CBCS SCHEME

USN | | | | | | | | | | |

17MT35

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
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. With a neat circuit derive the expression for gain of 1st order Butterworth High Pass filter as a function of frequency. Also write the frequency response diagram for it. **(10 Marks)**

b. Explain the working of all Pass filters with neat circuit and necessary waveforms. Also drive the expression for gain. **(10 Marks)**

OR

2 a. Explain the filter design steps for 1st order low pass filter. Design a 1st order low pass filter at a cutoff frequency of 1 kHz with a pass band gain of 2. Using frequency sealing technique converts 1 kHz cutoff frequency to 1.6 kHz. **(10 Marks)**

b. With neat circuit, frequency response diagram and with necessary equations explain the working of narrow band pass filter. **(10 Marks)**

Module-2

3 a. With neat sketch and necessary equations explain the operator Re phase shift oscillator. Also design a phase shift oscillator with $f_0 = 200$ Hz. **(10 Marks)**

b. With neat circuit diagram, explain the working of Schimitt trigger circuit. **(10 Marks)**

OR

4 a. Explain the principle of oscillation with the help of block diagram. Also define frequency stability. **(10 Marks)**

b. With the help of circuit diagram, explain the working of non-inverting comparator. Also write the output waveforms for positive Vref and negative Vref. **(10 Marks)**

Module-3

5 a. Explain how 555 timer can be used as monostable multivibrator. **(10 Marks)**

b. Explain the application of monostable multivibrator as frequency divider circuit. A monostable multivibrator used as a divide by 2 Network. The frequency of input trigger signal is 2 kHz. If the value of e = 0.01 μF, what should be the value of resistance. **(10 Marks)**

OR

6 a. Explain the operation of Astable multivibrator circuit with neat sketch and relevant equations. **(10 Marks)**

b. Explain the application of Astable multivibrator as free-running ramp generator. Also find the free running frequency of ramp generator if $V_{BE} = V_{D_1} = 0.7V$, R = 10 kΩ, e = 0.05 μF and $V_{CC} = 5$ V. **(10 Marks)**

Module-4

7 a. Simplify the Boolean function $F(W, X, Y, Z) = \sum(0,1,2,4,5,6,8,9,12,13,14)$ **(06 Marks)**

b. Write K map for Boolean junction with three variables. **(04 Marks)**

c. Construct a full adder from two half adder. **(10 Marks)**

OR

8 a. Define MUX. Construct 4 to 1 line MUX. Also implement the following function using MUX $F(A, B, C) = \sum(1,3,5,6)$ **(10 Marks)**

b. What is decoder? Write the circuit for 2 to 4 decoder. Construct 4×16 decoder using two 3×8 decoder IC. **(10 Marks)**

Module-5

9 a. With neat sketch, explain clocked J-K flip flop. Write characteristic table and derive expression for characteristic equation. **(10 Marks)**

b. Design a 3 bit binary up-down counter. **(10 Marks)**

OR

10 a. With neat sketch, explain the operation of clocked D flip flop. Also derive the characteristic equation. **(10 Marks)**

b. Design a 3 bit synchronous binary counter. **(10 Marks)**

* * * * *