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**Question Paper Code : 21450**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015

Fourth Semester

Electronics and Communication Engineering

EC 2254/EC 44/ EC 1254/080290022/10144 EC 405 — 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. What is an epitaxial layer?

2. The output of an operational amplifier is 5V peak sine wave whose slew rate is $0.5V/\mu s$. Find the maximum allowable frequency of the signal.

3. Design and sketch an operational amplifier subtractor circuit.

4. What is the difference between basic comparator and Schmitt trigger?

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. Why is an inverted R-2R ladder network DAC better than R-2R ladder DAC?

8. Which is the fastest ADC and why?

9. Write the advantages of switching regulators over series voltage regulators.

10. List any two features of a fibre optic IC.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Describe the following with respect to integrated circuit fabrication:

(1) Silicon water 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)

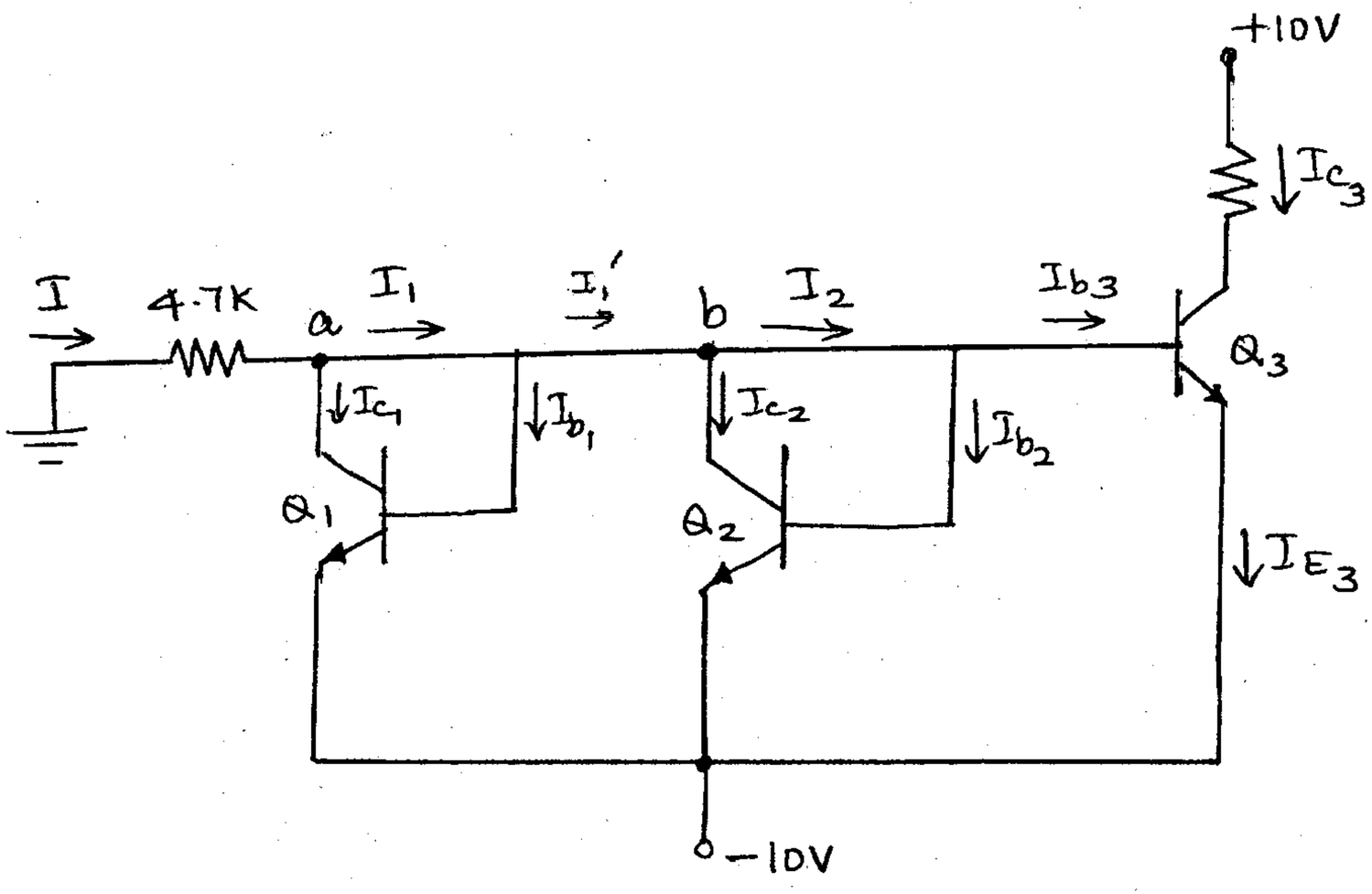


Fig. 11. b. (ii)

12. (a) (i) Explain the working of an op-amp differentiator and derive its output equation. (8)

(ii) What is the need for V to I and I to V converter? How are they realized using op-amp? (8)

Or

(b) (i) What is the purpose of a precision rectifier? How is this realized, using op-amp? Explain. (8)

(ii) Draw the regenerator comparison circuit and obtain expressions for UTP and LTP. (8)

13. (a) (i) Explain the working of an Analog multiplier using emitter coupled transistor with circuit diagram. (8)

(ii) Describe how a PLL could be used as a voltage controlled oscillator. (8)

Or

(b) (i) Draw the basic schematic of the PLL and explain its operation. (8)

(ii) Explain with functional diagram the FSK modulation and demodulation operations using PLLs. (8)

14. (a) (i) Design a suitable D/A converter to convert 8-bit binary input in parallel form. Binary '0' corresponds to OV and binary '1' to 5V. Maximum output is +5V. Assume any other data that may be required. Explain its operation. (10)

(ii) Write a note on high speed sample and hold circuits. (6)

Or

(b) (i) With circuit diagram explain the operation of a flash type A/D converter. (8)

(ii) Compare the properties of successive approximation type and dual slope type converters. (8)

15. (a) (i) Describe the astable mode of operation of IC 555 timer and discuss any two applications. (10)

(ii) Explain how opto-couplers can be used in circuits for isolation. (6)

Or

(b) (i) Draw the function diagram for a low voltage regulator using IC 723 and explain its operation. (8)

(ii) State the protection circuit used in voltage regulators and explain them with characteristic curve. (8)

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