S.E (Computer & Information Technology) (Sem III) (Rev)
Examination October 2006
Electronics Devices and circuits
[REVISED COURSE]

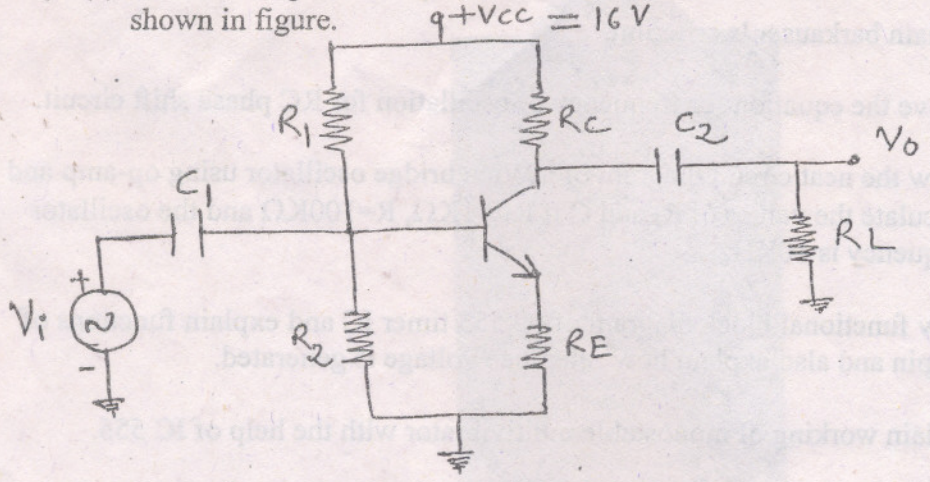
CON/4874-06. YM-5233

21/06/06

(3 Hours) [Total Marks : 100

N.B. (1) Question No.1 is compulsory. From the remaining questions solve any four questions.
(2) **Figures** to the right indicate full marks.
(3) Assume any **suitable data** wherever required but **justify** the same.

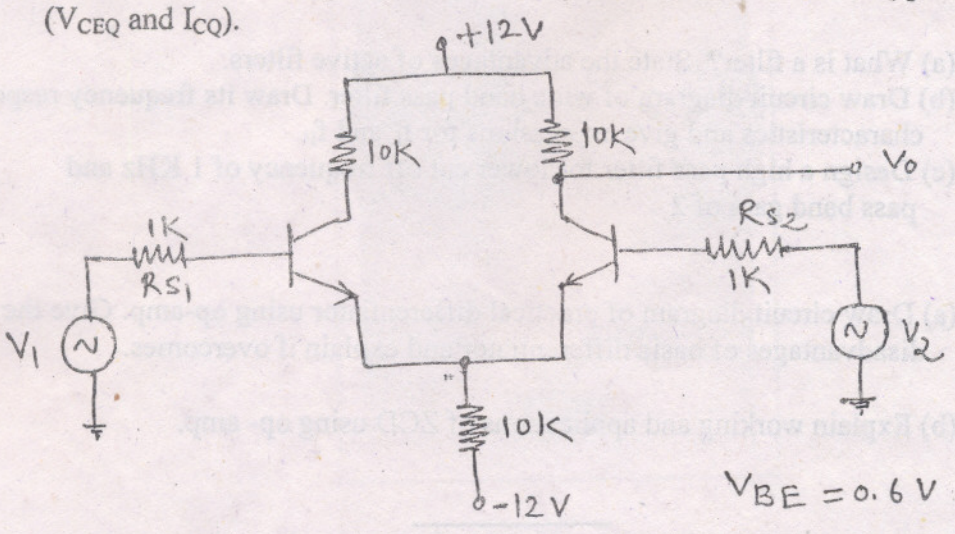
Q.1 (a) Derive the equation for Zi, Zo, Av and Ai for the circuit shown in figure. 12



(b) If R_1=100KΩ, R_2= 10KΩ, Rc =2.2KΩ, R_E = 0.68KΩ, R_L = 10KΩ, ß=200, V_{BE} = 0.7 V Vcc = 16 V.

Find (i) Voltage gain Av
(ii) Output impedance Zo
Use approximate analysis. 8

Q.2 (a) For the differential amplifier shown in figure determine DC bias Q-point (V_{CEQ} and I_{CQ}). 6



V_{BE} = 0.6 V

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(b) Write a note on current mirror circuit. 8

(c) For op-amp explain following terms & give practical values. 6

(i) Supply voltage rejection ratio
(ii) Slew rate
(iii) CMRR

Q.3 (a) Explain barkausen's criterion. 4

(b) Derive the equation for frequency of oscillation for RC phase shift circuit. 10

(c) Draw the neat circuit diagram of a Wien bridge oscillator using op-amp and calculate the values of R_f and C if R_1 =1KΩ, R=100KΩ and the oscillator frequency is 10KHz. 6

Q. 4 (a) Draw functional block diagram of IC 555 timer IC and explain functions of each pin and also explain how reference voltage is generated. 8

(b) Explain working of monostable multivibrator with the help of IC 555. 6

(c) Design a square wave generator using IC 555 for frequency of 10 KHz. 6

Q 5 (a) Draw and explain functional block diagram of IC 723. Also list its features. 8

(b) Design a voltage regulator using IC 723, which gives a 5 V output. The maximum load current is 120 mA. Fold back current limiting is to be provided with I_{SC} = 60mA. Assume Vsense = 0.6 V. 12

Q.6 (a) What is a filter? State the advantages of active filters. 4
(b) Draw circuit diagram of wide band pass filter. Draw its frequency response characteristics and give expressions for f_L and f_H. 8
(c) Design a high pass filter for lower cut off frequency of 1 KHz and pass band gain of 2 8

Q. 7 (a) Draw circuit diagram of practical differentiator using op-amp. Give the disadvantages of basic differentiator and explain if overcomes. 12

(b) Explain working and applications of ZCD using op- amp. 8