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Total No. of Questions : 09]

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B.Tech. (ECE/ETE) (Sem. - 4th)

PULSE WAVE SHAPING AND SWITCHING

SUBJECT CODE : BTEC - 405 (2011 Batch)

Paper ID : [A1193]

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

1) Section - A is Compulsory consisting of Ten questions carrying Two marks each.

2) Section - B contains Five questions carrying Five marks each and students has to attempt any Four questions.

3) Section - C contains Three questions carrying Ten marks each and students has to attempt any Two questions.

Section - A

Q1)

a) Define the condition for Low Pass filter to act as a good Integrator.

b) What is speed-up capacitor used in a multivibrator? Draw circuit diagram.

c) Explain Tripping points in Schmitt trigger.

d) List the advantages of Emitter Coupled Astable multivibrator over collector coupled.

e) Connect a diode to a transistor to improve its switching speed. Draw its circuit diagram.

f) What is the figure of merit of diodes when used in clipper circuit?

g) Mention the regions of transistor used as switch. How do you come to know that transistor is in saturation region, practically?

h) Sketch the internal details of probe used in Oscilloscopes.

i) Draw the ring circuit and sketch output corresponding to an input of square pulse train.

j) Distinguish between Avalanche break down and Zener break down.

Section - B

Q2) In case of R-L series circuit, derive the expression of output voltage for sinusoidal (A.C.) input voltage.

Q3) Explain working in detail of collector catching diodes, Commutating capacitor.

Q4) Draw and explain the working of Emitter Coupled Monostable multivibrator? What are its advantages?

Q5) Prove that Gate width (T) of a Collector Coupled Monostable multivibrator is $T = \tau \ln 2$. Symbols have usual meaning.

Q6) Explain the means/ways to improve the speed response of transistor as a switch.

Section - C

Q7) a) Explain the working of Diode Differential Comparator and derive relation for its output.

b) Refer to figure 7(b), A collector coupled monostable multivibrator using n-p-n silicon transistor has the following parameters : $V_{cc} = 12V$, $V_{BB} = 3V$, $R_c = 2K$, $R_1 = R_2 = R = 20K$, $h_{FE} = 30$, $r_{bb} = 200$ and $C = 1000$ pF. Neglect T_{CBO}.

i) Calculate and plot to scale the waveshapes at each base and collector.
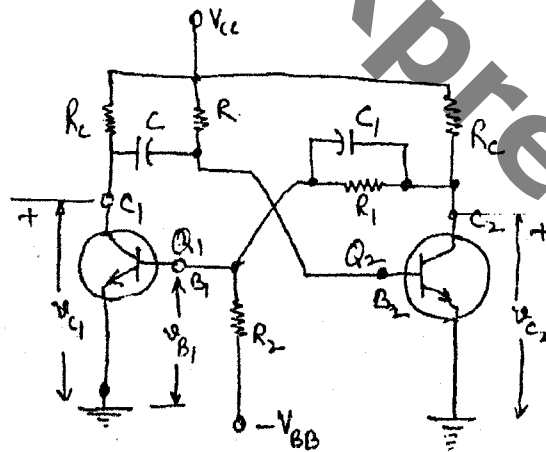
ii) Find the width of the output pulse.

· Figure 7(b)

Q8) a) Derive the expression of resonance frequency in case of parallel resonance circuit.

b) Refer to figure 8(b), for the diode clipping circuit assume that $V_R = 5V$,

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$V_i(t) = 10 \sin 2\omega t$, and that the diode forward resistance is $R_f = 100\Omega$ while $R_\tau = \infty$ and $V_\gamma = 0$. Neglect all capacitances. Draw to scale the input and output waveforms and label the maximum and minimum values if (i) $R = 100\Omega$, (ii) $R = 1$ K, (iii) $R = 10$K?
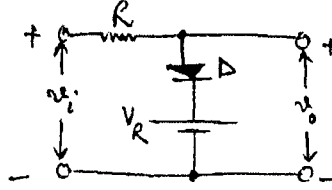

Figure 8(b)

Q9) Write note on the following :

a) Attenuator circuits and compensations.

b) Symmetrical Triggering in bistable Multivibrators.

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