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Total number of printed pages – 2

B. Tech
CPEN 5305

Sixth Semester (Special) Examination – 2013

ADVANCED ELECTRONICS CIRCUITS

BRANCH : AEIE

QUESTION CODE : E 514

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

- How damping factor (ζ) affect the frequency response of the active filters ?
- Mention at least four ideal characteristics of active filter.
- What is the function of commutating capacitors ?
- What do you mean by 'state' of multivibrators ? Mention different states in a multivibrator circuit.
- What is rise time of amplifiers ? How is it related with bandwidth ?
- Write down the expression of sweep speed error.
- Define capture range and lock range of a phase locked loop (PLL).
- Write the transfer function of the 3rd order filter. Find cut-off frequency from the transfer function.
- Mention at least four requirements that must be fulfilled in an amplifier circuit to become an instrumentation amplifier.
- What is a time base voltage ? What is its importance in electronics circuits ?

2. (a) What is an instrumentation amplifier ? Derive the voltage gain of three OPAMP base instrumentation amplifier in terms of component parameter. 5

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

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3. (a) With a neat diagram, explain the principle of a transistor current time base generator. 5
- (b) What is an oscillator ? With a neat diagram, explain Wein-bridge oscillator. 5
4. (a) Explain with a neat sketch the operation principle of an emitter coupled monostable multivibrator with waveforms. 5
- (b) Design a High-pass filter at a cut-off frequency of 16 KHz with a pass band gain of 12. Justify the component values you use. 5
5. (a) What is a band reject filter ? How poles are placed in the band reject filter ? Explain, in detail, a band reject filter and then find its transfer function. 5
- (b) Why an all pass filters are called phase shifter ?
Design a all- pass filter, and determine the phase shift between the input and output at $f = 1.2$ kHz. To obtain a positive phase shift, what modifications are necessary in the circuit ? 5
6. (a) Explain the principle of UJT. Explain how UJT can be used to generate saw tooth wave. 5
- (b) With a neat diagram, explain the principle of a tunnel diode. Explain, in brief, the various applications of tunnel diode. 5
7. (a) What do you mean by low frequency compensation and shunt compensation of amplifiers ? 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** of the following : 5x2
- (a) Schmitt trigger
- (b) Voltage controlled oscillator (VCO)
- (c) IC 555 timer as astable multivibrator
- (d) Universal active filter.

