(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0321   Roll No.

B.Tech.

(SEM IV) EVEN SEMESTER THEORY EXAMINATION, 2009-2010

ELECTRONIC CIRCUITS
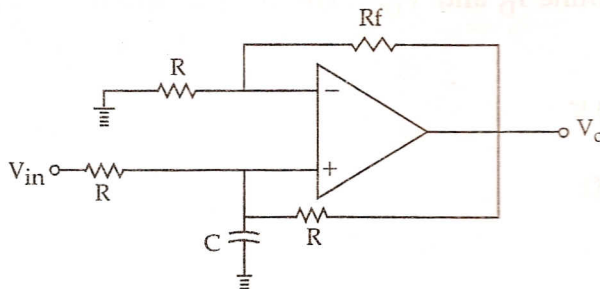
Time : 3 Hours   *Total Marks : 100*
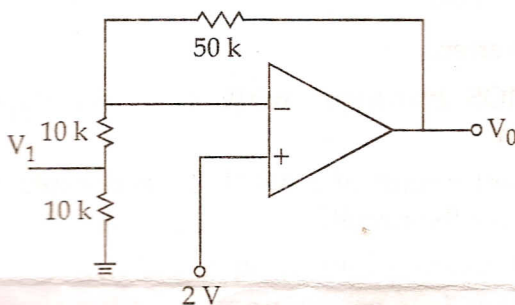
Note : *Attempt **all** questions.*

1.   Attempt **any four** parts of the following :

(a)   Derive a relationship between input and output voltages for the circuit shown in following figure
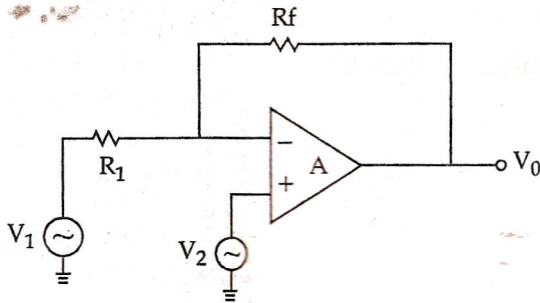

(b)   Obtain the voltages V_1 and V_0 in following figure

(c) Describe how the performance of an Op-amp is affected by the open loop gain of amplifier ?
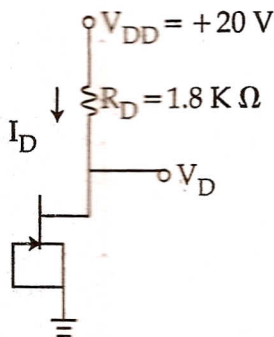
(d) Show that the output voltage of following circuit is :

$$V_0 = \left(\frac{R_f}{R_1}\right)(V_2-V_1) + V_2$$

(e) Draw the circuit diagram of a difference amplifier and explain its working.

(f) Describe the difference between inverting and non-inverting op-amp.
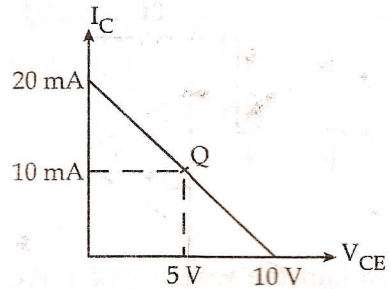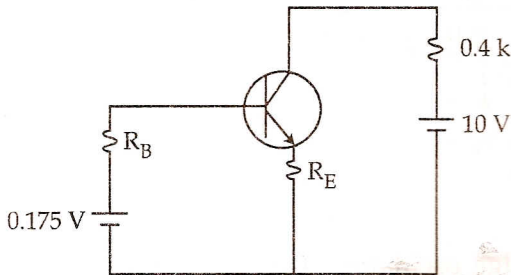
2. Attempt **any four** of the following :

(a) Analyze the circuit to determine I_D and V_D. The JFET is specified to have $V_p = -4V$ and $I_{DSS} = 10$ mA.


(b) Explain the working of MOSFET inverter.

(c) Obtain ON resistance of an NMOS transistor with $V_{GS} = 3V$, $V_{th} = 1V$, $\mu_n c_{ox} = 25mA/V^2$ $W = 3\mu m$, $L = 1\mu m$.

(d) Draw the high frequency equivalent circuit of a MOSFET and explain the significance of the different elements of the circuit.

(e) Explain operation of a MOSFET and explain its use as an amplifier.

(f) Draw and explain the frequency response of CS-amplifier.

3. Attempt **any two** of the following :

(a) Why transistor action can not be achieved by connecting two diodes back to back. Discuss briefly the charge transport mechanism in a BJT.

(b) Calculate R_E, R_B and ΔI_{CQ} if $40 < B < 120$ of a silicon transistor with $I_{CQ} = 10mA$, $V_{CQ} = 5V$ of following fig :

(c) Obtain the 3.db frequency and draw its voltage gain plot.
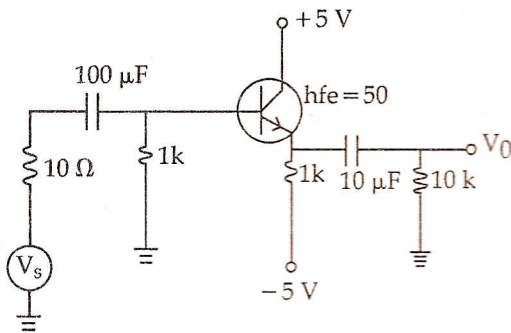
4. Attempt **any two** of the following :

(a) Draw the circuit diagram of a CS differential amplifier and derive the expression for its voltage gain.

(b) Explain the small–signal operation of the BJT differential amplifier and hence show that the differential input resistance R_{id} is given as :

$$R_{id} = (\beta+1)\,(2r_e + 2R_E)$$

(c) Explain the working of differential amplifier with active load.

5. Attempt **any two** of the following :

(a) Explain the effect of negative feedback on (i) gain and stability (ii) distortion of an amplifier.

(b) Obtain A_v, β, A_{vf}, R_i, R_{if}, R_o and R_{of} of following circuit.
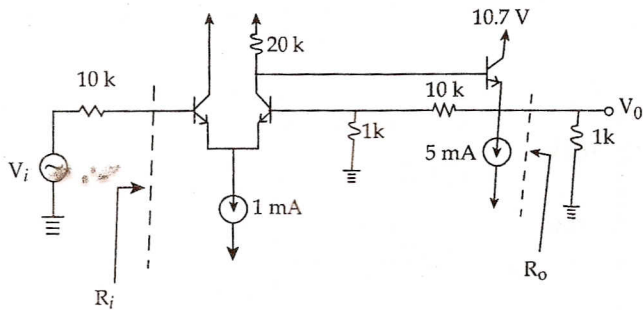
(c) Explain the working of a Weinbridge oscillator. Derive an expression for the frequency of oscillations. What are the merits and demerits of such oscillator ?

- o 0 o -