Registration No. :

Total number of printed pages – 2

B. Tech

CPEC 5306

Sixth Semester (Special) Examination – 2013

ADVANCED ELECTRONICS CIRCUITS

BRANCH : EC

QUESTION CODE : E 304

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) How quality factors (Q) is related with bandwidth of band pass filter ?

   (b) What is the cut off frequency of an op-amp if the unity-gain bandwidth is 1 MHz and the open-loop voltage gain is 10^5 ?

   (c) What is a multivibrator ? What is its physical significance in electronics circuits?

   (d) Write the transfer function of the 2nd order filter ? Find 3-dB frequency from the transfer function.

   (e) What is the basic principle of a phase detector (PD) of a PLL?

   (f) Define sweep speed error. Give an expression.

   (g) Define capture range of a phase locked loop (PLL)? What is its importance?

   (h) What is triggering in multivibrator ? Mention different methods of triggering used in multivibrator ?

   (i) Draw the characteristic waveform of UJT.

   (j) What is roll off rate (ROR) of an active filter ? How it effects the performance of a filter ?

2. (a) What is a phase detector (PD) ? With neat diagram, explain the principle operation of a PD. 5

(b) Explain the principle operation of a 2nd order phase locked loop (PLL). Derive its transfer function. 5

3. (a) What is a time base voltage ? With a neat diagram, explain the principle of a transistor current time base generator ? 5

(b) Explain the basic principle of an oscillator ? What are the conditions to be fulfilled to obtain steady oscillation at a fixed frequency ? 5

4. (a) Explain with a neat sketch the operation principle of a monostable multivibrator with waveforms. 5

(b) Design low pass filter at a cut-off frequency of 20 KHz with a pass band gain of 10. Justify the component values you use. 5

5. (a) What is a Notch filter ? What is its importance ? Explain in detail a notch filter and then find its transfer function. 5

(b) Design a all-pass filter, and determine the phase shift between the input and output at f = 2 KHz. To obtain a positive phase shift, what modifications are necessary in the circuit ? 5

6. (a) What is a voltage comparator circuit ? What are the characteristics of a voltage comparator ? Explain how OPAMP can be used as a voltage comparator. 5

(b) With a neat diagram, explain wein-bridge oscillator ? 5

7. (a) What is a Schmitt trigger circuits ? Discuss various applications of Schmitt trigger circuits. 5

(b) What do you mean by triggering of multivibrators ? What are the various methods to trigger the bistable multivibrators ? 5

8. Write short notes on any **two** : 5 × 2

(a) Voltage controlled oscillator (VCO)

(b) Active and passive filters

(c) IC 555

(d) All pass filter.