

7/1/17 AN

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**Question Paper Code : 60450**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Fourth Semester

Electronics and Communication Engineering

EC 2254/EC 44/10144 EC 405/EC 1254/080290022 — LINEAR INTEGRATED  
CIRCUITS

(Regulations 2008/2010)

(Common to PTEC 2254 Linear Integrated Circuits for B.E. (Part – Time) –  
Third Semester – ECE – Regulations 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the limitations of discrete circuits.
2. Why do we use Aluminium for metallization?
3. State reasons why integrator is called “lossy”.
4. What is a precision rectifier?
5. With the equations, show how is a multiplier can be used for finding phase angle difference between two signals.
6. Define pull-in time as referred to PLL.
7. What output voltage would be produced by a D/A converter whose output range is 0 to 10 V and whose input binary number is 0110 for a 4 bit DAC.
8. What is the main drawback of dual slope ADC?
9. State the applications of 555 Timer IC.
10. Define line regulation with respect to a voltage regulator.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Describe the following with respect to integrated circuit fabrication:
- (1) Silicon wafer preparation (6)
  - (2) Dielectric isolation. (6)
- (ii) Explain why inductors are difficult to fabricate in ICs. (4)

Or

- (b) (i) Draw the circuit diagram of a basic current mirror and explain its operation. (8)
- (ii) For the current mirror circuit shown in fig. (11. b. (ii)), determine the emitter current in transistor  $Q_3$  if  $\beta = 100$  and  $V_{BE} = 0.75V$ . (8)

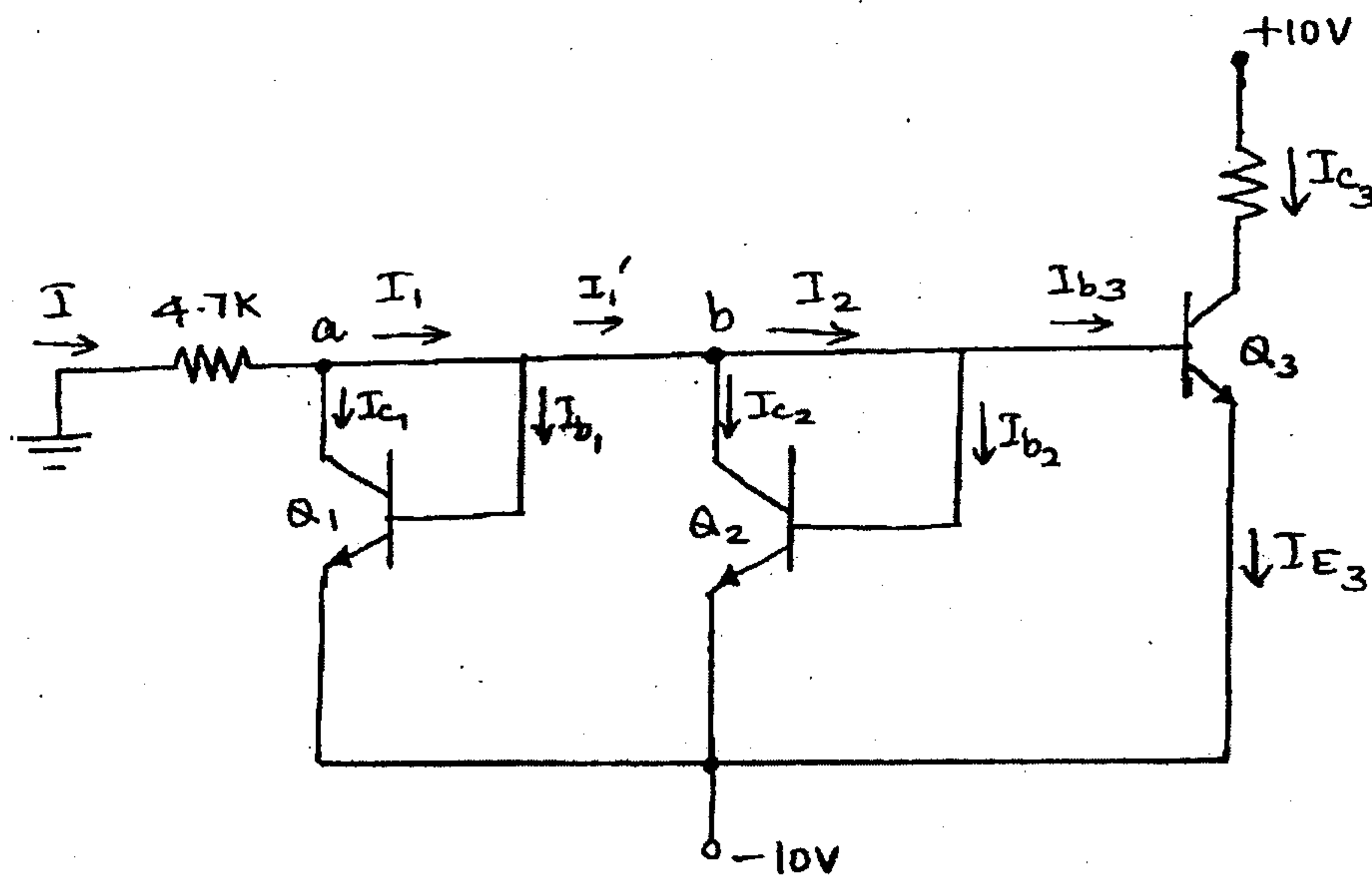


Figure – 11. (b) (ii)

12. (a) (i) What do you understand by an Instrumentation Amplifier? (2)
- (ii) State the requirements of a good Instrumentation Amplifier. (4)
- (iii) Draw the circuit diagram and explain the working of instrumentation Amplifier. (6)
- (iv) Mention the specific advantages of three op-amp Instrumentation Amplifier circuit. (4)

Or

- (b) (i) What do you understand by an Integrator? (2)
- (ii) Draw and explain an ideal active op-amp Integrator ckt (4)
- (iii) Draw the I/O waveforms for: integrator (3 × 1/2 = 1½)
- (1) Step input signal
  - (2) Square wave input signal
  - (3) Sine wave input signal

- (iv) Derive the expression for change in output voltage. (3)
  - (v) List the applications of practical Integrator. (1½)
  - (vi) Design a practical integrator circuit with a dc gain of 10, to integrate a square wave of 10 KHZ. (4)
13. (a) (i) Explain, with necessary equations, the basic circuits of Linearized transconductance multiplier' and Differential V-I converter' Hence explain the Four quadrant variable transconductance multiplier' circuit. (10)
- (ii) Explain the working of a divider circuit using multiplier IC. (6)

Or

- (b) (i) Draw the block diagram of VCO and explain its operation. Also derive the frequency of oscillator. (10)
- (ii) Draw the circuit of a PLL used as AM detector and explain its operation. (6)
14. (a) (i) Explain the flash type ADC. What are its merits and demerits? (10)
- (ii) Write a note on high speed sample and hold circuits. (6)

Or

- (b) (i) With circuit, explain current mode types of DAC's compare with voltage mode type. (10)
- (ii) What are over sampling data converters? (6)
15. (a) (i) Explain the working of monostable multivibrator. (14)
- (ii) What are opto-couplers? (2)

Or

- (b) (i) Explain the working of a general purpose voltage regulator. (14)
- (ii) What is the need for isolation amplifiers? (2)