(Pages :4)

3038

Reg. No. : .....

Name : .....

Third Semester B.Tech. Degree Examination, April 2015

(2013 Scheme)

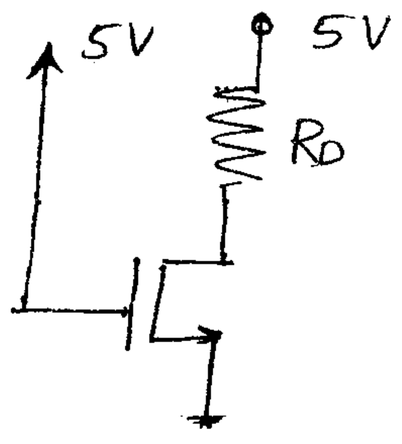
13.305 : ELECTRONIC CIRCUITS (T)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions. **Each** question carries **2** marks.

1. Explain how a LPF acts as an integrator.
2. Obtain the circuit of a double clipper clipping at +3 and – 3 volts. Assume ideal diodes.
3. Calculate the bandwidth and capacitance $C\pi$ of a bipolar transistor.f_T = 500 MHz at I_C = 1mA, β_0 = 100 C_y= 0.3 PF.
4. Draw the small signal equivalent of MOSFET including body effect.
5. Explain why voltage divider biasing is preferred over other biasing circuits.
6. Design the circuit to establish a drain voltage of 0.1V, V_t = 1V, K_n = 1 mA/V^2.



7. Compare the different feedback topologies.
8. Differentiate between synchronous tuning and stagger tuning.
9. Write down expressions for ripple factor of a bridge rectifier and full wave rectifier.
10. Draw a current mirror circuit. **(10×2=20 Marks)**

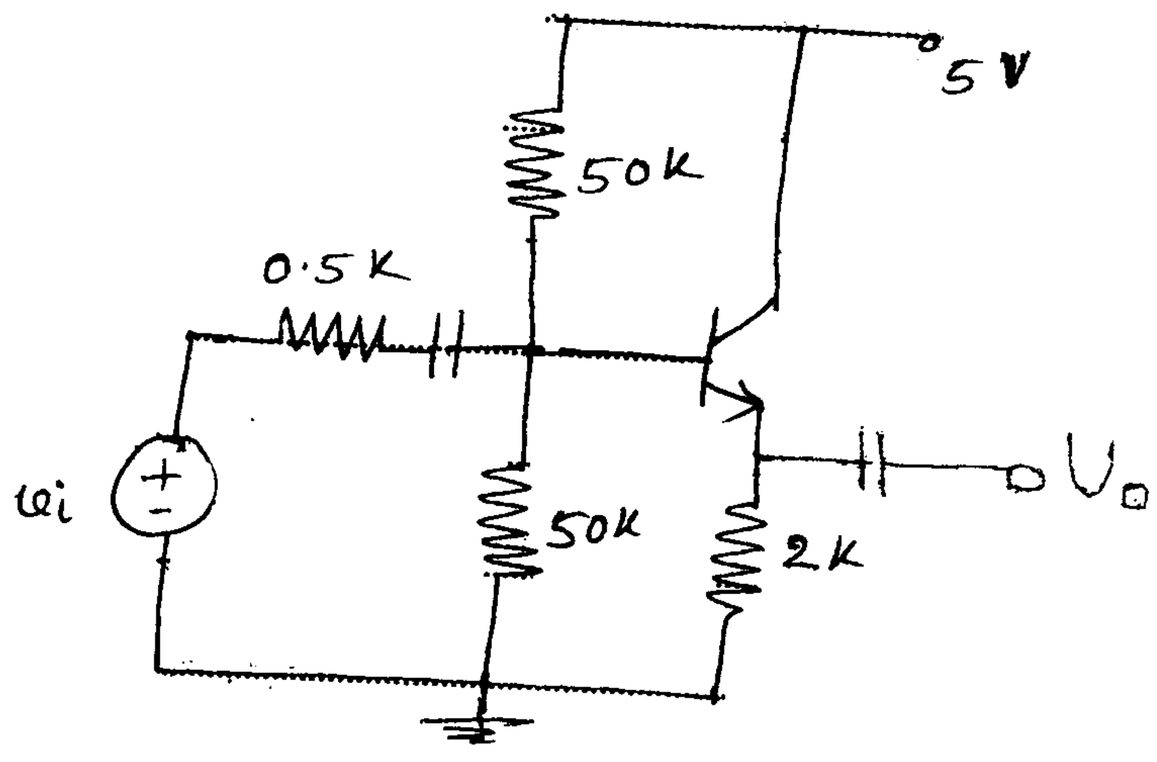
P.T.O.

