

**III B. Tech I Semester Supplementary Examinations, June/July-2022**  
**LINEAR IC APPLICATIONS**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions **ONE** Question from **Each unit**

All Questions Carry Equal Marks

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**UNIT-I**

1. a) Explain the measurement procedure for input and output offset voltages of a practical Op-Amp. [8M]  
b) Define slew rate of an Op-Amp and explain its significance in the dynamic characteristics of an Op-Amp. [7M]

**(OR)**

2. a) Explain the basic internal block diagram of a typical operational amplifier. [8M]  
b) With suitable sketches, explain the measurement procedure for the slew rate and CMRR. [7M]

**UNIT-II**

3. a) Explain the operation of Schmitt trigger circuit using Op-Amp comparators. [8M]  
b) Explain the operation of integrator using Op-Amp. Also sketch the output waveforms for sine-wave and square-wave inputs. [7M]

**(OR)**

4. a) Design a practical Op-Amp differentiator circuit for the frequency of 1kHz and explain its frequency response. [8M]  
b) Explain the operation of a logarithmic amplifier with compensation of emitter saturation current. Also obtain the expression for its output. [7M]

**UNIT-III**

5. a) Design a second order butter worth low pass filter having an upper cut off frequency of 2 kHz. [8M]  
b) With a suitable circuit diagram, explain the operation of narrow band pass filter (NBPF) and give the necessary design expressions. [7M]

**(OR)**

6. a) Design a second order Butter-worth low pass filter having a cut-off frequency of 1 kHz. The damping factor is equal to 1.414. [8M]  
b) Describe the working of sample and hold circuit with a suitable diagram. [7M]



**UNIT-IV**

7. a) Explain the operation of an astable multivibrator using 555 timer. [8M]  
Derive the expression for on and off state time periods.  
b) With a neat functional diagram, explain the operation of VCO and [7M]  
also derive an expression for free running frequency,  $f_0$ .

**(OR)**

8. a) Explain the operation of Monostable multivibrator using 555 timer. [8M]  
Derive the expression for quasi stable state time period of the  
multivibrator.  
b) Draw the block diagram of generation of FSK using a PLL. Explain [7M]  
how tracking range affects error voltage in detection?

**UNIT-V**

9. a) Draw the circuit of a Weighted Resistor DAC and obtain the [8M]  
expression for n-bits.  
b) Using a neat sketch, explain the working of a parallel comparator [7M]  
ADC.

**(OR)**

10. a) With the help of a block diagram, explain the operation of counter [8M]  
type of ADC.  
b) Explain the principle of R-2R ladder type DAC with neat diagrams. [7M]

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