Code No: 44106 **Set No. 1**

II B.Tech II Semester Regular Examinations, Apr/May 2009
PULSE AND DIGITAL CIRCUITS
(Common to Electronics & Communication Engineering, Bio-Medical Engineering, Electronics & Control Engineering, Electronics & Telematics, Electronics & Computer Engineering and Instrumentation & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Prove that for any periodic input wave form the average levle of the steady state outut signal froms Rc high pass circuit is always zero
   (b) Explain how a low pass RC circuit act as an integrator. [8+8]

2. (a) Design a clipping circuit with ideal components, which can give the waveform shown in figure 2a for a sinusoidal input.

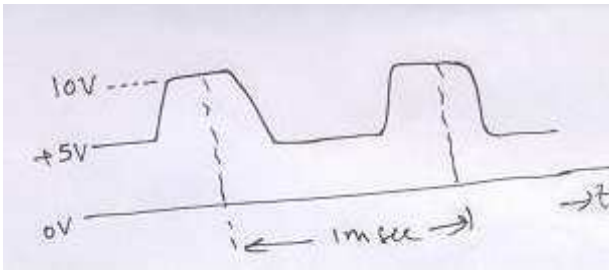

Figure 2a

   (b) State and prove clamping circuit theorem. [8+8]

3. (a) Explain how a transistor can be used as a switch.
   (b) Explain the phenomenon of 'Latching" in a transistor switch [8+8]

4. Explain the method of unsymmetrical triggering of the binary with relevant circuit diagram. [16]

5. (a) If the amplifier gain is different from unity in a bootstrap circuit, what is the effect on the sweep voltage? What is the effect of amplifier bandwidth on the sweep output?
   (b) In UJT sweep circuit V_{BB} = 20 V, V_{YY} = 50V, R = 5kΩ , $R_{B1} = R_{B2} = 0\Omega$ and C= 0.01 μF. the UJT fires when V_c = 10.6V and goes to OFF state when V_c = 2.8V. Find the
      i. the amplitude of sweep signal
      ii. the slope and displacement error
      iii. the duration of the sweep, and
      iv. the recovery time. [16]

6. (a) Explain the method of synchronization of a sinusoidal oscillator with pulses.

(b) Describe frequency division employing a transistor monostbale multivibrator. [8+8]

7. (a) Draw the circuit diagram of the unidirectional diode gate with more than two inputs and explain its operation.
   (b) How do you overcome the loading effect of signal sources on control voltage?
   (c) Draw the circuit diagram of a sampling gate with more than one control voltage and explain its working. [16]

8. (a) Define positive and negative logic system
   (b) Define fan-In, fan-out
   (c) Draw and explain the circuit diagram of a diode OR gate for positive logic. [4+4+8]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: 44106 **Set No. 2**

II B.Tech II Semester Regular Examinations, Apr/May 2009
PULSE AND DIGITAL CIRCUITS
(Common to Electronics & Communication Engineering, Bio-Medical Engineering, Electronics & Control Engineering, Electronics & Telematics, Electronics & Computer Engineering and Instrumentation & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Write a short notes on RC low pass circuit
   (b) Draw the output response of RC low pass circuit for a step input signal and explain in detailed. [8+8]
2. (a) Draw the diode comparator circuit and explain the operation of it when ramp input signal is applied.
   (b) Explain the operation of two level slicer. [10+6]
3. (a) Explain how a BJT can be used as a switch. Compare it performance as a switch with BBJT
   (b) Describe the switching times of BJT by considering the charge distribution across the base region. Explain this for cut-off, active and saturation region. [8+8]
4. Draw and explain about the response of Schmitt circuit for the following.
   (a) for loop gain ≤ 1
   (b) loop gain >1. [16]
5. (a) What is a linear time base generator?
   (b) Write the applications of time base generators.
   (c) Define the sweep speed error, displacement error and transmission error of voltage time base waveform. [16]
6. (a) Explain the method of synchronization of a sinusoidal oscillator with pulses.
   (b) Describe frequency division employing a transistor monostbale multivibrator. [8+8]
7. (a) Draw the circuit diagram of the unidirectional diode gate with more than two inputs and explain its operation.
   (b) How do you overcome the loading effect of signal sources on control voltage?
   (c) Draw the circuit diagram of a sampling gate with more than one control voltage and explain its working. [16]

