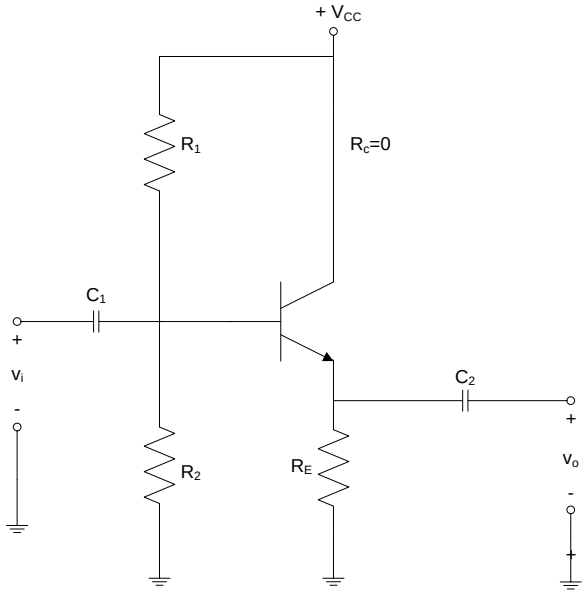
TUTORIAL-5 (EE 101: Basic Electronics)

DEPARTMENT OF ELECTRONICS & ELECTRICAL ENGINEERING, IIT GUWAHATI

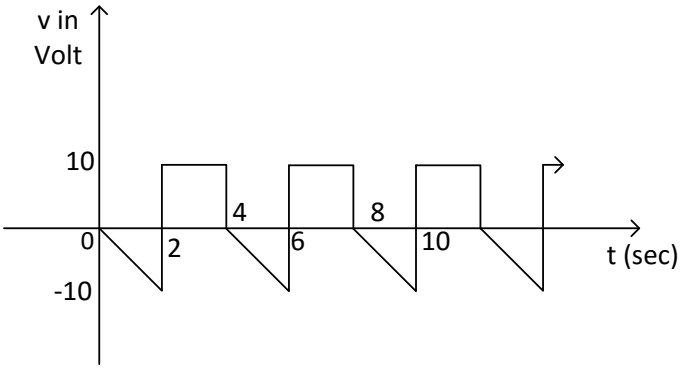
PRE-TUTORIAL ASSIGNMENT- PROBLEMS *(To be solved in the space provided)*

Name:	Roll No.	Tutorial Group:

Problem-1: In the transistor circuit shown, assume the following – β=100, R_1=100 KΩ, R_2=50KΩ, R_E=5KΩ, V_{CC}=15V. Find the Bias Point of the transistor and its r_e. (Assume this to be a silicon transistor with $V_{CE,SAT}$ = 0.1 V if it is in saturation. Use V_T = 26 mV)



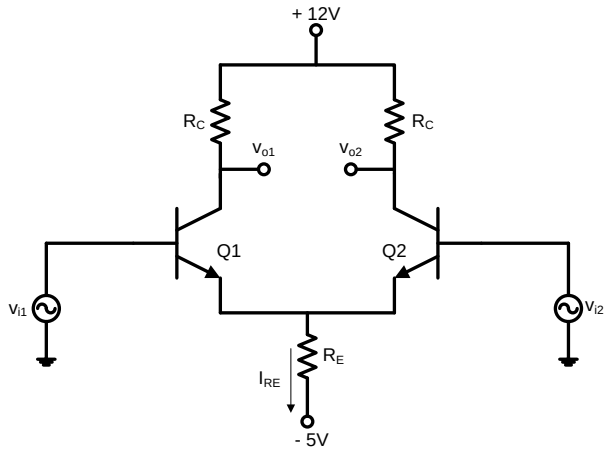
Problem-2: Determine the RMS value of a source with the voltage waveform given below. If the source is connected to a 2 Ω resistor, find the power absorbed by the resistor.



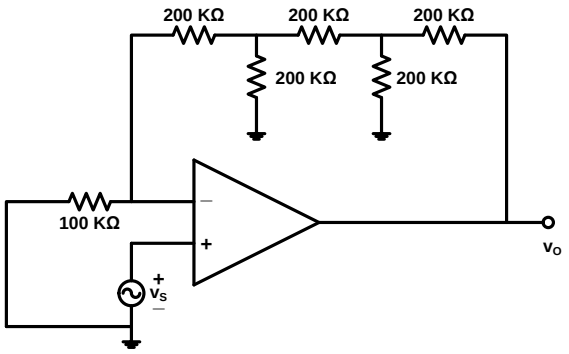
TUTORIAL-5: PROBLEMS

Problem 1: In the differential amplifier circuit shown, the two transistors are identical with β=50.

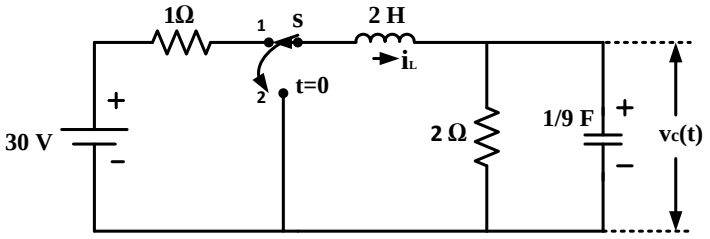
(a) If R_C=50 KΩ and R_E=10 KΩ, what is the Q-Point for the two transistors. (Assume that v_{i1} and v_{i2} are shorted to ground for DC.)
(b) Find the voltage gain A_V of this differential amplifier where $A_V=(v_{O1}-v_{O2})/(v_{i1}-v_{i2})$ assuming the transistor's output resistance r_O to be infinity.



Problem 2: Find the gain $A_v = v_o/v_s$ of the circuit shown.



Problem 3: Switch S was closed in position 1 for sufficiently long time before connection to position 2. Find the expression for Vc(t) for all time t > 0.



Problem 4: Draw the current phasor diagram for the circuit shown below when Vs = 100 cos(1.43t+53.13^0).