B. Tech

CPEN 5305 / CPEC 5306

Sixth Semester Examination – 2008

ADVANCED ELECTRONICS CIRCUITS

Full Marks – 70

Time : 3 Hours

*Answer Question No. 1 which is compulsory and any **five** from the rest.*

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

   (a) What are the two requirements for oscillation ?

   (b) What are Pass band and Stop bands for a filter ?

   (c) Define Notch-out frequency.

   (d) Give any two applications of Astable Multivibrator.

(e) Draw the output waveform for Collector-coupled monostable multi.

(f) Define Transition time of commutating capacitors.

(g) Define Transient response and Steady state response.

(h) Draw the Characteristic waveform of UJT.

(i) Define sweep-speed error. Give an expression.

(j) Name any four methods for generating a time-base waveform.

2 (a) Explain Voltage controlled oscillator with a neat sketch of circuit and output waveforms. 5

(b) For a typical connection diagram of VCO with parameters : 5

+V=12V, R2=1.5 Kohm, R1 = R3 =10 Kohm and c1 = 0.001 micro F

(i) Determine the nominal frequency of the output waveforms.

(ii) Compute the modulation in the output frequencies if Vc is varied between 9.5 V and 11.5 V.

3. (a) Draw frequency response curves for high-pass filter and derive expression for cut-off frequency. 5

(b) Design a high-pass filter at a cut-off frequency of 1 KHz with a pass band gain of 2. 5

4. (a) Explain with a neat sketch the operating principle of Schmitt Trigger circuit. 5

(b) Explain in detail any two applications of Schmitt Trigger circuit with necessary circuit diagrams and waveforms if necessary. 5

5. (a) Explain with a neat sketch the operation principle of Emitter-coupled monostable multi with waveforms. 5

(b) For a emitter-coupled monostable multi circuit with parameters :

Vcc = 18V, R_{C1} = 6K, R_{C2} = 5K, Re = 4K, R = 100K. Calculate the voltage levels at t = 0+ only. Assume germanium transistors h_{FE} = 50 and r_{bb} = 200 ohm. 5

6. Explain in detail with circuit diagrams and equations the Shunt compensation of a transistor stage in a cascade with identical poles. 10

7. (a) Explain Principle and characteristics of Tunnel diode with neat sketch. 6

   (b) Explain in detail with a neat sketch the Astable circuit using Tunnel diode. 4

8. (a) Explain the IC555 Timer Monostable operation with waveforms. Provide a neat sketch for this. 7

   (b) In a IC555 monostable operation, $R_A = 10$ Kohm, the ouput pulse width tp = 10 ms. Determine the Value of C. 3