8. (a) What are the basic logic gates which perform all the operations in digital systems.
   (b) Give some applications of logic gates.
   (c) Define a positive and negative pulse logic systems.
   (d) Draw a pulse train representing 1101011001. [16]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: 44106 **Set No. 3**

II B.Tech II Semester Regular Examinations, Apr/May 2009
PULSE AND DIGITAL CIRCUITS
(Common to Electronics & Communication Engineering, Bio-Medical Engineering, Electronics & Control Engineering, Electronics & Telematics, Electronics & Computer Engineering and Instrumentation & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain about RLC Ringing Circuit
   (b) Explain RC double differentiator circuit. [8+8]

2. (a) For the circuit shown in figure 2a , V_i is a sinusoidal voltage of peak 100 volts. Assume ideal diodes. Sketch one cycle of output voltage. Determine the maximum diode Current.

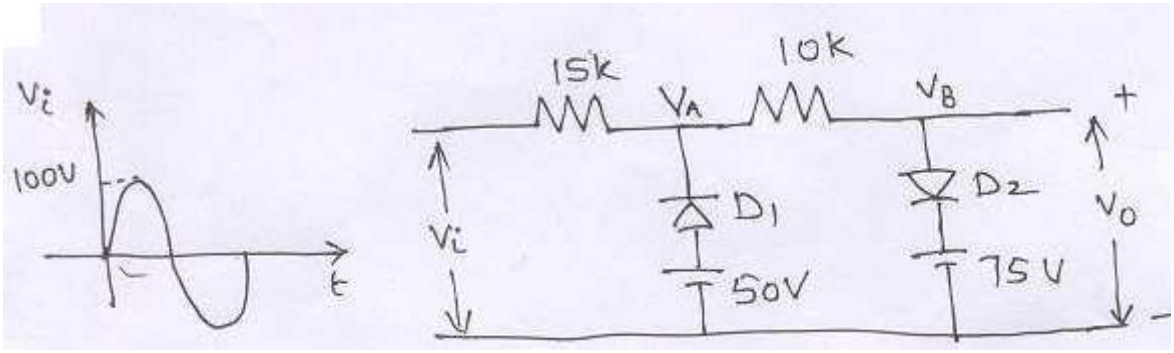

Figure 2a

   (b) Explain positive peak clipping with reference voltage. [12+4]

3. (a) Describe the switching times of BJT by considoring charge distribution across the base region. Explain this far cut-off, active and saturation region.
   (b) Give the expressions for rise time & fall time in terms of trunsistor parameters and operating corrents. [8+8]

4. Consider the Schmitt trigger of the following figure 4 with germanium transistors having h_{FE}=40. The circuit parameters are V_{CC}=55V, Rs=3.9K, Rc_1=12K, Rc_2=2K, R_1=39K, R_2=180K and Re=39K. Calculate [16]
   (a) V_1
   (b) V_2.

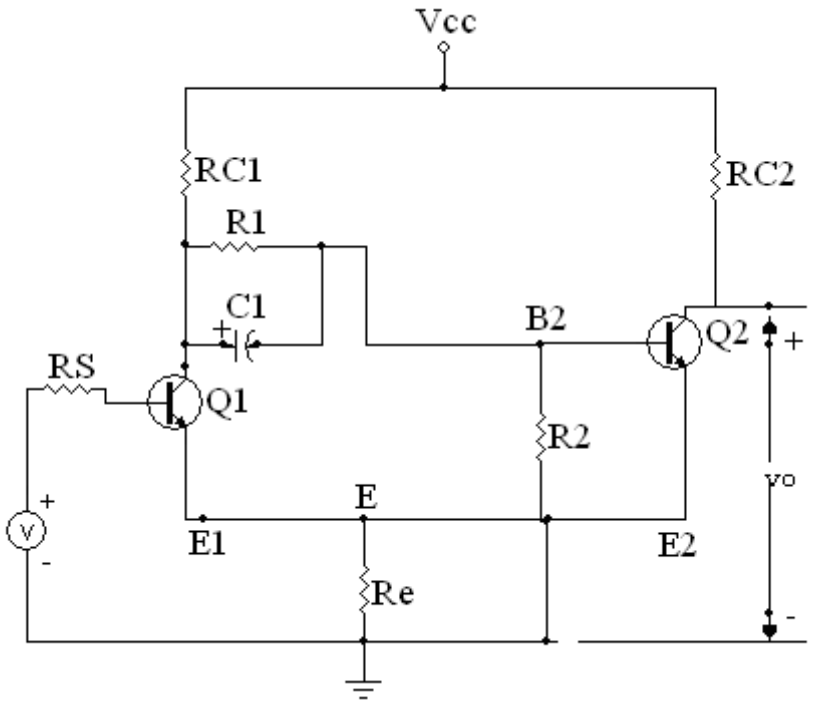

Figure 4

5. (a) Draw the circuit diagram of fixed amplitude sweep circuit and explain its operation.

