2 0 1 9

(Pre-CBCS)

(4th Semester)

ELECTRONICS

FOURTH PAPER

(Pulse Switching Circuits)

Full Marks : 55

Time : 2½ hours

(PART : A—OBJECTIVE)

(*Marks* : 20)

The figures in the margin indicate full marks for the questions

SECTION—A

(*Marks* : 5)

Tick (✓) the correct answer in the brackets provided : 1×5=5

1. Feedback network usually consists of

(a) inductor *(b)* capacitor

(c) insulator *(d)* resistor

2. An electronic oscillator is

(a) just like an alternator

(b) nothing but an amplifier

(c) an amplifier with feedback

(d) a converter of a.c. to d.c. energy

3. The RC phase shift produced per section of an RC oscillator is

(a) 60° *(b)* 120°

(c) 180° *(d)* 360°

4. The multivibrator which generates square wave of its own is

(a) monostable multivibrator *(b)* astable multivibrator

(c) bistable multivibrator *(d)* emitter-coupled multivibrator

5. In Boolean algebra, the bar sign (–) indicates

(a) OR operation *(b)* AND operation

(c) NOT operation *(d)* XOR operation

SECTION—B

(*Marks* : 15)

Answer any *five* of the following questions : 3×5=15

1. Write three advantages of negative feedback.

2. What is feedback amplifier? Distinguish between positive and negative feedback.

3. What is oscillator? Distinguish between damped and undamped oscillator.

4. Explain frequency stability of an oscillator.

5. Write the circuit diagram of phase shift oscillator. Also write its advantages and disadvantages.

6. What is a multivibrator? What are the uses of monostable multivibrators?

7. Convert $(11001)_2$ to its equivalent decimal number.

8. Explain the working of a digital odometer.

(PART : B—DESCRIPTIVE)

(*Marks* : 35)

The figures in the margin indicate full marks for the questions

1. *(a)* Explain how the upper cut-off frequency of an amplifier gain is increased with the application of negative feedback. 4

(b) The overall gain of a multistage amplifier is 140. When negative voltage feedback is applied, the gain is reduced to 17·5. Find the fraction of the output that is feedback to the input. 3

OR

2. *(a)* Derive the equation for general theory of feedback. 4

(b) How does the negative feedback bring about the increase in output impedance of an amplifier? 3

3. *(a)* Explain the construction and circuit operation of tuned collector oscillator. 5

(b) Differentiate between sinusoidal and non-sinusoidal oscillator. 2

OR

4. *(a)* Derive the frequency of oscillation and condition for sustained oscillation of Hartley oscillator. 4

(b) Discuss the Barkhausen criterion for sustained oscillation. 3

5. *(a)* With circuit diagram, explain the circuit operation, advantages and disadvantages of Wien Bridge Oscillator. 4

(b) Discuss the operation of a phase-shift oscillator with necessary diagram. 3

OR

6. *(a)* Derive the resistive cut-off frequency and self-resonant frequency in negative resistance oscillator. 4

(b) Discuss the working of a piezoelectric oscillator. 3

7. With a neat sketch, explain the working of bistable multivibrator. Also write its advantages. 5+2=7

OR

8. *(a)* With a neat circuit diagram, explain the working of Schmitt Trigger. 4

(b) Write the circuit diagram and uses of astable multivibrator. 1+2=3

9. *(a)* With the help of neat circuit diagram, discuss the working of OR gate. 4

(b) Using 1's complemental method, subtract $(01101)_2$ from $(11011)_2$. 3

OR

10. *(a)* Draw the block diagram for a digital to analog converter and explain its working principle. 5

(b) Write the truth table of XOR gate. 2

★ ★ ★