**R07** 

### Set No. 2

Max Marks: 80

### II B.Tech II Semester Examinations, APRIL 2011 PULSE AND DIGITAL CIRCUITS Common to BME, ICE, E.COMP.E, ETM, E.CONT.E, ECE

Time: 3 hours

Code No: 07A4EC07

### Answer any FIVE Questions All Questions carry equal marks \*\*\*\*

- 1. (a) Explain how a transistor can be used as a switch.
  - (b) Explain the phenomenon of 'Latching" in a transistor switch [8+8]
- 2. (a) Describe the operation of a transistor voltage sweep waveform generator, employing a constant current charging method with the help of its circuit diagram and waveforms.
  - (b) Mention the drawbacks of the transistor voltage sweep waveform generator and suggest the methods for eliminating those drawbacks.
  - (c) Define sweep speed, Displacement & transmission errors. [6+6+4]
- 3. (a) Design an astable multivibrator to generate a 5kHz square wave with a duty cycle of 60% and amplitude 12v. Use NPN silicon transistors having  $h_{FE(min)} = 70$ ,  $V_{CE(sat)} = 0.3v$ ,  $V_{BE(sat)} = 0.7v$ ,  $V_{BE(cut-off)} = 0v$  and  $R_C = 2K$ . Draw the waveforms seen at both collectors and bases.
  - (b) Explain the operation of bistable multivibrator circuit with circuit diagram and waveform. [8+8]
- 4. (a) What is phase delay and phase jitter?
  - (b) Explain the method of synchronization of a sinusoidal oscillator with pulses.
  - (c) Explain the frequency division in sweep circuit. [4+8+4]
- 5. (a) Draw the circuit diagram of diode resistor logic AND gate and explain its operation.
  - (b) Design a transistor inverter circuit (NOT gate) with the following specifications.  $V_{CC} = V_{BB} = 10V$ ,  $i_{csat} = 10mA$ ;  $h_{femin} = 30$ ; the input is varying between 0 and 10V. Assume typical junction voltages of npn silicon transistor. [16]
- 6. (a) What are the applications of sampling gates?
  - (b) What are the advantages and disadvantages of unidirectional diode gate?
  - (c) Discuss the operation of the four diode bi-directional sampling gate. [4+4+8]
- 7. (a) A symmetrical square wave of peak -to-peak amplitude 'V' and fequency 'f' is applied to a high pass circuit. Show that the percentage tilt is given by  $P = \frac{1-e^{-1/2Rcf}}{1+e^{-1/2Rcf}} \times 100\%.$ 
  - (b) Compare linear waveshaping with NonLinear wave shaping. [8+8]

#### www.firstranker.com

Code No: 07A4EC07

# **R07**

# Set No. 2

- 8. (a) For the clipper circuit shown in figure 1 the input  $v_i = 60 \sin \omega t$ . Calculate and plot to Scale
  - i. The transfer characteristic indicating slopes and intercepts.
  - ii. Input / output on the same scale. Assume ideal diodes.



### Figure 1:

(b) Explain positive peak clipping without reference voltage. [12+4]



**R07** 

### Set No. 4

### II B.Tech II Semester Examinations, APRIL 2011 PULSE AND DIGITAL CIRCUITS Common to BME, ICE, E.COMP.E, ETM, E.CONT.E, ECE Time: 3 hours

