplifier? How does it work for D.C. amplification?
(5)

5. Explain the operation of a Moving Iron instrument with suitable diagram.
(5)

6. What is frequency synthesizer? With a suitable block diagram describe the operation of it?
(1+4)

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. 3x15=45

7. (a) Explain the functional block diagram of CRO with neat diagram.

(b) What is Lissagous figure? Explain how phase and frequency can be measured using this figures.

(c) What are the differences between CRO dual beam and dual trace? What is the function of delay line?
[7+(1+3)+(3+1)]

8. a) Explain with the help of a neat diagram, the working of a digital frequency meter.

b) Explain the operation of a dual slope integrating type digital voltmeter.

c) Explain with the help of a neat diagram, the working principle

of a true RMS meter.
(5+5+5)

9. 9.a) Describe how low resistance can be measured by using Kelvin's Double Bridge.

b) A moving coil voltmeter has a resistance of 5 Ω and gives a full scale deflection of 10mV. Show how the instrument may be used to measure (a) voltage up to 50V and (b) current up to 10A

c) Prove $T_d = 0.5I^2 dL/d\theta$ for a MI instrument.
(6+4+5)

10. a) What are the objectives of Data Acquisition System (DAS)?

b) With a neat block diagram explain the different elements of the Data Acquisition System.

c) Define Total Harmonic Distortion (THD).

d) With a schematic block diagram explain the heterodyne wave analyzer.
(3+5+2+5=15)

11. Write short notes on any three of the followings:
(3x5=15)

a) Measurement errors

b) Signal Generator

c) PMMC Instrument

d) IEEE 488 interface

e) Digital Storage Oscilloscope

f) Watt Meter