

D 12042

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Name:

Reg. No.

**FIFTH SEMESTER B.TECH. (ENGINEERING) [14 SCHEME] DEGREE
EXAMINATION, NOVEMBER 2016**

EC 14 502—LINEAR INTEGRATED CIRCUITS

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any eight questions.

1. With relevant circuits, explain the operation of voltage comparators.
2. How do the open loop gain and closed loop gain of an op-amp differ ?
3. Design a practical integrator circuit with a dc gain of 10 to integrate a square wave of 10 kHz.
4. A certain BPF has a centre frequency of 15 kHz and bandwidth of 1 kHz. Determine Q and classify the filter as narrow band or wideband.
5. Design a 1 kHz active notch filter.
6. Elaborate the monostable operation of IC 555 timer.
7. Elaborate the voltage to frequency converters.
8. Explain how the IC 565 PLL can be used as a FSK demodulator.
9. Perform closed loop analysis of PLL.
10. What is the need for phase detector in PLL ? Give reason.

(8 × 5 = 40 marks)

Part B

Answer all questions

11. (a) Define the following DC characteristics of operational amplifier.
 - (i) Input bias current.
 - (ii) Input offset current.
 - (iii) Input offset voltage.

Suggest a suitable compensation technique for each of the above.

Or

- (b) Describe the working of an analog multiplier using emitter coupled transistor pair.

12. (a) Design an op-amp based second order active low pass filter with a cut off frequency of 2 kHz.

Or

- (b) Explain the working principle of RC phase shift sine wave generator using op-amp and derive the expression for F.

Turn over

13. (a) With circuit, explain the current mode type DAC's. Compare with the voltage mode type.

Or

(b) Describe the operation of dual slope and successive approximation type ADC. What are the advantages of dual slope ADC ?

14. (a) With usual notations, show that the lock-in range of PLL is $\Delta f_L = \frac{\pm f_0}{V}$.

Or

(b) A PLL is locked on to an incoming signal with a frequency of 1 MHz at a phase angle of 50 deg. The VCO signal is at a phase angle of 20 deg. The peak amplitude of the incoming signal is 0.5 V and that of the VCO output signal is 0.7 V.

(i) What is VCO frequency ?

(ii) What is the value of the control voltage being feedback to the VCO at this point ?

(4 × 15 = 60 marks)