

CBCS SCHEME

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15MT35

Third Semester B.E. Degree Examination, Dec.2018/Jan.2019 Analog and Digital Electronics

Time: 3 hrs.

Max. Marks: 80

Note: Answer FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Explain the V-I characteristics of an Ideal diode, silicon diode, Germanium diode and zener diode. (08 Marks)
- b. Explain junction diode models with necessary equivalent circuits. (08 Marks)

OR

- 2 a. Explain, with diagrams, how a pn-junction diode can be used as a switch. (06 Marks)
- b. Explain how the capacitor filter reduces the ripple in rectifier circuit. (06 Marks)
- c. The input voltage of centre tapped full wave rectifier is 10 V (rms). The sum of the dc resistance of the transformer winding and forward dc resistance of the diode is $R_s = 0.2 \Omega$, the load resistance $R_L = 10 \Omega$ and forward diode drop $V_D = 0.7$ V, Find :
- (i) Peak load current
- (ii) DC load current.
- (iii) Individual diode dc current.
- (iv) DC output voltage.
- (v) PIV. (04 Marks)

Module-2

- 3 a. Explain the operation of a first order low pass Butterworth filter and also draw its frequency response. (08 Marks)
- b. Draw the circuit diagram of a RC phase shift oscillator using op-amp and explain it. (08 Marks)

OR

- 4 a. Explain wide-band pass filter with neat circuit diagram and frequency response curves. (08 Marks)
- b. Design a first order high-pass Butter worth filter at a cut off frequency of 1 kHz and with pass band gain of 2. (08 Marks)

Module-3

- 5 a. What is comparator? Explain the operation of a non-inverting comparator. (08 Marks)
- b. Explain the operation of a monostable multivibrator using op-amp and derive the expression of pulse width. (08 Marks)

OR

- 6 a. Explain the operation of a inverting Schmitt trigger. Draw its input and output waveforms. (08 Marks)
- b. For the 555-astable multivibrator $R_A = 2.2$ k Ω , $R_B = 3.9$ k Ω and $C = 0.1$ μ F. Determine:
- (i) Positive pulse width.
- (ii) Negative pulse width.
- (iii) Free-running frequency.
- (iv) Duty cycle. (08 Marks)

Module-4

- 7 a. Explain the operation of transistor-transistor logic. (08 Marks)
b. Explain the operation of CMOS inverter. (08 Marks)

OR

- 8 a. Explain the operation of JK-flip flop. What is race around condition in JK-FF? Explain how it can be treated. (08 Marks)
b. Explain the working of a 4-bit bidirectional shift register. (08 Marks)

Module-5

- 9 a. What is multiplexer? Realize 4 : 1 multiplexer using basic gates and write its truth table. (08 Marks)
b. Explain the operation of R-2R DAC. And also derive the expression of output voltage. (08 Marks)

OR

- 10 a. What is decoder? Realize 2 to 4 line decoder using basic gates and write its truth table. (08 Marks)
b. Explain the operation of a successive approximation ADC. (08 Marks)
