CBCS SCHEME

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18MT35

Third Semester B.E. Degree Examination, July/August 2021
Analog and Digital Electronics

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions.***

1 a. With neat circuit diagrams and waveforms, explain the operation of positive and negative clippers with and without reference voltage. **(10 Marks)**

b. With neat circuit diagram and waveforms explain the operation of positive and negative clampers with and without reference voltage. **(10 Marks)**

2 a. Design a second order high pass Butterworth filter with a cutoff frequency 1kHz and draw the frequency response plot of the filter. **(10 Marks)**

b. Explain about wide band pass and narrow band reject with neat circuit diagram and waveform. **(10 Marks)**

3 a. Explain the oscillator principle and working of RC phase shift oscillator with neat diagram. **(10 Marks)**

b. With a neat diagram, explain Wien bridge oscillator. **(06 Marks)**

c. Design a Wien bridge oscillator so that $f_0 = 965Hz$. **(04 Marks)**

4 a. Explain the operation of non-inverting comparator and a circuit which converts sine wave to square wave with neat diagrams and waveforms. **(10 Marks)**

b. Explain the operation of a circuit which converts an irregular-shaped waveforms into a square wave or pulse with neat circuit, input and output waveforms. **(10 Marks)**

5 a. With neat diagrams, explain pin diagram and internal architecture of 555 timer. **(10 Marks)**

b. With neat circuit diagram, explain the operation of 555 timer as a monostable multivibrator. **(10 Marks)**

6 a. Explain the operation of 555 timer as a astable multivibrator with input and output waveforms. Derive the expressions for charging and discharging time. **(10 Marks)**

b. With neat circuit and waveform explain square wave oscillator and free running ramp generator. **(10 Marks)**

7 a. Simplify the following Boolean equations using k-maps:

i) $F = \overline{A}\overline{B}D + \overline{A}B\overline{C}\overline{D} + \overline{A}BD + \overline{A}BC\overline{D} + AB\overline{C}\overline{D} + ABC + A\overline{B}CD$

ii) $F(ABCD) = \sum M(1, 2, 3, 5, 6, 7, 8, 11, 13, 15)$ **(06 Marks)**

b. Explain full subtractor with truth table and implement them using logic gates. **(04 Marks)**

c. Explain a full adder circuit using truth table, logic diagram and design full adder using two half adders. **(10 Marks)**

8 a. Explain the operation of demultiplexer using truth table and logic diagram. **(06 Marks)**

b. Implement the following Boolean equation with a multiplexer considering A as input.
$F(ABCD) = \sum(0, 1, 3, 4, 8, 9, 15)$. **(08 Marks)**

c. Explain the operation of octal to binary encoder with truth table and logic diagram. **(06 Marks)**

9 a. Explain D-flipflop and T-flipflop with neat diagrams and truth table, timing diagrams. **(10 Marks)**

b. Explain race-around condition in J-K flip flop. Also explain working of master slave J-K flip flop. **(10 Marks)**

10 a. Explain modulo 16-ripple down counter using schematic, timing and state diagram. **(10 Marks)**

b. Design a synchronous up-down counter with neat diagram. **(10 Marks)**

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