53 (IE 504) ELIN

2019

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 following terms : 2+1+1=4

   (i) Analog Voltmeter

   (ii) Accuracy

   (iii) Precision.

   (b) With the help of a neat block diagram, explain the working principle of vector voltmeter. 10

   (c) What is power meter? Explain Induction wattmeter with a neat diagram. Also give the advantages of induction wattmeters. 1+4+1=6

Contd.

2. (a) Explain the working principle of PMMC instrument and also write the equation for the developed torque. 6

(b) Name different torques present in PMMC instrument. 3

(c) Sensitivity of a multimeter is given in _____. 1

(d) What is Q-meter? Explain different measurement methods of Q-meter. 1+9=10

3. (a) Explain capacitance measuring meter using the phase shift characteristics of RC circuit. Also give the Taylor expansion for phase angle. 3

(b) Explain the block diagram of simple sine wave generator. 3

(c) Explain the role of Colpitt's oscillator using BJT for sine wave generator. 6

(d) A Colpitts oscillator is designed with $C_1 = 100pF$ and $C_2 = 7500pF$. The inductance is variable. Determine the range of inductance values, if the frequency of oscillation is to vary between 950*kHz* and 2050*kHz*. 4

(e) Describe free-running multivibrator for the generation of pulses. 4

4. (a) What is sweep-frequency generator? Explain the importance of linearizing circuit for a sweep generator. 3+4=7

(b) Explain the block diagram of fundamental suppression distortion analyzer. 8

(c) What are the frequency instabilities found in spectrum analyzer for narrow frequency ranges? Explain. 4

(d) Frequency range of spectrum analysis is _____. 1

5. (a) Explain the block diagram of CRO. 6

(b) Define the following : 3+4+2=9

(i) Dual trace oscilloscope

(ii) Lumped parameter and distributed parameter delay line

(iii) Uncompensated attenuator.

(c) Classify storage CRT. What is secondary emission ratio? Explain with example. 2+3=5

6. (a) Explain schematic representation of the IEEE 488 instrumentation bus. 8

(b) Describe the operation of magnetic tape recorder. 6

(c) What is *X-Y* recorder? Explain. 6

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

(i) Data loggers

(ii) Wavemeter

(iii) DMM

(iv) Function generator

(v) True RMS-reading voltmeter.