53 (IE 504) ELIN

2014

ELECTRONIC INSTRUMENTATION

Paper : IE 504

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Define the Q-factor of a coil. Explain with a circuit diagram and principle of operation of a basic Q-meter. 2+6=8

   (b) A basic D'Arsonval movement with a full scale deflection of $50\mu A$ and an internal resistance of 1800Ω is available. Determine the value of the multiplier resistance needed to measure a voltage range of $0-225V$. 5

   (c) Define solid-state voltmeter. 3

   (d) Write the advantages and limitations of true *rms* reading voltmeter. 4

2, *(a)* What is function generator ? Explain briefly. 5

(b) Compare the signal generator and function generator. 3

(c) What is frequency synthesizer ? What are its types ? Explain frequency synthesizer with the help of block diagram. 2+3+7=12

3. *(a)* What is harmonic distortion ? What do you understand by the total harmonic distortion ? 2+2=4

(b) What is the basic principle of wave analyser ? Explain heterodyne wave analyser with applications. 4+6+2=12

(c) Differentiate between square wave generator and pulse generator. 4

4. *(a)* What do you understand by "Delay line" ? Explain briefly. 4

(b) How is the vertical axis of an oscilloscope deflected ? How does it differ from the horizontal axis ? 4+2=6

(c) In a CRT, the distance between the plates is 1*cm*, the length of the deflecting plates is 4·5*cm* and the distance of the screen from

the centre of the plates is 33*cm*. If the accelerating voltage is 300*V* and deflecting voltage is 50*V*, find 10

(i) Velocity of electron reaching the field

(ii) Deflection produced on the screen

(iii) Deflection sensitivity.

5. *(a)* Explain the working of dual beam oscilloscopes. 5

(b) Differentiate between digital storage oscilloscope and digital phosphor oscilloscope. 5

(c) What is "digital multimeter" ? Discuss briefly the working of IEEE-488 bus system. 2+8=10

6. *(a)* What is the X-Y recorder ? How does it differ from strip chart recorder ? Describe its advantages and application. 2+2+4=8

(b) Explain segmental display and dot matrices for numeric and alphanumeric displays. Draw the circuits for a even segment display and a 5×7 matrix using LEDs. 6+6=12

7. Write short notes on : ***(any four)*** 5×4=20

(a) Spectrum Analyser

(b) Noise generator

(c) Digital Storage Oscilloscope

(d) Vector impedance meter

(e) True RMS meter

(f) Screens for CRT graticules.
