Total No. of Questions—12]

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Seat
No.

[5057]-66

S.E. (Electronics/E&TC) (Second Semester) EXAMINATION, 2016

INTEGRATED CIRCUITS AND APPLICATIONS

(2008 PATTERN)

Time : Three Hours   **Maximum Marks : 100**

N.B. :— (i) Answer *three* questions from Section I and *three* questions from Section II.

(ii) Answers to the two Sections should be written in separate answer-books.

(iii) Neat diagram must be drawn whenever necessary.

(iv) Assume suitable data, if necessary.

SECTION I

1. (a) What is need of level shifter block in op-amp ? Explain different circuits used for level shifting. [10]

   (b) Explain how to improve CMRR of differential amplifier. Explain any *one* current source circuit. [8]

Or

2. (a) Derive the expression for differential gain, input resistance and output resistance for dual input balanced output differential amplifier using γ parameters. [10]

   (b) Draw the current mirror circuit with necessary derivation. [8]

P.T.O.

3. (*a*) What is need of frequency compensation ? State and explain the method of frequency compensation. [8]

(*b*) State the reason of limiting the value of slew rate. Op-amp has slew rate of 2 V/µsec. Find the rise time of output voltage of 10 V amplitude resulting from a rectangular pulse input if the op-amp is slew rate limited. [8]

Or

4. (*a*) Explain the effect of temperature on : [8]

(*i*) Input bias current

(*ii*) Input offset current

(*iii*) Input offset voltage

(*iv*) Output offset voltage.

(*b*) Write a note on low noise op-amp. [8]

5. (*a*) Explain the operation of summing differentiator. Derive its expression. [8]

(*b*) Explain voltage to current converter with grounded load using op-amp. Mention its applications. [8]

Or

6. (*a*) Design a practical integrator circuit with a d.c. gain of 10, to integrate a square wave of 10 kHz. [8]

(*b*) Draw the voltage follower using op-amp. Explain the working and its applications. [8]

SECTION II

7. (*a*) Explain various power supply performance parameters. [8]

(*b*) Write short notes on the following : [8]

(*i*) Clipper and clamper using op-amp

(*ii*) Instrumentation amplifier.

Or

8. (*a*) Draw the circuit of triangular wave generator and explain its operation. [8]

(*b*) Explain the working of inverting Schmitt trigger. [8]

9. (*a*) Explain working of any *two* ADC. Compare their performance. [8]

(*b*) Draw and explain the block diagram of IC 9400 for frequency to voltage conversion. [10]

Or

10. (*a*) Define the following terms for DAC : [8]

(*i*) Resolution

(*ii*) Accuracy

(*iii*) Conversion time

(*iv*) Monotonicity.

(*b*) State the various methods of DA conversion. State advantages and disadvantages of each. [10]

11. (*a*) State the advantages of active filter. Also explain the operation of second order low pass filter. [8]

(*b*) Design a second order band pass filter with f_0 = 1 kHz and bandwidth equal to 20 Hz. What is resonant gain ? [8]

Or

12. Write notes on (any *two*) : [16]

(*i*) Active tone control

(*ii*) PLL

(*iii*) Audio amplifier using op-amp.