17317

16172

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions : *(1)* ***All*** *questions are* ***compulsory****.*
(2) Illustrate your answers with neat sketches ***wherever*** *necessary.*
(3) Figures to the ***right*** *indicate* ***full*** *marks.*
(4) Assume suitable data, if ***necessary****.*
(5) Mobile Phone, Pager and any other Electronic Communication devices are ***not*** *permissible in Examination Hall.*

Marks

1. A) Attempt **any six** of the following : **12**

a) Define Precision and Fidelity.

b) Draw the circuit diagram of multirange current meter with and without Aryton shunt.

c) State two disadvantages of digital instruments.

d) State the principle of digital frequency meter.

e) Draw the waveform displayed on the CRO with delay line and without delay line.

f) Write the formula for frequency measurement and phase measurement with lissajeous figure.

g) What are the outputs of function generator ?

h) State the two applications of spectrum analyzer.

B) Attempt **any two** of the following : **8**

a) Define error. Write the formula for absolute error and % error. Write the cause of any one type of error.

b) Describe the different types of standards.

c) Draw the neat diagram of D'Arsonval movement meter. Derive the formula for torque of it.

P.T.O.

Marks

2. Attempt **any four** of the following : **16**

a) Define calibration and the need of calibration for measuring instruments.

b) Draw the block diagram of dual trace CRO and show the controls – V/div, time/div, intensity, X-Y in the block diagram.

c) Draw the circuit of time base generator and draw the waveforms of it w.r.t. trigger signal

d) Compare half wave and full wave rectifier type AC voltmeter.

e) Explain the operation of dual slope type DVM with block diagram and waveforms.

f) Draw the block diagram of vertical deflection system and explain its operation.

3. Attempt **any four** of the following : **16**

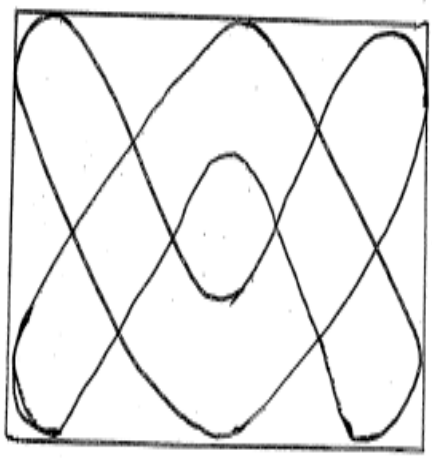
a) Define absolute instruments and secondary instruments. Write one example of each one.

b) A 1 mA meter movement with an internal resistance of 100 Ω is to be converted into 0 – 100 mA. Calculate the value of shunt resistance.

c) A basic D'Arsonval movement with a I_{FS} = 50 μ A, R_m = 500 Ω is to be converted into 0 –10 V voltmeter.

Determine the value of multiplier resistance.

d) The following lissajeous pattern is observed on CRO when channel – 2 frequency is 1200 Hz. Calculate the channel – 1 frequency.



e) Draw the block diagram of function generator and explain how sine wave is generated.

f) Write two applications of :

1) Function generator 2) Video pattern generator

3) AF signal generator and 4) Pulse generator.

Marks

4. Attempt **any four** of the following : **16**

a) Draw the circuit of rectifier type AC voltmeter (half-wave) and write the use of diodes in it.

b) What are the advantages of EVM over electric voltmeter ?

Draw the circuit of transistor voltmeter.

c) Compare analog CRO with Digital Storage Oscilloscope (DSO).

d) Draw the block diagram of spectrum analyzer and draw the output shown on its screen.

e) Draw Ramp type DVM block diagram and draw the necessary waveforms.

5. Attempt **any four** of the following : **16**

a) Draw the block diagram of digital storage oscilloscope.

b) Draw the construction diagram of CRT. Write two materials used for display in CRT screen.

c) Write four specifications of AF signal generator.

d) Draw the block diagram of Logic Analyzer. Draw the waveforms on it with different types/modes of display of logic analyzer.

e) Derive the equation of series resistance in DC voltmeter using basic D'Arsonval movement.

f) Draw the block diagram of digital multimeter.

6. Attempt **any four** of the following : **16**

a) Compare analog and digital instruments.

b) Explain the different methods to measure phase difference between two signals.

c) Explain the working of distortion factor meter with block diagram.

d) Compare accuracy and precision.

e) Write four specifications of analog multimeter.

f) Draw the block diagram of digital frequency meter.

Which is counting signal and gating signal in it with

1) Frequency measurement mode

2) Time measurement mode.