Max Marks: 80

#### Answer any FIVE Questions All Questions carry equal marks \*\*\*\*

- (a) A symmetrical square wave of peak -to-peak amplitude 'V' and fequency 'f' is 1. applied to a high pass circuit. Show that the percentage tilt is given by  $P = \frac{1-e^{-1/2Rcf}}{1+e^{-1/2Rcf}} \times 100\%.$ 
  - (b) Compare linear waveshaping with NonLinear wave shaping. [8+8]
- 2. (a) What is phase delay and phase jitter?
  - (b) Explain the method of synchronization of a sinusoidal oscillator with pulses.
  - (c) Explain the frequency division in sweep circuit. [4+8+4]
- 3. (a) Describe the operation of a transistor voltage sweep waveform generator, employing a constant current charging method with the help of its circuit diagram and waveforms.
  - (b) Mention the drawbacks of the transistor voltage sweep waveform generator and suggest the methods for eliminating those drawbacks.
  - (c) Define sweep speed, Displacement & transmission errors. [6+6+4]
- (a) Explain how a transistor can be used as a switch. 4.
  - (b) Explain the phenomenon of 'Latching" in a transistor switch [8+8]
- (a) Draw the circuit diagram of diode resistor logic AND gate and explain its 5. operation.
  - (b) Design a transistor inverter circuit (NOT gate) with the following specifications.  $V_{CC} = V_{BB} = 10V$ ,  $i_{csat} = 10mA$ ;  $h_{femin} = 30$ ; the input is varying between 0 and 10V. Assume typical junction voltages of npn silicon transistor. [16]
- 6. (a) What are the applications of sampling gates?
  - (b) What are the advantages and disadvantages of unidirectional diode gate?
  - (c) Discuss the operation of the four diode bi-directional sampling gate. [4+4+8]
- 7. (a) For the clipper circuit shown in figure 2 the input  $v_i = 60 \sin \omega t$ . Calculate and plot to Scale
  - i. The transfer characteristic indicating slopes and intercepts.
  - ii. Input / output on the same scale. Assume ideal diodes.
  - (b) Explain positive peak clipping without reference voltage. [12+4]

### $\mathbf{R07}$

### Set No. 4





- 8. (a) Design an astable multivibrator to generate a 5kHz square wave with a duty cycle of 60% and amplitude 12v. Use NPN silicon transistors having  $h_{FE(min)} = 70$ ,  $V_{CE(sat)} = 0.3v$ ,  $V_{BE(sat)} = 0.7v$ ,  $V_{BE(cut-off)} = 0v$  and  $R_C = 2K$ . Draw the waveforms seen at both collectors and bases.
  - (b) Explain the operation of bistable multivibrator circuit with circuit diagram and waveform. [8+8]

Re

**R07** 

### Set No. 1

#### Code No: 07A4EC07

#### II B.Tech II Semester Examinations, APRIL 2011 PULSE AND DIGITAL CIRCUITS Common to BME, ICE, E.COMP.E, ETM, E.CONT.E, ECE

Time: 3 hours

Max Marks: 80

#### Answer any FIVE Questions All Questions carry equal marks \*\*\*\*

- 1. (a) Explain how a transistor can be used as a switch.
  - (b) Explain the phenomenon of 'Latching" in a transistor switch [8+8]
- 2. (a) What are the applications of sampling gates?
  - (b) What are the advantages and disadvantages of unidirectional diode gate?
  - (c) Discuss the operation of the four diode bi-directional sampling gate. [4+4+8]
- 3. (a) Describe the operation of a transistor voltage sweep waveform generator, employing a constant current charging method with the help of its circuit diagram and waveforms.
  - (b) Mention the drawbacks of the transistor voltage sweep waveform generator and suggest the methods for eliminating those drawbacks.
  - (c) Define sweep speed, Displacement & transmission errors. [6+6+4]
- 4. (a) Design an astable multivibrator to generate a 5kHz square wave with a duty cycle of 60% and amplitude 12v. Use NPN silicon transistors having  $h_{FE(min)} = 70$ ,  $V_{CE(sat)} = 0.3$ v,  $V_{BE(sat)} = 0.7$ v,  $V_{BE(cut-off)} = 0$ v and  $R_C = 2$ K. Draw the waveforms seen at both collectors and bases.
  - (b) Explain the operation of bistable multivibrator circuit with circuit diagram and waveform. [8+8]
- 5. (a) A symmetrical square wave of peak -to-peak amplitude 'V' and fequency 'f' is applied to a high pass circuit. Show that the percentage tilt is given by  $P = \frac{1 e^{-1/2Rcf}}{1 + e^{-1/2Rcf}} \times 100\%.$ 
  - (b) Compare linear waveshaping with NonLinear wave shaping. [8+8]
- 6. (a) What is phase delay and phase jitter?
  - (b) Explain the method of synchronization of a sinusoidal oscillator with pulses.
  - (c) Explain the frequency division in sweep circuit. [4+8+4]
- 7. (a) Draw the circuit diagram of diode resistor logic AND gate and explain its operation.
  - (b) Design a transistor inverter circuit (NOT gate) with the following specifications.  $V_{CC} = V_{BB} = 10V$ ,  $i_{csat} = 10mA$ ;  $h_{femin} = 30$ ; the input is varying between 0 and 10V. Assume typical junction voltages of npn silicon transistor.

