(Following Paper ID and Numbers to be filled in your Answer books)

Paper ID: | | | | | | |

Roll No: | | | | | | | | | | |

B.Tech

EXAMINATION, 2015-16

Subject: Integrated Circuits **Code: NEC 501**

[Time: 3 Hours] **[Total Marks: 100]**

SECTION-A

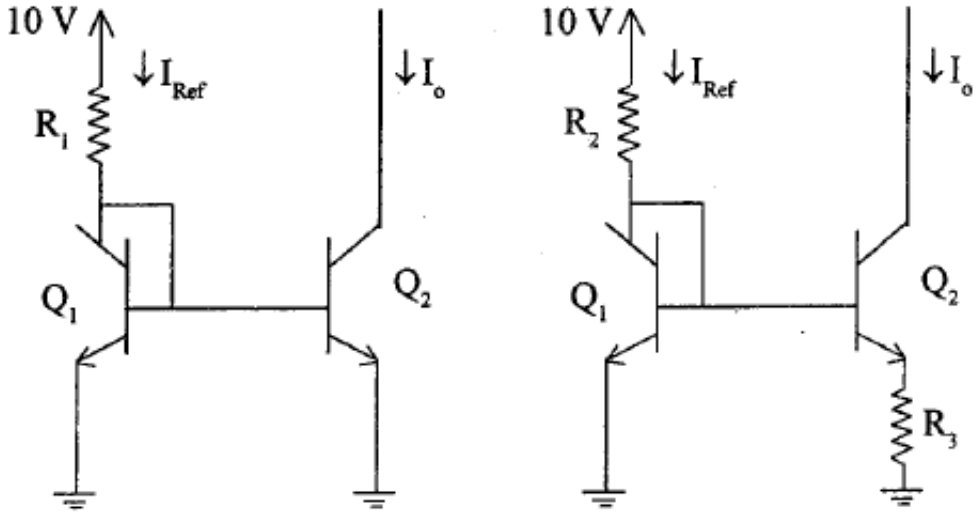
Q.1 Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2 x 10=20)

(a) What are the device parameters for the IC-741?
(b) List out the properties of current mirror circuit.
(c) What do you mean by unity gain bandwidth?
(d) Name the IC number used for phase locked loop and comparators.
(e) Write down the applications of V-I and I-V converter.
(f) Write down the two resistive techniques for DAC and name the CMOS version of the 555 timer.
(g) Calculate the time period of astable multivibrator having R1= R2= 2k?, R= 4k? and C= 0.01µF
(h) What is a Sallen-key filter?
(i) Define the term delay-power product for digital logic family.
(j) What are the applications of analog multiplier?

SECTION-B

Note: Attempt any 5 questions from this section. (10 x 5=50)

Q.2 With the help of a neat circuit diagram explain the operation of Widlar current source. Figure given below shows two circuit for generating a constant current Io = 10µA which operates from a 10V supply. Determine the values of the required resistor assuming the V_{BE}=0.7V at a current of 1mA and neglecting the effect of finite ?.



Q.3 Explain the generation of triangular waveform in detail.

Q.4 Draw and explain the working of instrumentation amplifier. Find out input and output voltage relationship for instrumentation amplifier.

Q.5 Draw and explain the circuit diagram and waveforms for one shot multivibrator using op-amp. Also derive the expression for its time period.

Q.6 Write down the short notes on the R-2R ladder D/A converter.

Q.7 Give truth table and CMOS realization (AOI and OAI both) of following gate: $F = \bar{A}B + A\bar{B}$.

Q.8 Draw & explain the operation of antilog amplifier circuit. Find out the expression for its output voltage equation. Also discuss applications of log and antilog amplifiers.

Q.9 Why ADC is required? Explain the working of Dual Slope ADC with the help of circuit diagram and obtain expressions for integrator output at distinct input signals.

SECTION-C

Note: Attempt any 2 questions from this section. (15 x 2=30)

Q.10 Write down the short notes on the following:

a. Functional block diagram of 555 timer
b. Monolithic PLL

Q.11 Design the high-pass filter at a cutoff frequency of 1kHz with a passband gain of 2. Also explain the DC analysis of input stage of IC 741 in detail.

Q.12 Derive the expression for the noise margin of the CMOS inverter in term of V_{IH}, V_{IL}, V_{OL} and V_{OH}.