

<b>5E5022</b>	Roll No.	Total No of Pages: <span style="border: 1px solid black; padding: 2px;">4</span>
<b>5E5022</b>		
<b>B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015</b>		
<b>Electronics &amp; Communication Engineering</b>		
<b>5EC2A Linear Integrated Circuits</b>		
<b>Common with EI</b>		

**Time: 3 Hours**

**Maximum Marks: 80**

**Min. Passing Marks Main: 26**

**Min. Passing Marks Back: 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.*

1. NIL

2. NIL

### UNIT-I

- Q.1 (a) What is the significance of CMRR & slew rate in practical circuits? Explain with an example. [4]
- (b) Why level shifter is required to design an operational amplifier? Explain its circuit. [4]
- (c) What is the difference between cascade and cascode amplifier? Explain cascode amplifier in detail. [8]

OR

- Q.1 (a) What are the various properties of operational amplifier for using as comparator? Explain briefly. [4]

[5E5022]

Page 1 of 4

[8640]

- (b) The 741C op-amp having following parameter is connected as a non-inverting amplifier (as shown in Figure 1) with  $R_1 = 1k\Omega$  &  $R_F = 10k\Omega$  :

Open loop gain ( $A$ ) = 200,000, Input Impedance ( $R_i$ ) =  $2M\Omega$

Output Impedance ( $R_o$ ) =  $75\Omega$ ,  $f_o \cong 5\text{ Hz}$ .

Supply voltage =  $\pm 15\text{ V}$ , output voltage swing =  $\pm 13\text{ V}$

Find the voltage gain with feed back ( $A_F$ ), Input Impedance with feed back ( $R_{iF}$ ),

Output Impedance with feed back ( $R_{oF}$ ) and Total offset voltage ( $V_{OOT}$ ). [12]

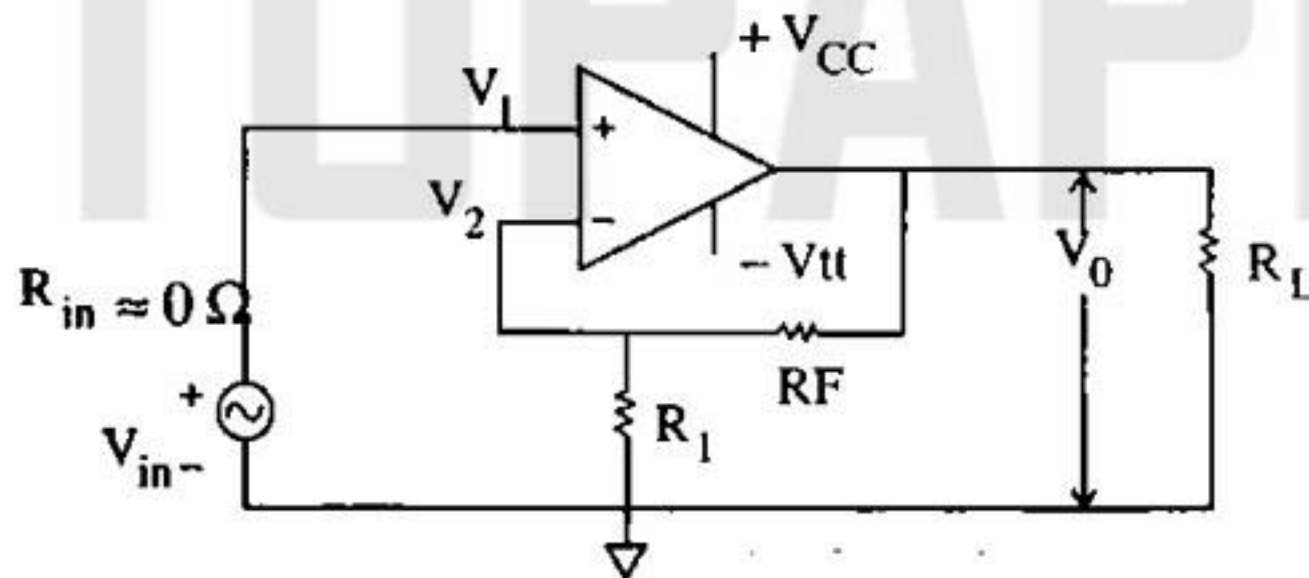


Figure - 1

## UNIT-II

- Q.2 (a) Why differentiator circuits are not used in design of analog computers for solving differential circuit? [4]

- (b) (i) Design a differentiator to differentiate an input signal that varies in frequency range from  $10\text{ Hz}$  to about  $1\text{ kHz}$ . [6]

- (ii) IF a sine wave of  $1\text{ V}$  peak at  $1000\text{ Hz}$  is applied to differentiator of part (i), draw its output wave form. [6]

**OR**

- Q.2 (a) The open loop voltage gain of operational amplifier is A as shown in figure 2.  
Find out the close loop voltage gain of circuit. [8]

