

T 8155

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2006.

Fourth Semester

Electronics and Communication Engineering

EC 1254 — LINEAR INTEGRATED CIRCUITS

(Common to B.E. (Part-Time) (R 2005) — Third Semester)

(Regulation 2004)

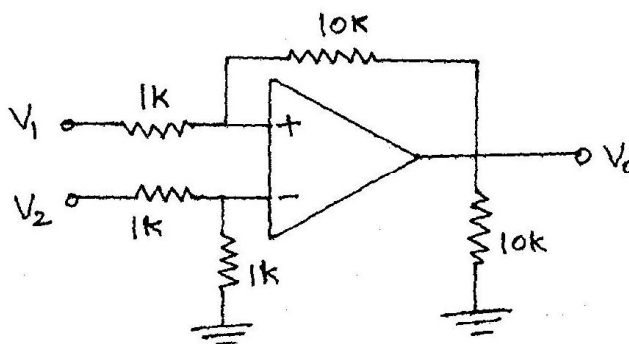
Time : Three hours

Maximum : 100 marks

Answer ALL questions.

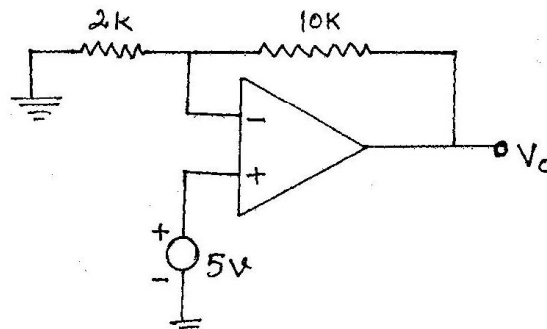
PART A — (10 × 2 = 20 marks)

1. An opamp circuit shown in Figure has differential gain $A_d = 5$ MV. Calculate V_0 .



2. Compare the ideal and practical characteristics of opamp.

3. Draw the circuit diagram of an opamp integrator. Mention its applications.
4. For the op amp shown in figure, determine the voltage gain.



5. What is a four quadrant multiplier? Draw the circuit diagram of a squaring circuit using multiplier.
6. What is a compander IC? Enlist the features.
7. Which is the fastest A/D converter? Give reason.
8. An 12 bit D/A converter has resolution of 30 mv/LSB. Find the full scale output voltage.
9. State the conditions required for designing a video amplifier.
10. What is a switched capacitor filter? Mention any two advantages.

PART B — ($5 \times 16 = 80$ marks)

11. (a) (i) Explain various stability criteria of opamp circuit. (6)
(ii) Write a brief note on frequency compensation in opamp. (10)

Or

- (b) (i) Determine the output voltage of a differential amplifier having differential amplifier gain 2000 and the CMRR 100. (4)

- (ii) Explain the concept of current source applicable to differential amplifier. (6)
- (iii) For the differential amplifier shown in figure find the differential gain, common mode gain and CMRR. Assume $h_{fe} = 100$
 $h_{ie} = 1 \text{ K ohm}$. (6)

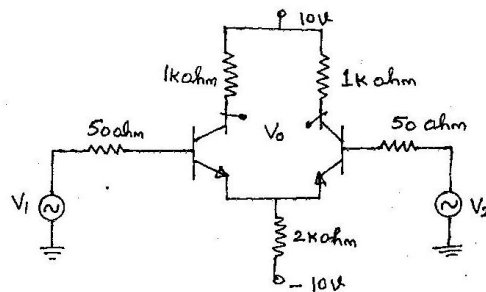


Fig. Q. 11 (b) (iii)

12. (a) (i) Determine the output voltage V_0 for the following circuit. (4)

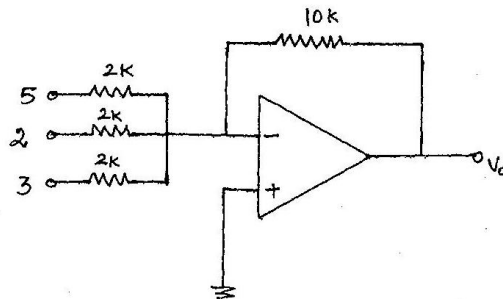


Fig. Q. 12 (a) (i)

- (ii) Briefly explain the working principle of Schmitt trigger. (12)

Or

- (b) (i) With circuit diagram discuss the following applications of op amp. (8)
- (1) Voltage to current converter
 - (2) Precision rectifier.
- (ii) Draw the schematic of a linear IC saw-tooth wave generator and explain the principle of operation. (8)

13. (a) (i) Explain the working principle of Gilbert cell multiplier circuit. (8)
(ii) With block diagram discuss the principle of operation of NE 565 PLL circuit. (8)

Or

- (b) (i) Explain PLL as a frequency synthesizer. (8)
(ii) With circuit diagram explain the working of a NE 566 voltage controlled oscillator. (8)
14. (a) (i) Explain the working principle of high speed sample and hold circuit. (10)
(ii) For an 8 bit successive approximation type A/D converter is driven by a 2 MHz clock. Find the conversion time. (6)

Or

- (b) (i) Briefly explain the working principle of successive approximation type ADC. (12)
(ii) An 8 bit DAC has a step size of 10 mv. Determine the full scale output voltage and percentage resolution. Find the output voltage for the input of 01010101. (4)
15. (a) (i) A 555 timer configured in astable mode with $R_A = 2 \text{ K ohm}$, $R_B = 4 \text{ K ohm}$ and $C = 0.1 \mu\text{F}$. Determine the frequency of the output and duty cycle. (8)
(ii) Write a note on switched mode power supply. (8)

Or

- (b) (i) With circuit diagram explain the working principle of IC 723 voltage regulator. (8)
(ii) Explain the working principle of isolation amplifier IC - ISO 100. (8)