S.E. Sem 3 (Rev.) I.T. Electronics Devices & Circuits 04/12/08

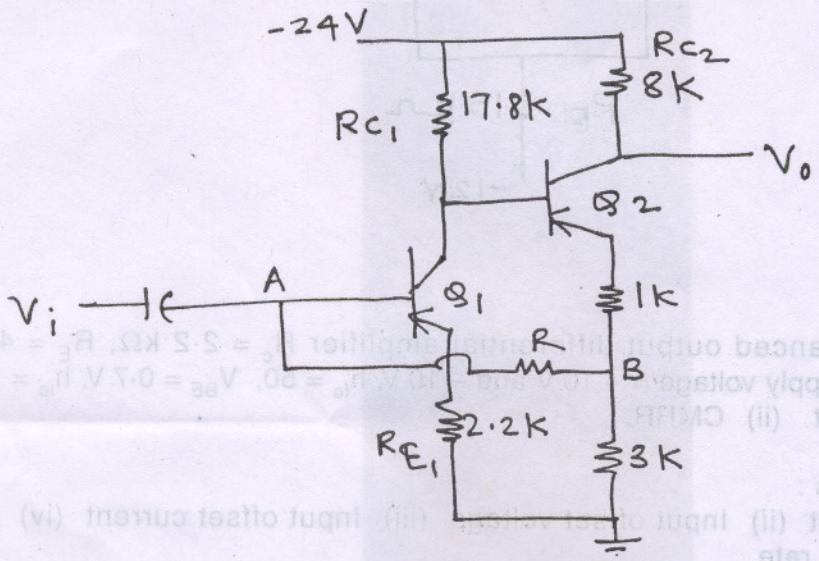
Con. 5449-08. RC-8795

(REVISED COURSE)

( 3 Hours) [ Total Marks : 100

N.B.: (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** question.
(3) Assume **suitable** data wherever **required** but **justify** the **same**.
(4) **Figures** to the **right** indicate **full** marks.

1. (a) For the circuit shown in figure assume $\beta = 100$ for each transistor. Determine R so that the quiescent conditions are $V_{CE}1 = -4$ V and $V_{CE}2 = -6$ V and also explain how Q-point stabilization is obtained. 6