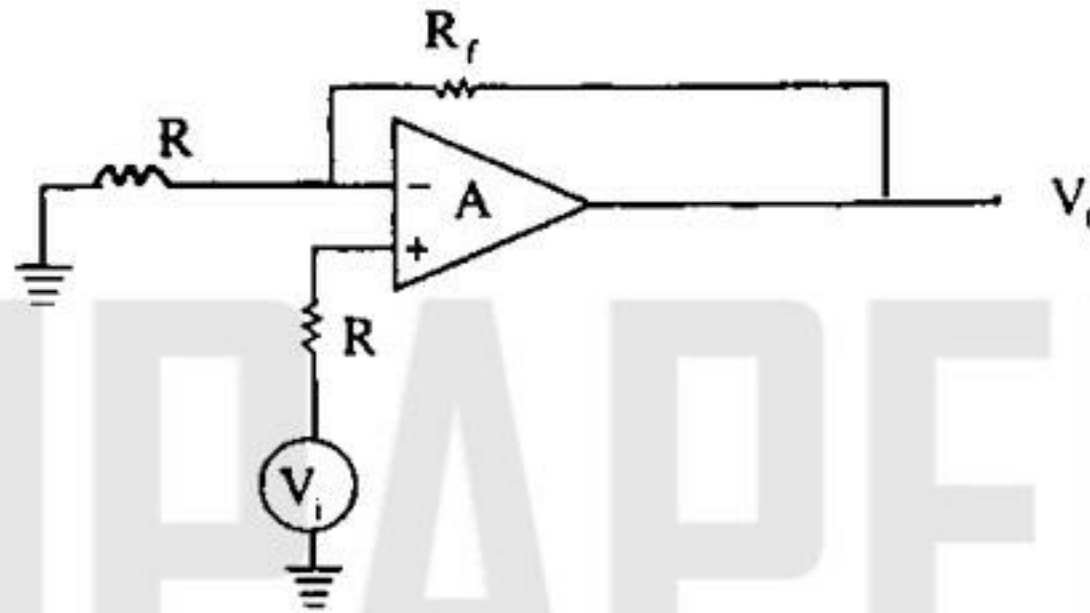


Figure - 2

- (b) Find the voltage gain of the circuit as shown in figure 3. [8]

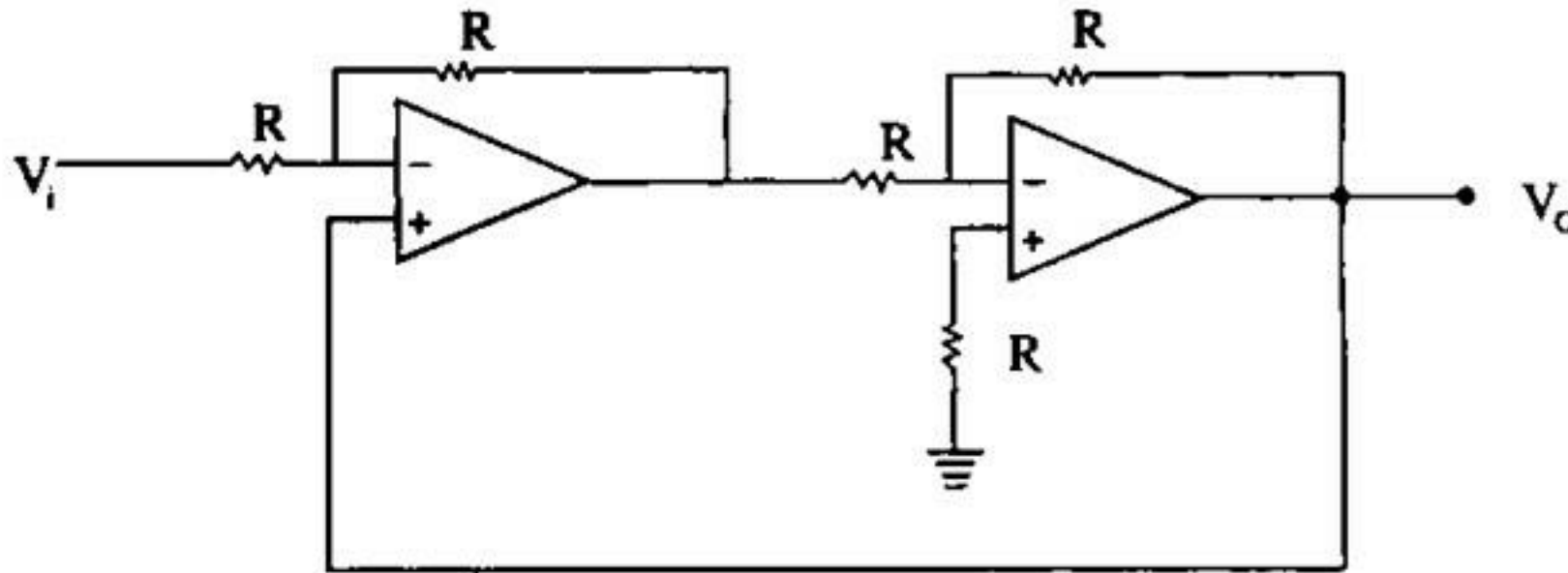


Figure - 3

**UNIT-III**

- Q.3 (a) (i) Design a active second order low pass filter at a high cutoff frequency of 1KHz. [4]  
(ii) Also draw the frequency response of network in part (i) [4]  
(b) Design the phase shift oscillator using op-amp 741 for  $f_o = 200\text{Hz}$ . [8]

OR

- Q.3 (a) Design the triangular wave generator for  $f_0 = 2\text{KHz}$  using op-amp 741 and output peak to peak voltage of 7V. [8]
- (b) Design a  $60\text{Hz}$  active notch filter using op-amp 741. [8]

UNIT-IV

- Q.4 (a) Design a regulated power supply of  $\pm 5\text{V}$  using filters and three terminal voltage regulated I. C. Also mention the value of capacitance for filtering. [8]
- (b) What are the various operating modes of 555 IC? Also explain the working principle of free running multi-vibrator. [8]

OR

- Q.4 (a) Explain the working and application of four quadrant multiplier. [8]
- (b) Write a brief note on Schmitt trigger. Also compare its performance with zero crossing detector. [8]

UNIT-V

Q.5 Write a short note on following (Any two) - [8×2=16]

- (a) Log and antilog amplifiers
- (b) Block diagram and operation of PLL
- (c) Frequency synthesizer
- (d) Lock range and capture range of PLL.