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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 × 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)