[Total No. of Questions - 9] [Total No. of Printed Pages - 4] (2125)

15104

B. Tech 4th Semester Examination

Pulse Shaping and Wave Generation (OS)

EC-4005

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question each from sections A, B, C and D. Section - E is compulsory.

SECTION - A

1. (a) Show that low-pass circuit with a large time constant acts as an integrator. Draw the response of a low pass circuit with small, medium and large time constants when input is square wave. (10)

   (b) Draw the high-pass circuit and explain its working. How a High RC circuit is used in linear wave shaping? Find out the lower cut off frequency of high pass circuit. (10)

2. (a) Explain the design procedure of Transistor Switch. For a CE transistor circuit with V_{cc} = 15V, R_c = 1.5K ohms, calculate the transistor power dissipation at open and closed positions. (10)

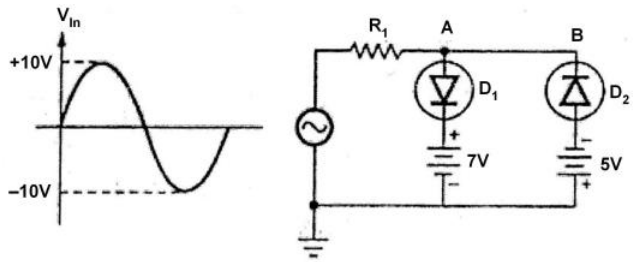
   (b) Give the expression for rise time and fall time in terms of transistor parameters and operating currents. What is delay time and storage time of a transistor? What factors does contribute to it? (10)

[P.T.O.]

SECTION - B

3. (a) How the clipping circuits are used in non-linear wave shaping? Draw a circuit to transmit that part of a sine wave which lies between +4V and +8V and explain its working. (10)

   (b) The limiter circuit is shown below:



   Explain its working and Sketch its output waveform. (10)

4. (a) What are the limitations of practical clamping circuit? What do you mean by biased clamping? A 100V peak square wave with an average value of 0V and a period of 20ms is to be negatively clamped at 25V. Draw the input and output waveforms and necessary circuit diagram. (10)

   (b) Explain the working of transistor as switch. Explain the various timing parameters associated with transistor switching characteristics. (10)

SECTION - C

5. (a) Draw the circuit diagram and explain a DTL gate. Why totem pole is used in DTL? (10)

(b) What are registers? Explain circuit of dynamic registers. (10)

6. (a) Why NAND and NOR are known as universal gates. Prove that positive logic NOR is equivalent to negative logic NAND gate. (10)

(b) Describe the characteristics of logic families. Compare logic gates. (10)

SECTION - D

7. (a) Derive an expression for the frequency of oscillations of an astable multivibrator. Show that an astable multivibrator can be used as a voltage to frequency converter. (10)

(b) Draw and explain the base and collector waveforms of a monostable multivibrator. Derive the expression for the gate width of a monostable multivibrator. (10)

8. (a) Explain the working of bidirectional diode gate. (10)

(b) Why are sampling gates called Selection circuits? Compare the unidirectional and bi directional sampling gates (10)

SECTION - E

9. (i) What is sampling gate? Explain how it differs from Logic gates?

(ii) How low pass RC circuit act as integrator?

(iii) Define a diode forward recovery time and reverse recovery time.

(iv) Describe De-Morgen theorem.

(v) What do you understand by dynamic analysis of switches?

(vi) What are the different schemes for temperature compensation of clipper?

(vii) Explain the effect of temperature on transistor parameters.

(viii) Why are RC circuits commonly used compared to RL circuits?

(ix) What is positive clamping?

(x) Draw a circuit to transmit that part of a sine wave which is below-5V. (2×10=20)