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Question Paper Code : **51450**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

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 ($10 \times 2 = 20$ Marks)

1. List the characteristics of ideal Op-Amp and draw its equivalent circuit.
2. An operational amplifier has a slew rate of $4V/\mu s$. Determine the maximum frequency of operation to produce a distortionless output swing of 12V.
3. Draw the circuit diagram of an Op-Amp differentiator circuit.
4. How does precision rectifier differ from the conventional rectifier ?
5. What is meant by frequency synthesizing ?
6. Define lock range of a 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. Give the formula for period of oscillations in an Op-Amp astable circuit.
10. Define duty cycle of a periodic pulse waveform.

PART - B (5 × 16 = 80 Marks)

11. (a) List the levels of integration in ICs. Explain with neat diagrams the various steps involved in the fabrication of monolithic BJT, resistor and capacitor. (16)

OR

- (b) Define the following dc characteristics of operational Amplifier : (8)

- (i) Input bias current
- (ii) Input offset current
- (iii) Input offset voltage

Suggest a suitable compensation technique for each of the above. (8)

12. (a) With neat circuit diagrams and mathematical expressions, explain the operation of the following Op-Amp applications :

- (i) Scale changer. (4)
- (ii) Voltage follower. (4)
- (iii) Non-Inverting adder. (4)
- (iv) Integrator. (4)

OR

- (b) With the help of circuits and necessary equations, explain how log and antilog computations are performed using IC 741. (16)

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) Explain the working of
(i) R-2R ladder D/A converter (6)
(ii) Dual slope A/D converter. (10)

OR

- (b) Explain the working of
(i) Weighted resistor D/A converter (6)
(ii) Successive approximation A/D converter. (10)

15. (a) State the advantages of IC voltage regulator. Explain the features and internal structure of general purpose Linear IC 723 Regulator. Design a regulator using IC 723 to meet the following specifications : $V_0 = 5V$; $I_0 = 100 \text{ mA}$; $V_{in} = 15 \pm 20\%$; $I_{sc} = 150 \text{ mA}$; $V_{sense} = 0.7v$.

OR

- (b) Write detailed notes on the following :
(i) Low noise op-amps (8)
(ii) Integrated fiber optic system. (8)