22331

23124

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following: **10**

a) Define the following:–

i) Precession

ii) Resolution.

b) Draw circuit diagram of universal shunt in DC ammeter.

c) State two uses of spectrum analyzer.

d) List one example of time domain and frequency domain instrument.

e) List any four features of logic analyzer.

f) i) Classify the following bridges :–

(1) Hay bridge

(2) Schering bridge.

ii) State one application of above bridge circuit.

g) Draw the circuit of Maxwell bridge.

P.T.O.

Marks

2. Attempt any THREE of the following: **12**

a) Describe gross error, systematic error and write one source of these error.

b) State the reason for ammeter never connected in shunt across source of emf.

c) State the formula for frequency and phase measurement using Lissajous pattern on CRO with necessary diagram.

d) Compare series type and shunt type ohm-meter.

3. Attempt any THREE of the following: **12**

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

b) Draw the block diagram of basic spectrum analyzer and heterodyne type spectrum analyzer.

c) Write specifications of DMM or logic analyzer.

d) Draw the block diagram of dual trace CRO and state the function of ALT/CHOP mode.

4. Attempt any THREE of the following: **12**

a) Design a multirange DC ammeter using basic movement with an internal resistance Rm = 50Ω and full scale deflection current Im = 1mA. The range required are O – 10mA, O – 50mA

b) Draw the circuit diagram of half wave rectifier type AC voltmeter (Ideal and practical circuit diagram) and explain the function of additional component in practical circuit.

c) Explain the working of successive approximation type DVM.

d) Explain the function of grid and final anode in CRT.

e) Draw and explain time base generator circuit.

f) i) Draw block diagram of DSO.

ii) State two advantages of DSO over analog dual trace CRO.

Marks

5. Attempt any TWO of the following: **12**

a) i) Write the meaning of absolute instrument and secondary instrument. Write one example of each one.

ii) Define any two dynamic characteristics.

b) i) Digital voltmeter is having $3\frac{1}{2}$ digit display.

(1) Calculate the resolution.

(2) Find the value displayed on this meter when unknown voltage, V = 3.5427 volts and the range is 0 – 10V.

ii) Draw the diagram of Lux meter.

c) Explain the operation of Ramp type DVM with block diagram and waveform.

6. Attempt any TWO of the following: **12**

a) Draw the block diagram of logic analyzer. List the modes or types of display in it.

b) Draw the block diagram and explain Digital LCR-Q meter.

c) i) List the detectors used in AC and DC bridges.

ii) In an AC bridge, arms contains following constants –

arm AB – R = 1 kΩ,

arm BC – unknown inductor coil.

arm CD – R = 1 kΩ.

arm DA – R = 470Ω 11 C = 0.22μF.

Calculate the unknown constants.

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