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5E3102-Q

B. Tech. (Sem. V) (Main/Back) Examination, December - 2011
Electronics & Communication Engg.
5EC2 Linear Integrated Circuits (Common with 5EC2, 5EI2, 5AI2 & 5BM2)

Time : 3 Hours]   [Maximum Marks : 80
          [Min. Passing Marks : 24

Instructions to Candidates :

Attempt any five questions selecting one question from each unit. `All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1.   NIL _____   2.   NIL _____

UNIT - I

1   Draw the schematic diagram of non-inverting OP AMP with voltage series feedback; explain it and derive the expression for the

(i)   voltage gain

(ii)   Input Resistance

(iii)   Output Resistance.

16

OR

1   Explain the following applications of OPAMP :

(i)   Voltage follower

(ii)   Adder

(iii)   Comparator

(iv)   Inverting Amplifier

16

UNIT - II

2   (a)   Design a triangular wave generator using a comparator circuit with integrator circuit to generate a triangular wave of frequency 5 KHz. Assume peak to peak output voltage is 5V and $(\pm V_{sat}) = (\pm 14 \text{ V})$.

                 8

   (b)   Design a R-C phase shift oscillator which gives the sinusoidal waveform of 600 Hz.

                 8

OR

2   (a)   Draw and explain with suitable diagram : Voltage to frequency converter.

                 8

   (b)   Explain the working of quadrature oscillator with suitable diagram.

                 8

UNIT - III

3   (a)   Draw and explain with suitable diagram First-order low pass Butterworth filter.

                 8

   (b)   Design a wide band pass filter with $f_L = 500$ Hz and $f_H = 2\text{KHz}$, and a pass band again = 5 for both sections of filter. Also determine the value of Q for the filter.

                 8

OR

3   (a)   Write short note on "switched capacitor filter".

                 8

   (b)   Design a narrow bandpass filter with a centre frequency fc = 1KHz, Q = 5, $A_f = 8$. Change the centre frequency to 2KHz, keeping A_F and B_W constant.

                 8

UNIT - IV

4   Explain the operation of PLL with the help of block diagram. Also explain linear model of second order PLL.

16

OR

4   Briefly describe the role of PLL in the following applications :
(i)   AM detector
(ii)   Tracking filter

16

UNIT - V

5   (a)   Explain the "Four quadrant Multiplier".

8

(b)   Design a 555 a stable multivibrator to generate an output pulse with a frequency f_0 = 5KHz and a duty cycle of 60%. Given V_{CC} = 15V and I_C min = 1mA.

8

OR

5   (a)   In the schmitt trigger, R_1 = 100 Ω, R_2 = 56 KΩ, V_{in} = 2V peak to peak sine wave, and the power supply voltage = $\pm$ 15 V. Determine the upper and lower threshold voltage, V_{ut} and V_{it}. The maximum output voltage swing is $\pm$ 14 V.

8

(b)   Write short note on Monostable multivibrator.

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