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Question Paper Code : 70514

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Fourth Semester

Electronics and Communication Engineering

EC 8453 — LINEAR INTEGRATED CIRCUITS

(Common to: Biomedical Engineering / Medical Electronics / Robotics and Automation)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Slew rate.
2. Draw the equivalent circuit of OPAMP.
3. Write the significances of voltage follower.
4. Draw the transfer characteristic of a comparator.
5. List out the applications of Analog Multiplier
6. Define 'lock in range in PLL.
7. Write the merits and demerits of binary weighted resistor DAC.
8. Define Duty Cycle.
9. Mention the characteristics of IC voltage regulator.
10. Why the 555 timer is called so?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain BJT differential Amplifier with active load with neat circuit diagram. (10)
(ii) List out the Ideal Characteristics of OPAMP. (3)

Or

- (b) Explain input bias currents in Inverting Amplifier and how it can be compensated. Derive the expression for the compensation resistance. (13)

12. (a) (i) With neat circuit diagram explain the Instrumentation Amplifier and derive the expression for output voltage. (10)
- (ii) Construct V to I converter using OPAMP. (3)

Or

- (b) (i) With neat circuit diagram and Waveforms, explain Precision Full Wave Rectifier Circuit. (7)
- (ii) Design a first order Low pass active filter with the cut off frequency of 10 kHz. Assume the gain of the filter is unity. (6)
13. (a) With help of block diagram explain PLL and explain any two its applications. (13)

Or

- (b) (i) With neat diagram explain Analog Multiplier using emitter coupled transistor pair. (10)
- (ii) Discuss the function of VCO in PLL. (3)
14. (a) (i) With Circuit diagram explain 4-bit R-2R Ladder type DAC. (7)
- (ii) Define the following specifications of DAC:
Resolution, Speed, Linearity, Settling Time. (6)

Or

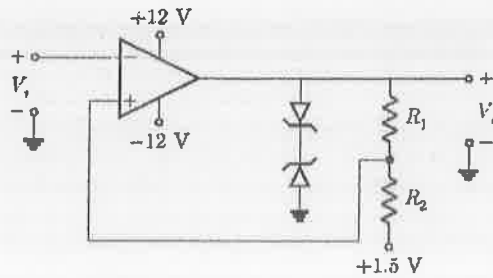
- (b) (i) With block diagram explain Successive Approximation type ADC. (6)
- (ii) With block diagram explain Dual Slope type ADC. (7)
15. (a) (i) Explain the Triangular Wave generator using OPAMP. (7)
- (ii) Explain Astable Multivibrator using IC 555 timer. (6)

Or

- (b) Explain Audio Power Amplifier and Isolation amplifier with circuit diagram. (13)

PART C — (1 × 15 = 15 marks)

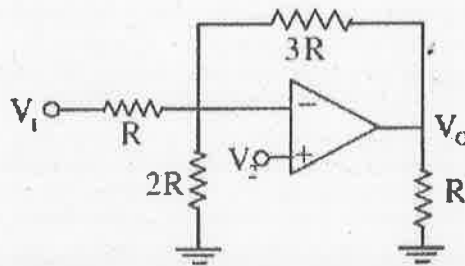
16. (a) (i) In the Schmitt trigger circuit shown below, the Zener diodes have V_Z (reverse saturation voltage) = 6 V and V_D (forward voltage drop) = 0.7 V.



- (1) Find threshold voltages V_{UT} , V_{LT} and hysteresis width V_H .
 - (2) If $V_{UT} = 0$, find R_1/R_2 . (10)
- (ii) Design safety locker system using 555 Timer, The locker door should be in OPEN condition for 20 Secs when push button is pressed. (5)

Or

- (b) (i) Assuming that the Op-amp in the circuit shown is ideal, Find V_o . (10)



- (ii) For given circuit the operational amplifiers are ideal find out the output voltage V_o . (5)

