CBCS SCHEME

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18MT35

Third Semester B.E. Degree Examination, Aug./Sept. 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 diagram and waveform, explain Double ended shunt clippers. **(07 Marks)**

b. Explain the working of positive clampers with neat circuit diagram and waveforms. **(05 Marks)**

c. Explain with a neat diagram the working of RC coupled BJT amplifier and also sketch the frequency response curve. **(08 Marks)**

OR

2 a. Explain first order low pass Butterworth filter and derive the gain and phase angle equations. **(08 Marks)**

b. Design a low pass filter at a cutoff frequency of 1KHz with a passband gain of 2. Using frequency scaling technique converts 1KHz cutoff frequency of LPF to cutoff frequency of 1.6KHz. Assume C = 0.01μfarad. **(06 Marks)**

c. With neat diagram and waveform, explain working of Narrow band reject filter. **(06 Marks)**

Module-2

3 a. With a neat diagram, explain working of RC phase shift oscillator. **(08 Marks)**

b. Explain with a neat diagram the working of wein bridge oscillator. **(08 Marks)**

c. What is frequency stability? Mention the conditions for oscillation. **(04 Marks)**

OR

4 a. What is a comparator? Explain the working of zero crossing detector. **(08 Marks)**

b. Explain the working of inverting comparator as a Schmitt trigger with necessary waveforms. **(08 Marks)**

c. For Schmitt trigger with $R_1 = 100\Omega$, $R_2 = 56K\Omega$, $V_{in} = 1V_{P-P}$ sine wave and the opamp type is 741 with supply voltages = ± 15V. Determine V_{ut} and $V_{\ell t}$ **(04 Marks)**

Module-3

5 a. With a neat diagram and waveform, explain working of monostable multivibrator. **(08 Marks)**

b. Derive the expression for pulse width in monostable multivibrator. **(06 Marks)**

c. Explain any one application of monostable multivibrator. **(06 Marks)**

OR

6 a. Explain with neat diagram and waveform the working of Astable multivibrator, and also derive equation for time and duty cycle. **(10 Marks)**

b. Design an astable multivibrator using 555 timer to generate a clock of 1KHz with 60% duty cycle. Modify the circuit designed to with 50% duty cycle. [Choose C = 0.01μfarad]. **(10 Marks)**

Module-4

7 a. Using K-map solve
   i) $V = f(w, x, y, z) = \Sigma(1, 5, 7, 8, 9, 10, 11, 13, 15)$
   ii) $T = f(w, x, y, z) = \pi(1, 3, 8, 10, 12, 13, 14, 15)$. **(08 Marks)**

b. Design a full Adder from two half adder. **(06 Marks)**

c. Using 8:1 MUX realize $f(A\ B\ C\ D) = \Sigma(0, 1, 3, 4, 8, 9, 15)$. **(06 Marks)**

OR

8 a. What is Multiplexer? Explain with logic diagram quadruple 2 to 1 line multiplexer. **(10 Marks)**

b. Design BCD to decimal decoder circuit. **(10 Marks)**

Module-5

9 a. Analyze the operation of clocked RS flip-flop, also derive characteristics equation from truth table. **(10 Marks)**

b. Design a 4-bit binary ripple counter. **(10 Marks)**

OR

10 a. Design a synchronous counter to sequence $0 \rightarrow 2 \rightarrow 3 \rightarrow 6 \rightarrow 5 \rightarrow 1$ using JK flip flop. **(10 Marks)**

b. With a neat circuit, analyze the operation of clocked JK flip flop and also derive the characteristic equation from truth table. **(10 Marks)**

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