

B.TECH. SEM -IV ELECTRONICS 2014 COURSE (CBCS) :

WINTER - 2017

SUBJECT: ELECTRONIC CIRCUITS AND APPLICATIONS

Day: Tuesday
Date: 21/11/2017

W-2017-2084

Time: 02.30 PM TO 05.30 PM
Max. Marks: 60

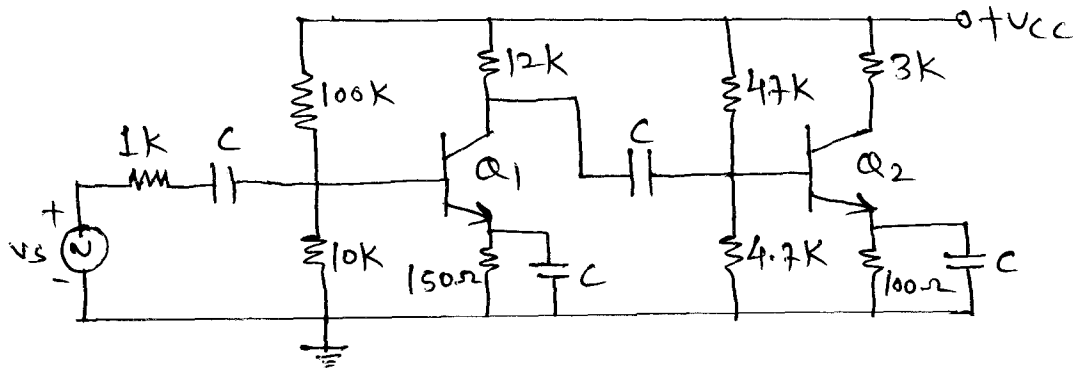
N.B:

- 1) All questions are **COMUPLSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable **CALCULATOR** is allowed.
- 4) Draw neat and labeled diagram **WHEREVER** necessary.

- Q.1 a)** Compare the three types of coupling methods used in multistage amplifiers. (07)
- b)** Discuss the effects of coupling, bypass and shunt capacitances on frequency response of amplifiers. (03)

OR

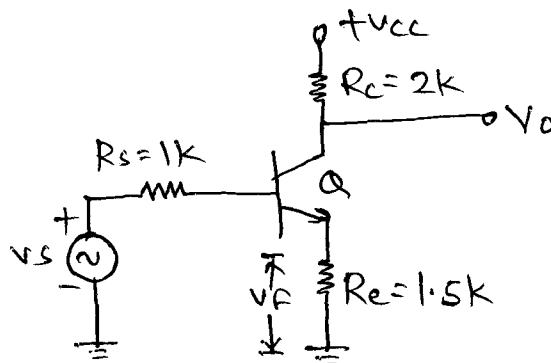
- Q.1** For the two stage amplifier circuit shown in following figure calculate, (10)
i) R_i , ii) R_o , iii) A_v . If both the transistors are identical with $h_{ie} = 1K \Omega$, $h_{fe} = 50$, h_{re} and $h_{oe} = 0$. All the capacitors are assumed to be large.



- Q.2** List the advantages of negative feedback. Derive relation between gain with and without feedback in a transistor amplifier. Describe the different topologies of negative feedback amplifier using block diagrams. (10)

OR

- Q.2** Identify the topology for given negative feedback amplifier. Calculate the values of D , G_{mf} , A_{vf} , R_{of} and R_{of}' . Assume the $h_{ie} = 1K \Omega$, $h_{fe} = 75$ and $h_{oe} = h_{re} = 0$. (10)



- Q.3 a)** Classify the power amplifiers based on the position of Q point on the dc load line. (06)
- b)** Describe how even harmonics are cancelled in the push-pull connection of transistors used in power amplifier. (04)

OR

P.T.O.

- Q.3** A class B push-pull amplifier supplies power to a loud speaker of $8\ \Omega$. The output transformer has a turn ratio $N_1:N_2$ of 4:1 and efficiency of 95%. Calculate the following: (10)
- AC output power.
 - Maximum power dissipation in each transistor.
 - DC input power.
 - Efficiency.
 - Maximum base currents for each transistor.
- Assume $h_{fe} = 15$ and $V_{cc} = 24V$

- Q.4** Compare LC and RC oscillators. Describe the working of RC phase shift oscillator using transistor. Derive expression for its frequency of oscillations. (10)

OR

- Q.4** A quartz crystal has following constants, $L = 0.05H$, $C_1 = 0.02\ pF$, $R = 500\ \Omega$ and $C_2 = 12\ pF$. Find the values of f_s and f_p . If the external capacitance across the crystal changes from 5pF to 6pF, find the change in frequency of oscillations. (10)

- Q.5** a) With a suitable diagram describe the operation of foldback current limiting protection in series voltage regulator circuit. (06)
- b) Describe the zener shunt regulator and derive expression for its voltage stability factor. (04)

OR

- Q.5** Draw circuit diagram of IC723 based positive voltage regulator to give 15V at 600mA output. Incorporate short circuit protection limit circuit to operate at 700mA. Find all resistor values, calculate their wattage. (10)

- Q.6** Draw the hybrid- π equivalent circuit of a transistor and derive the following relations from the equivalence of hybrid- π and h- parameter model. (10)

i) $h_{ie} = r_{bb'} + r_{b'e}$

ii) $h_{fe} = g_m \cdot r_{b'e}$

iii) $h_{re} = \frac{r_{b'e}}{r_{b'e} + r_{b'c}}$

OR

- Q.6** A single stage CE amplifier is measured to have a bandwidth of 4 MHz with a resistive load of $600\ \Omega$. Find the value of the source resistance R_s that will give the required bandwidth. Assume the following parameters for the transistor. $h_{fe} = 100$, $g_m = 50mA/V$, $r_{bb'} = 100\ \Omega$, $C_c = 2pF$, $f_T = 300\ MHz$. Make suitable assumptions. (10)