



CBCS SCHEME

21MT32

Third Semester B.E. Degree Examination, Jan./Feb. 2023 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 double ended shunt clippers with neat diagram and waveforms. (06 Marks)
- b. Explain first order low pass filter and derive the gain and phase angle equation. (08 Marks)
- c. Explain with neat circuit diagram and waveform the working of wideband pass filter. (06 Marks)

OR

- 2 a. Explain the operation of second order high pass filter and draw the frequency response. (10 Marks)
- b. Design a wide band pass filter with $f_L = 200$ Hz and $f_H = 1$ kHz and passband gain = 4. Draw the frequency response plot and calculate the value of 'Q' for the filter. (10 Marks)

Module-2

- 3 a. What is comparator? Explain the working of zero crossing detector. (10 Marks)
- b. Explain the working of inverting comparator as a Schmitt trigger with necessary waveform. (10 Marks)

OR

- 4 a. For Schmitt trigger with $R = 100 \Omega$, $R_2 = 56 K\Omega$, $V_{in} = 1 V_{P-P}$ sine wave and the op-amp type is 741 with the supply voltage = $\pm 15V$. Determine V_{ut} and V_{lt} . (10 Marks)
- b. What is an oscillator? Mention the conditions required for sustained oscillation and also explain the working of Wein bridge oscillator. (10 Marks)

Module-3

- 5 a. Explain with neat diagram and waveform the working of astable multivibrator and also derive equation for total time and duty cycle. (12 Marks)
- b. Explain the application of astable multivibrator of square wave oscillator. (08 Marks)

OR

- 6 a. Explain with neat diagram and waveform, the working of monostable multivibrator and also derive the expression for pulse width. (12 Marks)
- b. With a neat sketch, explain the architecture of 555 timer. (08 Marks)

Module-4

- 7 a. Design a full adder from two half adder. (06 Marks)
- b. Using K-map solve:
 - (i) $P = f(w, x, y, z) = \sum (0, 1, 2, 4, 5, 6, 8, 9, 12, 13, 14)$
 - (ii) $G = f(x, y, z) = \sum (0, 2, 4, 5, 6)$(06 Marks)
- c. Explain full subtractors circuit with a truth table and logic diagram. (08 Marks)

OR

- 8 a. What is a decoder? With the logic diagram and truth table, explain 3 to 8 line decoder. (10 Marks)
- b. What is multiplexer? With the logic diagram and truth table explain 4 to 1 line multiplexer. (10 Marks)

Module-5

- 9 a. With a neat circuit, analyze the operation of clocked RS flip-flop and also derive the characteristics equation from the truth table. (10 Marks)
- b. Explain clocked D flip-flop with the following: (10 Marks)
- (i) Logic diagram
 - (ii) Truth table
 - (iii) Input and output waveform

OR

- 10 a. With a neat circuit, analyze the operation of clocked JK flip flop and also derive the characteristic equation from the truth table. (10 Marks)
- b. Explain clocked T-flip flop with the following: (10 Marks)
- (i) Logic diagram
 - (ii) Truth table
 - (iii) Input and output waveform
