02166

Printed Pages—3 EC—502

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3005 Roll No.

B.Tech.

FIFTH SEMESTER EXAMINATION, 2005-2006

ANALOG INTEGRATED CIRCUITS

Time : 3 Hours *Total Marks : 100*

IFTH

Note : *(i) Answer ALL questions.*

(ii) All questions carry equal marks.

(iii) Make suitable assumptions wherever required and justify.

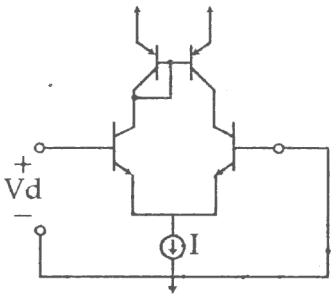
(iv) Be precise in your answer.

1. Attempt ***any two*** of the following questions : **(10x2=20)**

(a) (i) Discuss the operation and significance of a multiple output transistor current mirror.

(ii) Discuss the operation of an active load in Differential Amplifier. What is primary advantage of using an active load ?

(b) For an active loaded differential amplifier of figure shown below when biased with a current I = 0.2mA, and if the BJTs have $\beta = 200$ and $V_A = 100V$, find the values of R_i, R_o, the differential mode voltage gain, common-mode voltage gain.



(c) Describe the operation and characteristics of a BJT complementary push pull output stage. What are the advantages of this circuit ?

2. Attempt ***any two*** of the following questions : **(10x2=20)**

(a) Design an inverting Op-amp circuit with a voltage gain of $Av = v_o/v_I = -8$. When the input voltage is $V_I = -1V$, the maximum current in R_1 and R_2 must be no larger than $15\mu A$. Determine the minimum values of R_1 and R_2.

(b) Describe the operation and characteristics of an Instrumentation Amplifier with neat sketch. Why do we call this as instrumentation amplifier ?

(c) Design a second order low-pass filter at a cutoff frequency of 2KHz using op-amp.

3. Attempt ***any two*** of the following questions : **(10x2=20)**

(a) Sketch the circuit and characteristics of basic Schmitt trigger. What are the advantages of a Schmitt trigger circuit in analog electronics ? Explain its working.

(b) Draw and explain the operation of a triangular wave generator. How square wave can be obtained using this triangle wave ?

(c) Draw the circuit of a log amplifier using op amps and explain its operation. Enlist the possible applications of this circuit.

4. Attempt ***any two*** of the following questions : **(10x2=20)**

(a) Draw and explain the circuit of Electronically tunable "resistor" using OTAs.

(b) (i) How is current boosting achieved in 723 IC ?

(ii) Explain current fold back characteristics in voltage regulators.

(c) Explain with circuit which gives square and square root of the given analog signal.

5. Attempt ***any two*** of the following questions : **(10x2=20)**

(a) Design a 555 timer as an astable multivibrator with an output signal frequency of 800Hz and 60 percent duty cycle.

(b) Draw the circuit of a PLL AM detector and explain its operation.

(c) Draw and explain the circuit of Programmable Gain Amplifiers using Analog switch.

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