

USN

--	--	--	--	--	--	--	--	--	--

15MT35

Third Semester B.E. Degree Examination, Feb./Mar. 2022 Analog and Digital Electronics

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Explain the working of diode in different biasing conditions with the help of diagrams. (08 Marks)
b. Explain the V-I characteristics of ideal and practical diode. (08 Marks)

OR

- 2 a. With neat diagram and waveforms, explain the operation of capacitor filter also derive the expression for ripple factor. (08 Marks)
b. Explain the operation of zener diode as a voltage Regulator. (04 Marks)
c. A zener diode regular has the following circuit parameters $V_i = 10V$, $V_z = 5V$, $R_z = 100\Omega$, $R_D = 500\Omega$. Find :
i) The percentage change in V_L for a 25% change in V_i
ii) The output resistance R_0
iii) The power dissipation in the regular circuit
iv) Voltage regulation
Assuming $R_L = 0.5K\Omega$. (04 Marks)

Module-2

- 3 a. Design a first order lowpass filter at cutoff frequency 1KHz and passband gain of 2 draw the frequency response. (08 Marks)
b. With neat circuit diagram and frequency response, explain the operation of 2nd order highpass filter and wide bandpass filter. (08 Marks)

OR

- 4 a. With neat diagram, explain the operation of RC phase shift oscillator and derive the expression for frequency of oscillations. (08 Marks)
b. Explain the operation of wien bridge oscillator. (05 Marks)
c. Design the wien bridge oscillator so that $f_0 = 965Hz$ (03 Marks)

Module-3

- 5 a. Explain the operation of Investing comparator and zero crossing detector with circuit diagram and waveforms. (08 Marks)
b. Explain the operation of Schmitt trigger and derive the expression for hysteresis voltage. (08 Marks)

OR

- 6 a. Explain the operation of 555 timer as a monostable multi-vibrator with the help of circuit diagram and waveforms. (08 Marks)
b. Explain the operation of 555 timer as a Astable multi-vibrator with the help of circuit diagram and waveforms. (08 Marks)

Module-4

- 7 a. Explain the operation of AND, OR, NAND, NOR logic gates using logic symbol, truth table, timing diagram and diode logic. (08 Marks)
- b. Explain CMOS NOR and NAND logic gates. (04 Marks)
- c. Explain the operation of emitter coupled logic circuit. (04 Marks)

OR

- 8 a. Explain the operation of D, JK flip-flop with schematic and truth table. (06 Marks)
- b. Explain the operation of 4-bit shift register using Schematic, state diagram. (05 Marks)
- c. Explain the operation of 3-bit ripple down counter using Schematic, timing and state diagram. (05 Marks)

Module-5

- 9 a. Implement a full adder circuit with a decoder and two OR Gates. (08 Marks)
- b. Implement a Quadraple 2 to 1 line, multiplexer with AND, OR, NOT gates. (04 Marks)
- c. Explain the encoder (octal to binary) using logic diagram and truth table. (04 Marks)

OR

- 10 a. Explain the operation of Resistor – Ladder digital to Analog converter with neat circuit diagram. (08 Marks)
- b. Explain the successive approximation type analog to digital converter with Schematic, timing and typical sequences. (08 Marks)
