

Roll No.

$$v_o = 2v_1 + v_2 - 4v_3$$

NEELKANTH INSTITUTE OF TECHNOLOGY

B.Tech ECE (Semester IV)

**FIRST SESSIONAL EXAMINATION
(IMPROVEMENT) 2014-2015**

ELECTRONICS CIRCUITS (NEC-402)

Time: 1:00 Hours

Maximum Marks 30

NOTE: - i. be precise in your Answer

ii. All section are compulsory

SECTION A

1. **Attempt any Five Question :
2X5=10**

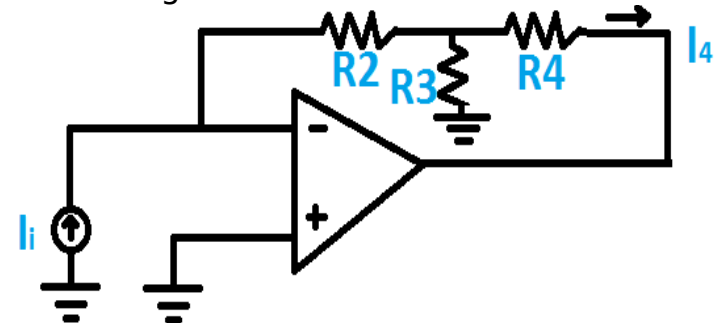
- Derive an expression for the trans-conductance (g_m) in NMOS and draw curve between g_m and $V_{gs} - V_t$ when I_d is constant.
- Define pinch off and threshold voltage in NMOS depletion and enhancement type of devices.
- Find the input impedance of the Difference amplifier.
- Design a weighted summer that provide

- Write down the expression for Gain in the inverting and non-inverting amplifier with finite open loop gain (A_{ol}). (***Please write only the final equation do not derive in the answer section***)
- Define full power bandwidth (***Please write down the formula also***) and the offset voltage.

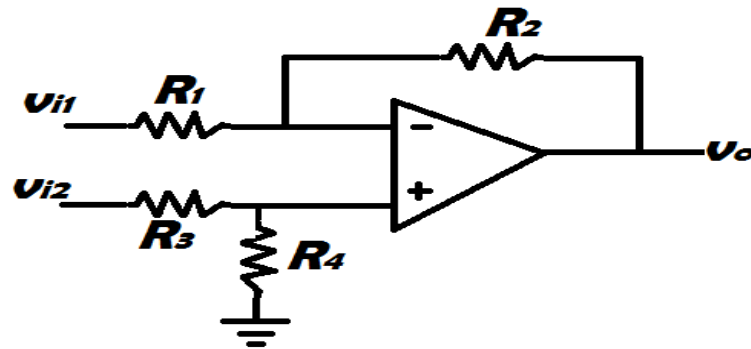
SECTION B

2. **Attempt any Four Questions:
5X4=20**

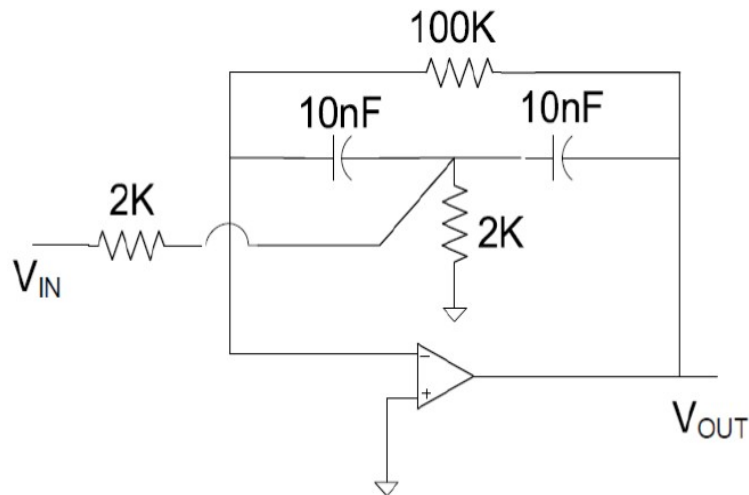
- Find the relationship between I_i and I_4 for the circuit given below



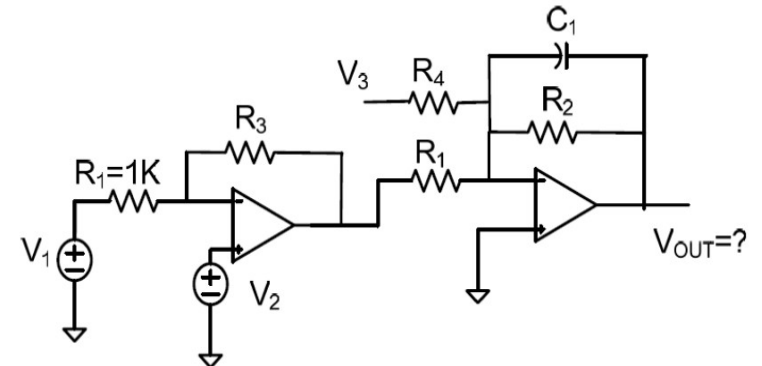
- Derive an expression for the differential gain, Common mode gain and differential input resistance of the circuit given below.



- (c) Determine the peaking frequency, the 3dB bandwidth, and the poles of the following circuit. Assume the OPM is ideal.



- (d) Determine the output variable in s domain. Assume the OPM is Ideal.



- (e) Derive an expression for the frequency response of close loop amplifier (**use the practical OPM case**) & also find the expression for 3dB frequency.
- (f) An OPM has a rated output voltage of $\pm 10V$ and a slew rate of $1V/\mu s$. What is the full-power bandwidth? If an input sinusoid with frequency of $f = 5f_M$ is applied to a unity gain follower constructed using this OPM, what is the maximum possible amplitude that can be accommodated at the output without incurring SR distortion?