

2007 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

II B.TECH I SEMESTER REGULAR EXAMINATIONS
PULSE AND DIGITAL CIRCUITS
(COMMON TO ELECTRICAL & ELECTRONIC ENGINEERING, ELECTRONICS & COMMUNICATION
ENGINEERING,
ELECTRONICS & INSTRUMENTATION ENGINEERING AND ELECTRONICS & TELEMATICS)

NOVEMBER 2007

Time: 3 hours
Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Verify $V_2 = (V/2)(e^{2x}-1)/(e^{2x}+1) = (V/2) \tanh x$ for a symmetrical square wave applied to a low pass RC circuit.
- (b) Derive the expression for percentage tilt (P) of a square wave output of RC high pass circuit. [8+8]
2. (a) Give the circuits of different types of shunt clippers and explain their operation with the help of their transfer characteristics.
- (b) Draw the diode differentiator comparator circuit and explain the operation of it when ramp input signal is applied. [8+8]
3. Write Short notes on:
- (a) Diode switching times
- (b) Switching characteristics of transistors
- (c) FET as a switch. [4+8+4]
4. (a) Draw the circuit diagram of a Schmitt trigger circuit and explain its operation. Derive the Expressions for its UTP and LTP.
- (b) Explain how an Schmitt trigger circuit acts as a comparator. [12+4]
5. (a) Explain the basic principles of Miller and bootstrap time base generators.
- (b) A transistor bootstrap ramp generator is to produce a 15V, 5ms output to a 2kohms load resistor. The ramp is to be linear within 2%. Design a suitable circuit using $V_{cc} = 22V$, $-V_{EE} = -22V$ and transistor with $h_{fe}(\min) = 25$. The input pulse has an amplitude of -5V, pulse width = 5ms and space width = 2.5ms. [8+8]
6. (a) What is relaxation oscillator? Name some negative resistance devices used as relaxation oscillators and give its applications.
- (b) With the help of a circuit diagram and waveforms, explain the frequency division by an astable multivibrator? [8+8]
7. (a) Why are sampling gates called linear gates?

(b) What are the other names of a gate signal?

(c) Compare the unidirectional and bi-directional sampling gates.

8. (a) Why totem pole is used in DTL? Draw the circuit diagram and explain a DTL gate with this.

(b) Verify the truth table of RTL NOR gate with the circuit diagram of two inputs.

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