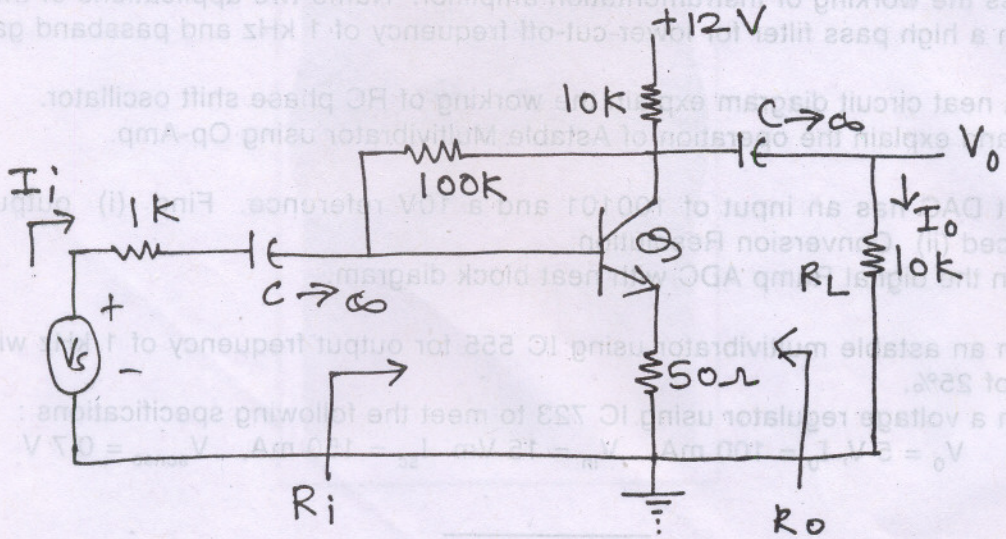



(b) Give the comparison between CB, CE and CC amplifiers. 4

(c) For the circuit shown calculate : 10

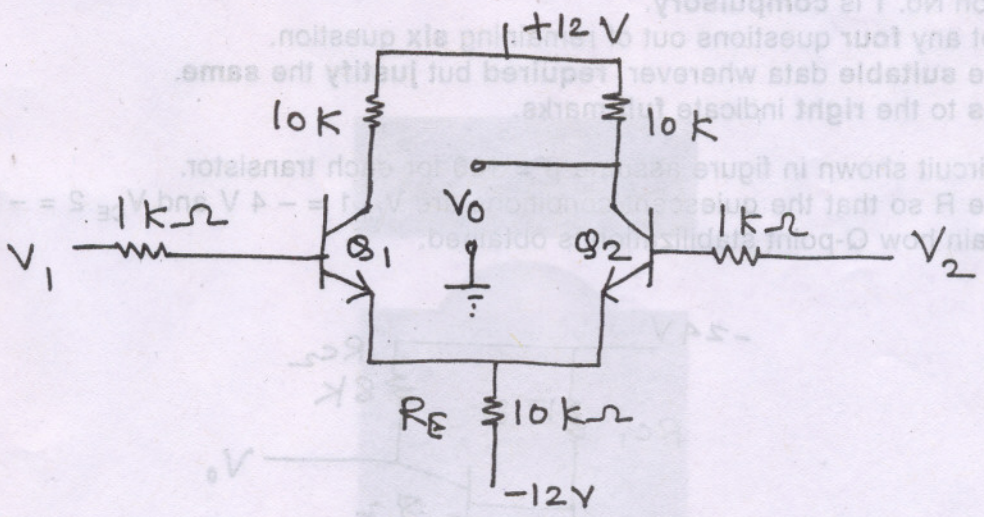
(i) $A_i = Io/Ii$ (ii) $A_{vs}$ (iii) $R_i$ (iv) $R_o$

Assume $h_{ie} = 1\ k\Omega$ $h_{fe} = 100$, neglect the $h_{re}$ and $h_{oe}$.




[TURN OVER

2. (a) Explain the method of improving CMRR. 4
(b) For the differential amplifier shown, determine 8
(i) Q point (ii) $A_d$ (iii) $A_c$ Assume $h_{ie}$ = 1 kΩ, $h_{fe}$ = 100, $V_{BE}$ = 0·6 V




(c) For a dual input balanced output differential amplifier $R_c$ = 2·2 kΩ, $R_E$ = 4·7 kΩ, $R_s 1 = R_s 2$ = 50 Ω, Supply voltage = + 10 V and – 10 V, $h_{fe}$ = 50, $V_{BE}$ = 0·7 V, $h_{ie}$ = 1·4 kΩ, determine (i) Q-point (ii) CMRR. 8

3. (a) Define following terms : 6
(i) Input Bias Current (ii) Input offset voltage (iii) Input offset current (iv) CMRR (v) PSRR (vi) Slew rate.
(b) If RC time constant is 1 ms and input to an integrator is a aquare wave with 1 kHz with $V_{pp}$ = 4 V draw the output waveform. Assume $V_0$ at t = 0 as 0 V. 6
(c) Using Op-Amp draw the circuit diagram with the resister values to realize the relation, $V_0 = V_1 + 2V_2 - 3V_3$. 8

4. (a) Discuss the working of Instrumentation amplifier. Name two applications of the same. 10
(b) Design a high pass filter for lower-cut-off frequency of 1 kHz and passband gain of 2. 10

5. (a) With a neat circuit diagram explain the working of RC phase shift oscillator. 10
(b) Draw and explain the operation of Astable Multivibrator using Op-Amp. 10

6. (a) A 6-bit DAC has an input of 100101 and a 10V reference. Find (i) output votage produced (ii) Conversion Resolution. 10
(b) Explain the digital Ramp ADC with neat block diagram. 10

7. (a) Design an astable multivibrator using IC 555 for output frequency of 1 kHz with a duty cycle of 25%. 10
(b) Design a voltage regulator using IC 723 to meet the following specifications : 10
$V_0$ = 5 V, $I_0$ = 100 mA, $V_{in}$ = 15 Vm $I_{sc}$ = 150 mA, $V_{sense}$ = 0·7 V