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# CBCS SCHEME



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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

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<sub>L</sub> for a 25%, change in V<sub>i</sub>
  - ii) The output resistance R<sub>0</sub>
  - 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 2<sup>nd</sup> 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  $f_0 = 965$ Hz

(03 Marks)

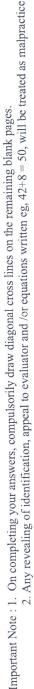
### Module-3

- 5 a. Explain the operation of Investing comparator and zero crossing detector with circuit diagram and wavefroms. (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

- Explain the operation of AND, OR, NAND, NOR logic gates using logic symbol, truth table, timing diagram and diode logic.
  - Explain CMOS NOR and NAND logic gates.

(04 Marks)

Explain the operation of emitter coupled logic circuit.

(04 Marks)

# OR

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

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

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