[16]

#### www.firstranker.com

Code No: 07A4EC07

# **R07**

# Set No. 1

- 8. (a) For the clipper circuit shown in figure 3 the input  $v_i = 60 \sin \omega t$ . Calculate and plot to Scale
  - i. The transfer characteristic indicating slopes and intercepts.
  - ii. Input / output on the same scale. Assume ideal diodes.



### .

(b) Explain positive peak clipping without reference voltage. [12+4]



**R07** 

### Set No. 3

### II B.Tech II Semester Examinations, APRIL 2011 PULSE AND DIGITAL CIRCUITS Common to BME, ICE, E.COMP.E, ETM, E.CONT.E, ECE Time: 3 hours

Max Marks: 80

#### Answer any FIVE Questions All Questions carry equal marks \*\*\*\*

- 1. (a) Draw the circuit diagram of diode resistor logic AND gate and explain its operation.
  - (b) Design a transistor inverter circuit (NOT gate) with the following specifications.  $V_{CC} = V_{BB} = 10V$ ,  $i_{csat} = 10mA$ ;  $h_{femin} = 30$ ; the input is varying between 0 and 10V. Assume typical junction voltages of npn silicon transistor. [16]
- 2. (a) Design an astable multivibrator to generate a 5kHz square wave with a duty cycle of 60% and amplitude 12v. Use NPN silicon transistors having  $h_{FE(min)}$  $= 70, V_{CE(sat)} = 0.3v, V_{BE(sat)} = 0.7v, V_{BE(cut-off)} = 0v \text{ and } R_C = 2K.$  Draw the waveforms seen at both collectors and bases.
  - (b) Explain the operation of bistable multivibrator circuit with circuit diagram and waveform. [8+8]
- 3. (a) A symmetrical square wave of peak -to-peak amplitude 'V' and fequency 'f' is applied to a high pass circuit. Show that the percentage tilt is given by  $P = \frac{1 - e^{-1/2Rcf}}{1 + e^{-1/2Rcf}} \times 100\%.$ +e
  - (b) Compare linear waveshaping with NonLinear wave shaping. [8+8]
- 4. (a) What is phase delay and phase jitter?
  - (b) Explain the method of synchronization of a sinusoidal oscillator with pulses.
  - (c) Explain the frequency division in sweep circuit. [4+8+4]
- (a) Describe the operation of a transistor voltage sweep waveform generator, em-5. ploying a constant current charging method with the help of its circuit diagram and waveforms.
  - (b) Mention the drawbacks of the transistor voltage sweep waveform generator and suggest the methods for eliminating those drawbacks.
  - (c) Define sweep speed, Displacement & transmission errors. [6+6+4]
- 6. (a) For the clipper circuit shown in figure 4 the input  $v_i = 60 \sin \omega t$ . Calculate and plot to Scale
  - i. The transfer characteristic indicating slopes and intercepts.
  - ii. Input / output on the same scale. Assume ideal diodes.
  - (b) Explain positive peak clipping without reference voltage. [12+4]
- 7. (a) Explain how a transistor can be used as a switch.

### $\mathbf{R07}$

# Set No. 3





- (b) Explain the phenomenon of 'Latching" in a transistor switch [8+8]
- 8. (a) What are the applications of sampling gates?

Ri

- (b) What are the advantages and disadvantages of unidirectional diode gate?
- (c) Discuss the operation of the four diode bi-directional sampling gate. [4+4+8]