DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2018

LINEAR INTEGRATED CIRCUITS

[*Time* : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I   Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Define input offset voltage of an op-amp.

2. Draw the circuit diagram of a peak detector using op-amp.

3. Write the applications of Schmitt trigger circuit.

4. Write the expression for time period of astable and monostable circuits using IC 555.

5. What is the function of a voltage regulator ?   (5×2 = 10)

PART — B

(Maximum marks : 30)

II   Answer any *five* of the following questions. Each question carries 6 marks.

1. Derive the expression for voltage gain of an inverting amplifier using op-amp.

2. Explain the working of an op-amp differentiator with the help of circuit diagram and waveform.

3. Draw and explain the first order low pass filter using op-amp.

4. Define capture range, lock-in range and pull-in time of PLL.

5. Draw the pin diagram of 555 timer and explain the function of each pin.

6. Explain the working principle of opto-coupler.

7. List the advantages and disadvantages of SMPS.   (5×6 = 30)

PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT — I

III (a) Draw and explain the block diagram of general purpose operational amplifier.   8

     (b) Draw the circuit diagram of an op-amp voltage follower and explain its working.   7

OR

IV (a) Draw the circuit diagram of a non-inverting amplifier using op-amp and derive the expression for voltage gain.   8

     (b) Explain the package types available for op-amp.   7

UNIT — II

V (a) Draw and explain the astable multivibrator circuit using op-amp.   8

    (b) Draw and explain the working of inverting summing amplifier using op-amp.   7

OR

VI (a) Draw the circuit diagram of RC phase shift oscillator using op-amp and explain its working.   8

     (b) Draw and explain the circuit diagram of current to voltage converter using op-amp.   7

UNIT — III

VII (a) With the help of a block diagram explain the working of a phase locked loop.   8

      (b) With the help of a circuit diagram explain how a phase locked loop can be used as FM demodulator.   7

OR

VIII (a) Draw the circuit diagram and explain the working of an astable multivibrator using 555 IC.   8

      (b) Draw the pin configuration of NE566 VCO and explain the function of each pin.   7

UNIT — IV

IX (a) Draw and explain the functional block diagram of LM 723 voltage regulator.   8

     (b) Explain the operation of adjustable voltage regulator LM 317.   7

OR

X (a) Construct a ± 9V dual voltage supply using suitable 78XX/79XX series regulator ICs. Explain the working of the circuit.   8

    (b) Draw and explain the basic low voltage regulator circuit using LM 723.   7

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ELECTRONICS INSTRUMENTS & MEASUREMENTS

[*Time* : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I   Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Define the term 'accuracy' for an electronic instrument.

2. What is the difference between active and passive transducer ?

3. What is a logic analyser ?

4. List any two types of DAS.

5. What is a dual trace CRO ?   (5×2 = 10)

PART — B

(Maximum marks : 30)

II   Answer any *five* of the following questions. Each question carries 6 marks.

1. With the support of neat diagram, explain how one can convert a basic Galvanometer into a multi range ammeter.

2. List the applications of CRO.

3. Explain the method of finding the value of an unknown inductance using 'ac bridge method'.

4. With a neat diagram, explain the operation of X-Y recorders.

5. Explain the theory of a hall effect sensor with necessary diagram.

6. Differentiate 3½ and 4½ digit displays in terms of accuracy.

7. What is telemetry ? Describe the role of telemetry in instrumentation system.   (5×6 = 30)

PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT — I

III (a) How does a digital multimeter measure fundamental electrical quantities ? Explain with the help of a block diagram.   9

   (b) Compare moving coil and moving iron instruments.   6

OR

IV (a) Explain the operation of digital frequency meter with a neat diagram. Also explain a method for extending its range.   9

   (b) Explain how resistances are measured by an analog multimeter.   6

UNIT — II

V (a) Explain the working of a DSO with the help of a neat block diagram.   9

   (b) What is thermocouple ? Explain its principle.   6

OR

VI (a) Draw the internal structure of a Cathode Ray Tube and explain its Constructional details.   9

   (b) How is a thermistor used for accurate measurement of temperature ?   6

UNIT — III

VII (a) Draw the block diagram of logic analyser. Explain why logic state analyser is better suited for designing digital system than oscilloscopes.   9

   (b) List the applications of Spectrum analyser.   6

OR

VIII (a) Derive the mathematical expression for finding an unknown inductance, using Hay's bridge.   9

   (b) Describe the principle of measuring frequency using Wien bridge.   6

UNIT — IV

IX (a) How does a strip chart recorder record the measured variable ? Explain with the support of a neat diagram.   9

   (b) How does a closed loop control system differ from an open loop control system ?   6

OR

X (a) Draw the block diagram and explain the operation of a Digital Data Acquisition System.   10

   (b) Draw the block diagram of potentiometric type recorder.   5

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