d) Explain how adjustable regulator IC works. Derive the expression for the output voltage for LM317 adjustable voltage regulator.

OR

Write short notes on (any one):

i) AVC using OP-AMP

ii) Frequency shift keying

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Roll No .....

EC/EI/IC-404 (New)

B.E. IV Semester

Examination, June 2016

Linear Integrated Circuits and Its Applications

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each questions are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

1. a) What happens when the common terminal of V+ and V– sources is not grounded?

b) Define Virtual Ground concept.

c) Derive the required expression for closed loop gain of non-inverting amplifier.

d) State and explain various characteristics of an ideal op-amp in detail.

OR

Draw and explain the schematic block diagram of an Op-amp. Identify each step in function.

2. a) Define input offset voltage and input offset current.

   b) Define CMRR of an op-amp.

   c) A square wave with negligible rise time at a peak to peak amplitude of 500mV must be amplified to a peak-to-peak amplitude of 3V, with a rise time of μsec or less. Can a 741 with a slew rate of 0.5 V/μsec be used?

   d) For an op-amp the values of R_f and R_1 are 100kΩ and 1 kΩ respectively. It is an inverting amplifier with input offset voltage drift of 14μV/°C and input offset current drift of 0.5 nA/°C. The amplifier is nulled at 25°C. Calculate the error voltage E_v and the output voltage at 45°C if the input is 7mv dc.

OR

What do you mean by frequency compensation of an op-amp? Explain in detail.

3. a) Draw a circuit using OPAMP in which the output voltage will be proportional to the rate of change of the amplitude of the input voltage. Write down the expression for its output voltage.

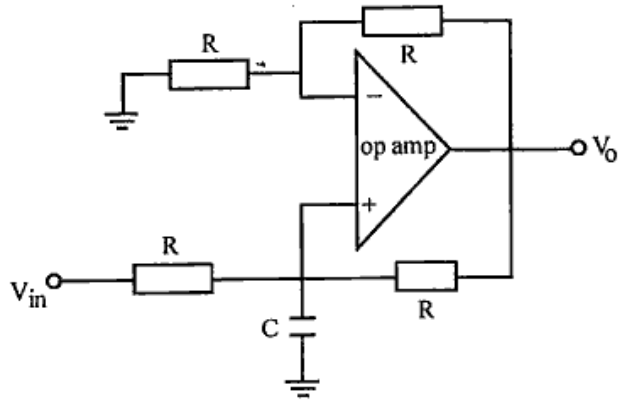
   b) Draw the circuit diagram of Wien bridge oscillator using op-amp.

   c) Draw and explain isolation amplifier.

   d) What are the effects of feedback on the input and output impedances of an OPAMP under inverting configuration. Deduce necessary expressions to support your answers.

OR

Prove that the circuit in figure is a non inverting integrator with $V_o = \frac{2}{RC}\int V_{in}\, dt$.



4. a) What is a sample and hold circuit? Where it is used?

   b) Differentiate between monostable and astable multivibrator.

   c) What are the disadvantages of zero crossing detector circuit? How it can be overcome by Schmitt trigger circuit.

   d) Explain full wave precision rectifier with neat diagram and waveforms.

OR

Explain voltage to current converter and current to voltage converter with neat circuit diagram.

5. a) Define PLL.

   b) Draw the Magnitude and frequency response of Butterworth 2nd order low pass filter.

   c) What are the important aspects related to filters?