   (b) Draw the circuit diagram of transistor Miller time base generator and explain its working. [16]

6. (a) With the help of a circuit diagram and waveforms, explain frequency division of an astable multivibrator with pulse signals.

   (b) The relaxation oscillator, when running freely, generates an output signal of peak - to - peak amplitude 100V and frequency 1 kHz. Synchronizing pulses are applied of such amplitude that at each pulse the breakdown voltage is lowered by 20V. Over what frequency range may the sync pulse frequency be varied if 1 : 1 synchronization is to result? If 5 : 1 synchronization is to be obtained ($f_P/f_S = 5$), over what range of frequency may the pulse source be varied? [16]

7. (a) What is pedestal? How it effects the output of a sampling gate?

   (b) What are the applications of sampling gates?

   (c) Explain clearly the disadvantages of two diode bidirectional sampling gate compared to four divide gate. [6+4+6]

8. (a) Draw the circuit diagram of diode - resistor logic OR gate and explain its operation.

   (b) The transistor inverter (NOT gate) circuit has a minimum value $h_{fe} = 30$, $V_{CC} = 12$V, $R_C = 2.2$kΩ, $R_1 = 15$kΩ and $R_2 = 100$kΩ, $V_{BB} = 12$V. Prove

that circuit works as NOT gate. Assume typical junction voltages. The input is varying between 0 and 12V. [16]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: 44106 **Set No. 4**

II B.Tech II Semester Regular Examinations, Apr/May 2009
PULSE AND DIGITAL CIRCUITS
(Common to Electronics & Communication Engineering, Bio-Medical Engineering, Electronics & Control Engineering, Electronics & Telematics, Electronics & Computer Engineering and Instrumentation & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) A symmetrical square wave whose peak-to-peak amptitude id 2V and whose average value is zero as applied to on Rc integrating circuit. The time constant is equals to half -period of th esquare wave find the peak to peak value of the output amplitude
   (b) Describe the relationship between rise time and RCtime constant of a low pass RC circuit. [8+8]
2. (a) Draw the basic circuit diagram of negative peak clamper circuit and explain its operation.
   (b) What is meant by comparator and explain diode differentiator comparator operation with the help of ramp input signal is applied. [6+10]
3. (a) Define the following:
      i. Storage time
      ii. Delay time
      iii. Rise time
      iv. Fall time
   (b) Explain how a BJT can be used as a switch. Compare its perfoemance as a switch with JFET. [8+8]
4. Write short notes on:
   (a) Gate width of mono-stable multivibrator.
   (b) Astable multivibrator as a voltage to frequency converter with circuit and waveform. [8+8]
5. (a) With the help of neat diagram explain the working of transistor Bootstrap time base generator.
   (b) Draw a simple current sweep circuit and explain its working with the help of diagrams. [16]
6. (a) Describe the sine wave frequency division with a sweep circuit.
   (b) Compare sine wave synchronzation with pulse synchronization.
   (c) What is Synchronization on one-to-one basis? [8+4+4]

7. (a) What is a sampling gate.
   (b) Illustrate the principle of sampling gates with series and parallel switches and compare them.
   (c) Draw the circuit diagram of unidirectional diode gate and explain its operation. [16]

8. (a) Draw the circuit diagram of diode - resistor logic OR gate and explain its operation.
   (b) The transistor inverter (NOT gate) circuit has a minimum value $h_{fe} = 30$, $V_{CC} = 12V$, $R_C = 2.2k\Omega$, $R_1 = 15k\Omega$ and $R_2 = 100k\Omega$, $V_{BB} = 12V$. Prove that circuit works as NOT gate. Assume typical junction voltages. The input is varying between 0 and 12V. [16]

⋆ ⋆ ⋆ ⋆ ⋆