

Roll No.

Total No. of Questions : 09]

[Total No. of Pages : 02

Paper ID [EC309]

(Please fill this Paper ID in OMR Sheet)

B.Tech. (Sem. - 5th)

PULSE AND DIGITAL SWITCHING CIRCUITS (EC - 309)

MAY 2008

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

Section - A

Q1)

(10 × 2 = 20)

- a) Sketch the transient response of a series RLC circuit with step input.
- b) Describe the operation of non-saturating transistor clipper.
- c) Differentiate between symmetrical and asymmetrical triggering.
- d) What is Miller integrator?
- e) How does the commutating capacitor reduces the transition time of a transistor.
- f) Explain Comparator circuit and its uses.
- g) Sketch typical input/output characteristics for a Schmitt trigger circuit.
- h) Define various transistor switching times.
- i) Why does the frequency response of a filter is not flat?
- j) What are advantages and disadvantages of symmetrical and unsymmetrical triggering?

Section - B



(4 × 5 = 20)

- Q2) Design an RC differentiator network of square pulses of 1ms repetition rate and 10 V amplitude. It is desired to have output trigger pulses of 8 V amplitude. Assume source resistance of 50 Ω and load resistance of 500 Ω.

- Q3) A silicon abrupt-junction diode has the following ratings: reverse saturation current $I_o = 0.1 \mu A$ at 20 V; at 1 V forward voltage, the current is 5 mA; junction capacitance at 0 V is 60 pF. Calculate: (a) dynamic resistance of diode at 1 V, (b) static resistance at 1 V, (c) reverse resistance at 20 V, (d) junction capacitance at external applied voltage of -5 V and (e) bulk resistance.
- Q4) Describe the design of mono-stable multi-vibrator and comment on selection of transistor.
- Q5) Prove that the gate width of a collector coupled mono-stable multi-vibrator is $0.69 RC$.
- Q6) What are the switching characteristics of transistor switches? Explain.

Section - C

(2 × 10 = 20)

- Q7) A symmetrical square wave of 200 μs repetition period and 100 V peak amplitude is applied to a diode clamper circuit shown below. Determine and plot the output voltage waveform for first few cycles.
- Q8) Describe the principle and working of a sweep generator. List the various types available alongwith their merits. Comment on the Slope error, transmission error and displacement error.
- Q9) Write short notes on the following :
- (a) Compensation in wide band amplifiers.
 - (b) Ringing circuits.
