Code: EC4T2, EE4T6

II B.Tech - II Semester–Regular/Supplementary Examinations
April 2019

PULSE AND DIGITAL CIRCUITS
(Common for ECE, EEE)

Duration: 3 hours   Max. Marks: 70

PART – A

Answer **all** the questions.   All questions carry equal marks

11 x 2 = 22M

1.

a) What is meant by linear wave shaping? Give some examples of linear wave shaping circuits.

b) Define rise time and fall time.

c) What is meant by clipping in wave shaping?

d) Define Steady state response.

e) Compare between triggering at base and collectors.

f) Write short notes on commutating capacitors.

g) Draw the circuit diagram of non saturating binary.

h) List the basic and universal gates.

i) What do you understand by the terms fan-in and fan-out? Draw an RTL NAND Gate.

j) List the methods of generating time-base waveforms.

k) Define relaxation circuit. Give some examples.

PART – B

Answer any ***THREE*** questions.   All questions carry equal marks.

3 x 16 = 48 M

2. a) Three low pass RC circuits are in cascade and isolated from one another by ideal buffer amplifiers. Find the expression for the output voltage as a function of time if the input is a step voltage.   10 M

b) Explain how High-pass RC circuit acts as differentiator.

6 M

3. a) Give the circuits of different types of shunt clippers and explain their operation with the help of their transfer characteristics.   8 M

b) State and prove clamping circuit theorem with relevant circuit and waveforms.   8 M

4. a) Explain the phenomenon of fixed bias binary transistor circuit.   7 M

b) Sketch the circuit diagram of Schmitt trigger and explain its operation. Define UTP and LTP.   9 M

5. a) How Astable Multivibrator can be operated? Illustrate with waveforms.   8 M

b) Design a collector coupled monostable multivibrator to obtain an output pulse of amplitude 6V and a gating time of 20 μsec, I_c (sat) = 6 mA. The base drive required for the ON transistor is 2 times I_B (min).
Assume that V_{CE} (sat) =0, V_{BE} (sat) =0, h_{fe} (min) =20 & V_{CC} =6V. 　　　　　　　　　　　　8 M

6. a) In the boot strap circuit (shown in figure 5)
V_{cc} = 25 V, V_{EE} = -15V, R = 10 K ohms, R_B = 150 K ohms, C = 0.05 μF, C_1=100 μF and R_E=15 K ohms. The gating waveform has a duration of 300 μs. The transistor parameters are h_{ie} = 1.1K ohms, h_{re} = 2.5 x 10^{-4} K ohms, h_{fe} =50 and h_{oe} = 1/40 K ohms.
　　i. Draw the waveform of IC_1 and Vo , labeling all current and voltage levels,
　　ii. What is the slope error of the sweep?
　　iii. What is the sweep speed and the maximum value of the sweep voltage?
　　iv. What is the retrace time Tr for C to discharge completely?
Calculate the recovery time T_1 for C_1 to recharge completely. 　　　　　　　　　　　10 M
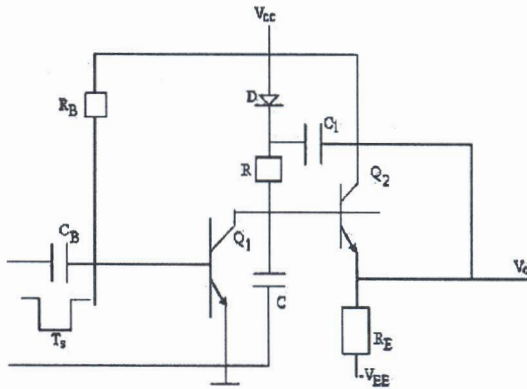
figure. 5

b) Explain the basic principles of Miller and Bootstrap time
   base generators.   6 M