CBCS SCHEME

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

15MT35

Third Semester B.E. Degree Examination, June/July 2019
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 operation of P-N junction diode under :
i) No-bias condition
ii) Forward bias condition
iii) Reverse bias condition. **(08 Marks)**

b. A zener diode regulator shown below in Fig.Q1(b) has the following circuit parameters : $V_1 = 10V$, $V_Z = 5V$, $R_Z = 100\Omega$ and $R_D = 500\Omega$. Find : i) The percentage change in V_1 for a 25 percent change in V_i ii) Output reactance R_0 iii) Power dissipation in the regulator circuit iv) Voltage regulation assuming $R_L = 0.5\Omega$. **(08 Marks)**

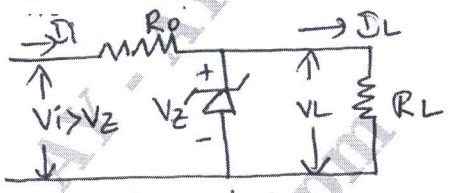

Fig.Q1(b)unregulated rectifier filter circuit.

OR

2 a. Explain how a diode acts as a switch and also explain switching response of the diode with necessary circuit and timing diagram. **(06 Marks)**

b. Explain bridge wave rectifier with capacitor filter with neat circuit diagram and waveform, also derive the equation for ripple factor. **(10 Marks)**

Module-2

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

b. Design a wide band pass filter with $f_L = 200hz$, $f_H = 1KHz$ i) passband gain = 4 ii) draw the frequency response of the filter ii) calculate the value of Q for the filter. **(08 Marks)**

OR

4 a. Explain second order high pass Butterworth filter with necessary circuit diagram and equations. **(04 Marks)**

b. Design Wein bridge oscillator for the Fig.Q4(b) below so that $f_0 = 965hz$. **(04 Marks)**

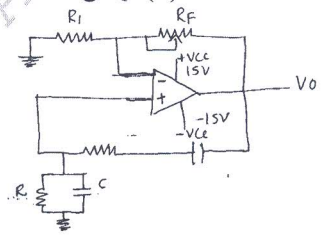

Fig.Q4(b)

c. State Backhausen criterion for sustained oscillations and explain phase shift oscillator with necessary circuit and equations. **(08 Marks)**

Module-3

5 a. Explain basic non-inverting comparator with the input and output wave form if V_{ref} is positive and V_{ref} is negative. **(08 Marks)**

b. With neat circuit and necessary equations explain squaring circuit with the input and output waveform and also plot the hysterisis voltage. **(08 Marks)**

OR

6 a. Explain how 555 timer can be configured for monostable operation with the internal block diagram. **(10 Marks)**

b. Explain how an astable multivibrator can be used as free Ramp generator with necessary circuit, equations and waveforms. **(06 Marks)**

Module-4

7 a. Draw Rs latch with NAND and NOR gate circuit. **(04 Marks)**

b. Explain clocked master-slave JK flip-flop with necessary logic circuit. **(06 Marks)**

c. Explain bi-directional shift register with parallel load. **(06 Marks)**

OR

8 a. Explain 3-bit synchronous – Binary up-down counter. **(08 Marks)**

b. Explain how read and write information transfer takes place in magnetic core-memory. **(08 Marks)**

Module-5

9 a. What is a multiplexer? $F(A, B, C, D) = \sum (0, 1, 3, 4, 8, 9, 15)$. Implement the following Boolean function with 8 : 1 MUX. **(06 Marks)**

b. Design BCD – to decimal decoder. **(06 Marks)**

c. Implement a fulladder using 3: 8 a decoder. **(04 Marks)**

OR

10 a. What is quantization of analog signal? **(02 Marks)**

b. What output voltage would be produced by D/A converter whose output range is 0 to 10V and whose input binary number is :

i) 10 (for a 2-bit D/A converter)

ii) 010 (for a 4-bit D/A converter)

iii) 10111100 (for a 8-bit D/A converter). **(06 Marks)**

c. Explain SAR–ADC with necessary functional diagram. **(08 Marks)**

* * * * *