[06 – 3110]   *EEE*

Oct-16

III/IV B.E. DEGREE EXAMINATION

First Semester

Electrical and Electronics Engineering

PULSE AND DIGITAL CIRCUITS

(Common for EEE and ECE)

(Effective from the admitted batch of 2004–2005 and after batches)

Time : Three hours   Maximum : 70 marks

Answer question No. 1 and answer any FOUR questions from the remaining.

All questions carry equal marks.

1. (a) What is the function of commutating capacitors?

   (b) Define the Rise Time for a Transistor switch.

   (c) Write short notes on Transistor clipper.

   (d) List out the applications of Bistable Multivibrators.

   (e) What are the merits and Demerits of DTL family?

   (f) Mention the features of Miller Sawtooth generator.

   (g) What do you mean by linear time based generator?

2. (a) Explain how RC circuits are used as integrators and differentiators and draw the output waveforms for a square wave input signal.

(b) Explain with the help schematic diagram, how the low pass RC circuit can be used as an integrator.

3. (a) Draw and Explain the operation of Emitter coupled clipper.

(b) Explain the characteristics of practical clamper circuit with neat sketch.

4. (a) Derive an expression for the gate width of a monostable multivibrator.

(b) Explain the principle of working of fixed bias Bistable multivibrator with the help of neat diagram.

5. (a) What is meant by triggered sweep? What are the merits and demerits of triggered sweep circuits.

(b) Explain about current sweep circuit used for TV and the transistor.

6. (a) Realize a three input NAND gate using TTL and explain its operation with Totem-Pole load.

(b) Explain the following terms w.r.s to logic gates:

(i) Fan out

(ii) Noise-margin

(iii) Propagation delay

(iv) Figure of merit

7. (a) Classify different types of clipper circuits and explain their operation with the help of transfer characteristics.

(b) Design a diode clamper circuit to clamp the positive peaks of the input signal at zero level by considering the frequency of the input signal as 500 Hz.

8. (a) Explain the operation of Base timing circuit with neat sketch.

(b) Explain the operation of Emitter timing circuit with neat sketch.

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(Common with ECE and Dual Degree Programme in ECE & ECE)

(Effective from the admitted batch of 2004–2005)

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$(7 \times 2 = 14)$

1.   (a)   Write about ringing circuit in brief.

     (b)   List out any four applications of diode and give the characteristic of ideal diode.

     (c)   Define what is Regenerative circuit.

     (d)   Explain the operation of basic gates, with its truth table.

     (e)   Discuss the need for synchronization in multivibrators.

(f) Write about the errors that define deviation from linearity.

(g) What is Attenuator? Give some applications of attenuator?

2. (a) An oscilloscope displays a 5 Hz square wave form with a 6% tilt. The signal input has no tilt and is coupled to the oscilloscope via a 4.7 μF capacitor. Calculate the oscilloscope input resistance?

(b) Explain in detail the output response of low-pass RC-circuit for a given input pulse waveform.

(c) Show that a high pass RC circuit is a differentiator.

3. (a) For the diode clipping circuit shown in the figure below, assume $V_R = 10$ V, $V_i = 20 \sin$ wt, $R_f = 100$ Ω and $R_r = \infty$ and $V_r = 0$. Neglect all capacitances. Draw to scale the input and output wave form and label the maximum and minimum values if
(i) $R = 100$ Ω (ii) $R = 1$ kΩ.
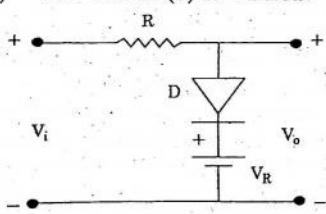
(b) Explain with an example positive peak clamping circuit with diode.

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4. (a) Discuss in detail asymmetrical triggering methods of multivibrator.

(b) Explain the principle of operation of monostable multivibrator.

5. (a) With a neat diagram, explain the working principle of UJT relaxation oscillator.

(b) What is bootstrap sweep circuit? Discuss.

6. (a) Write about synchronisation of sweep circuit with symmetrical signals.

(b) Explain the principles behind synchronisation with frequency division.

7. (a) Give the practical application of blocking oscillators.

(b) Write about modified version of triggered transistor blocking oscillator.

8. (a) Discuss in detail various TTL gates output configurations.

(b) With neat diagram and truth table explain the operation of J-K flip flop.

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III/IV B.E. DEGREE EXAMINATION.

First Semester

Electrical and Electronics Engineering

PULSE AND DIGITAL CIRCUITS

(Common with Electronics and Communication
Engineering and Dual Degree Programs in
EEE and ECE)

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and after batches)

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1. (a) What is meant by Linear wave shaping?

    (b) State clamping circuit theorem.

    (c) What do you mean by storage time in a
         transistor? How storage time can be
         reduced?

    (d) What is relaxation oscillator?

(e) Explain base timing and emitter timing.

(f) What is blocking oscillator? Write its applications.

(g) Explain the terms fan out and propagation delay.

2. (a) Derive the expression for rise time of the pulse waveform after passing through low pass RC circuit.

(b) A symmetrical square wave of ± 5 v at a frequency of 5 kHz is applied in a High pass RC circuit with a cut-off frequency of 20 kHz. Sketch the steady state input and output voltage waveforms. Calculate the steady state output voltage levels.

3. (a) Draw the circuit diagram of Slicer circuit using Zener diode and explain its operation with the help of transfer characteristics.

(b) Explain transfer characteristics of the emitter coupled clipper and derive the necessary equation.

4. (a) What do you understand by hysteresis? What is hysteresis voltage? Explain how it can be eliminated in a Schmitt trigger?

(b) Design an astable multivibrator to generate a square wave if 5 kHz frequency and with a duty cycle of 25%.

5. (a) Draw the self biased binary circuit and derive necessary relations for steady state analysis of the circuit.

(b) Design a monostable multivibrator to generate an output pulse of 250 μs duration. Assume $h_{fe}(\min) = 25$, $I_{CC}(\text{sat}) = 5 \, mA$, $V_{CC} = 10V$ and $V_{BB} = -4V$.

6. (a) Explain the working of a millers time base generator with neat circuit diagram.

(b) Explain current time base generator with neat sketches.

7. (a) What is Synchronization? Why it is necessary in waveform generators?

(b) How an astable multivibrator can be synchronized ? illustrate with waveforms.

8. (a) Compare the RTL and DTL logic families in terms of fan-in, fan-out, propagation delay, power dissipation and noise immunity.

(b) Find the component values of a bootstrap sweep generator given $V_{CC} = 18V$, $I_C(\text{sat}) = 2 \, mA$ and $h_{fe}(\min) = 30$.

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