

CBCS SCHEME

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21MT32

Third Semester B.E. Degree Examination, Dec.2023/Jan.2024 Analog and Digital Electronics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain second order high pass filter and derive the gain and phase angle equations. (08 Marks)
- b. With a neat diagram and waveform, explain the working and positive and negative clampers. (06 Marks)
- c. Design a lowpass filter at a cut off frequency of 1kHz with a pass band gain 2. Using frequency scaling techniques convert 1kHz cut off frequency to 1.6kHz. Assume $C = 0.01\mu\text{F}$. (06 Marks)

OR

- 2 a. Explain with neat circuit diagram and waveform the working of wideband pass filter. Mention its necessary equation. (08 Marks)
- b. Explain with neat diagram and waveform double ended clipper circuit. (06 Marks)
- c. Design a first order Butterworth high pass filter with cut off frequency of 2kHz and pass band gain of 2. Plot the frequency response. (06 Marks)

Module-2

- 3 a. Design and explain the working of RC phase shift oscillator for $f_0 = 1\text{kHz}$. (10 Marks)
- b. What is comparator? With a neat diagram and waveform explain zero crossing detector. (10 Marks)

OR

- 4 a. With a neat block diagram, analyze the oscillator circuit and also derive the condition for oscillation. (10 Marks)
- b. With the help of input output wave forms. Explain the operation of Schmitt trigger circuit. (10 Marks)

Module-3

- 5 a. With a neat sketch of 555 timer architecture explain the operations of each pins of the IC. (10 Marks)
- b. Explain the operation of 555 timer as a monostable multivibrator and derive the expression for pulse width. (10 Marks)

OR

- 6 a. Explain the working of astable multivibrator and derive the equation for total time and duty cycle. (10 Marks)
- b. Explain with neat diagram and waveform square wave oscillator. (10 Marks)

Module-4

- 7 a. Simplify the following Boolean function using K-map.
- $F(w, x, y, z) = \sum(0, 1, 2, 4, 5, 6, 8, 9, 12, 13, 14)$
 - $F(ABCD) = A'B'C' + B'CD' + A'BCD' + AB'C'$
 - $F = A'C + A'B + AB'C + BC.$
- b. Explain the working of 8:1 MUX with operation table and logic diagram using 4:1 MUX.

(10 Marks)

(10 Marks)

OR

- 8 a. Explain the full adder circuit with truth table and logic diagram, derive the expression for sum, carry.
- b. What is Encoder? Realize octal to binary encoder using basic gates and write its truth table.

(10 Marks)

(10 Marks)

Module-5

- 9 a. Analyze the operation of clocked RS flip-flop, also derive characteristics equation from the truth table.
- b. Design a 4 bit BCD ripple counter using T-flip-flop with timing diagram.

(10 Marks)

(10 Marks)

OR

- 10 a. With the neat sketch, explain the operation of clocked J-K flip flop. Also write its truth table and characteristics equations.
- b. Design a 3 bit synchronous binary counter with timing diagram.

(10 Marks)

(10 Marks)
