

PULSE & DIGITAL CIRCUITS

(Common to ECE and EIE)

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- (a) Give the general response of a High pass circuit.
 - (b) Explain how attenuator is used as a CRO probe.
 - (c) Explain positive peak clipping with reference voltage.
 - (d) What is the function of a comparator? Briefly explain its operation.
 - (e) Explain the terms pertaining to transistor switching characteristics:
 - (i) Rise time. (ii) Delay time.
 - (f) Explain the terms pertaining to transistor switching characteristics:
 - (i) Fall time. (ii) Turn-off time.
 - (g) What are the different methods of generating time base waveform?
 - (h) Explain the basic principles of Miller and bootstrap time base generators.
 - (i) Compare the unidirectional and bidirectional sampling gates.
 - (j) Draw a TTL NAND gate.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 (a) With relevant waveforms, explain in detail the response of an RC Low pass circuit to an exponential input.
- (b) Explain the working of RC Low pass as integrator.

OR

- 3 A square wave whose peak-peak value is 1 V extends ± 5 V, with respect to ground. The duration of the positive section is 0.1 sec and of the negative section 0.2 sec. If this waveform is given as an input to an RC differentiation circuit whose time constant is 0.2 sec, what are the steady state maximum and minimum values of the output waveform? Prove that the area under the positive section equals that under the negative section of the output waveform.

UNIT – II

- 4 Draw the circuit diagram of emitter coupled clipper. Draw its transfer characteristics indicating all intercepts, slopes and voltage levels. Derive the necessary equations.

OR

- 5 What are clamping circuits? What do you mean by positive and negative clamping? State and prove clamping circuit theorem?

UNIT – III

- 6 Give the expression for rise time and fall time in terms of transistor parameters and operating currents.

OR

- 7 Write short notes on:
- (a) Diode switching times
 - (b) Switching characteristics of transistors
 - (c) FET as a switch.

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Code: 13A04401**UNIT – IV**

- 8 (a) With the help of a circuit diagram and waveforms explain the frequency division by an Astable multivibrator.
(b) Explain the basic principles of Miller and bootstrap time base generators.

OR

- 9 (a) A transistor bootstrap ramp generator is to produce a 15 V, 5ms output to a 2 kohms load resistor. The ramp is to be linear within 2%. Design a suitable circuit using $V_{CC} = 22\text{ V}$, $-V_{EE} = -22\text{ V}$ and transistor with $h_{fe}(\text{min}) = 25$. The input pulse has an amplitude of -5 V, pulse width = 5ms and space width = 2.5ms.
(b) Write short notes on methods of linearity improvements.

UNIT – V

- 10 (a) Draw and explain the circuit diagram of integrated positive RTL NOR gate.
(b) Compare RTL and DTL logic families in terms of Fan out, propagation delay, power dissipated per gate and noise immunity.

OR

- 11 (a) What are the other names of a gate signal?
(b) What are the basic logic gates which perform almost all the operations in digital communication systems?
(c) Give some applications of logic gates.
