III B. Tech I Semester Regular Examinations, February-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) Name the most important parameters of an operational amplifier. What are their ideal values and practical values? [6M]
    b) Explain the terms input offset current, input offset voltage and PSRR with respect to an Op-Amp. [9M]

(OR)

2. a) For a given Op-Amp, CMMR = 10^5 and differential gain $A_d = 10^5$. Determine the common-mode gain A_{cm} of the Op-Amp. [9M]
    b) What are the differences between compensated and uncompensated Op-Amp? Explain. [6M]

UNIT-II
3. a) Derive the expression for gain of a non-inverting Op-Amp amplifier. [7M]
    b) With a neat sketch explain the operation of Anti log Amplifiers and derive the expression for its output voltage. [8M]

(OR)

4. a) Using three Op-Amps draw the circuit diagram of an instrumentation amplifier and derive the expression for its output voltage. [8M]
    b) Draw the circuit diagram of a practical log amplifier and obtain an expression for its output voltage. [7M]

UNIT-III
5. a) Design a first order high pass filter with a cutoff frequency of 1 kHz and pass band gain of 11. Also draw its frequency response. [8M]
    b) Explain the operation of IC 1496 balanced modulator with a neat diagram. [7M]

(OR)

6. a) Design a wide band-pass filter with f_H = 200Hz, f_L = 1 kHz and a pass-band gain = 4. Draw the frequency response and calculate Q factor for the filter. [8M]
    b) Describe any two applications of four quadrant multiplier. [7M]

UNIT-IV
7. a) Design a symmetrical square wave generator with 1 kHz frequency and 5V peak value using 555 timer IC. Assume necessary data. [8M]
    b) Explain the lock-in range and capture range of a PLL. [7M]

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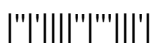
(OR)

8. a) Using 555 timer, design a monostable multivibrator to produce pulses of width of 110 msec. Use a 1 µF capacitor.   [8M]

    b) With a neat sketch, explain IC 566 VCO operation and discuss any two applications.   [7M]

UNIT-V

9. a) Draw the circuit of weighted resistor DAC and derive expression for output-analog voltage.   [8M]

    b) Draw the simplified block diagram of a successive approximation ADC and explain its working.   [7M]

(OR)

10. a) With a clear block diagram explain the data conversion procedure for dual slope ADC.   [8M]

    b) Draw the circuit of a ladder type DAC for 4 bits and derive expression for the output voltage.   [7M]

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