PART – B

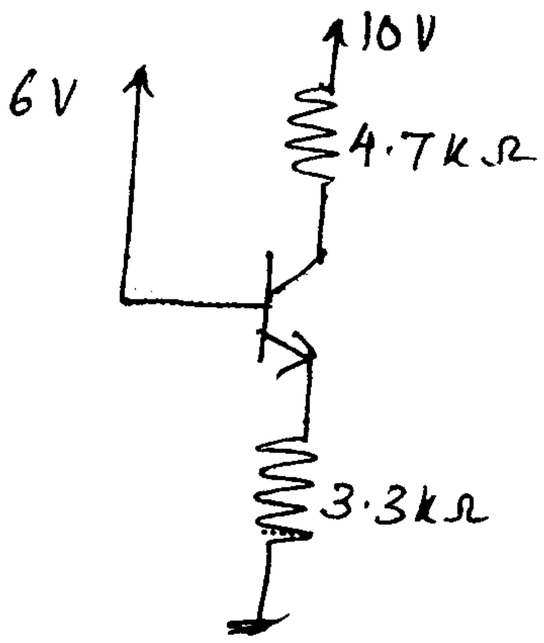
Answer **any one** question from each Module. **Each full** question carries **20** marks.

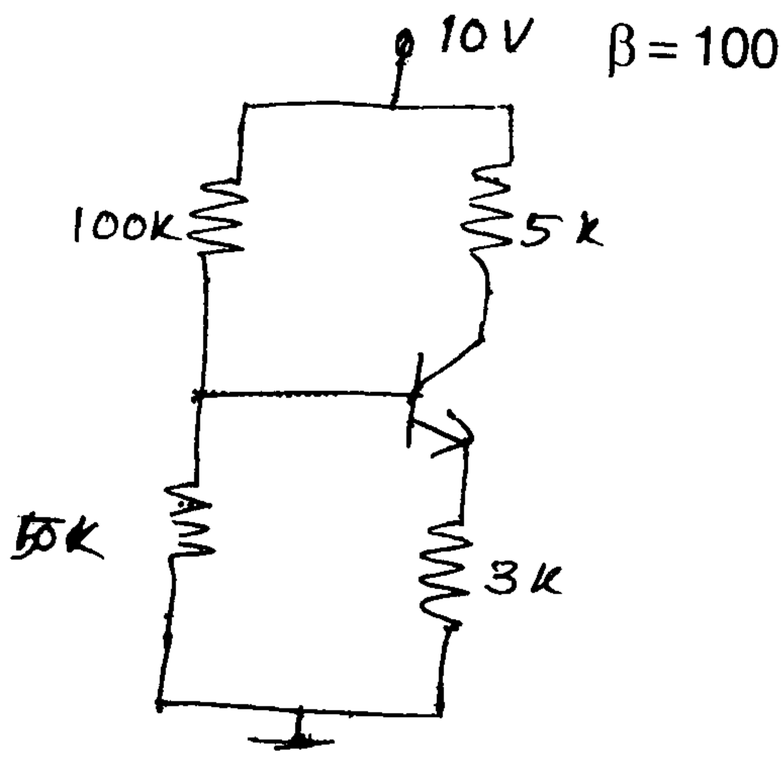
Module – I

11. a) Calculate A_v, R_i and R_o of the circuit. Given $\beta = 100$, $V_{BE} = 0.7$ v and $V_A = 80$ V. **10**

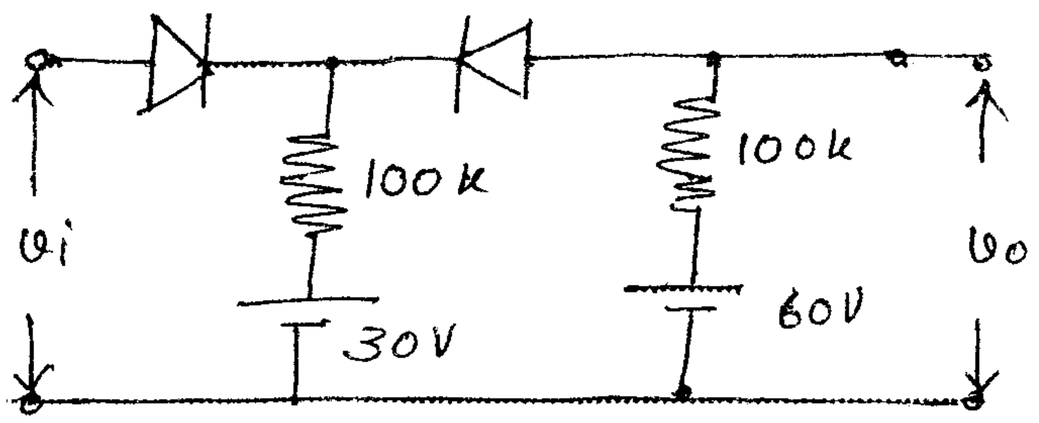


b) Determine voltages at all nodes and current through all branches of the following circuits. **(4+6=10)**





12. a) Draw the transfer characteristics of the clipping circuit shown. The input varies linearly from 0 to 125 V. Plot the output. **10**



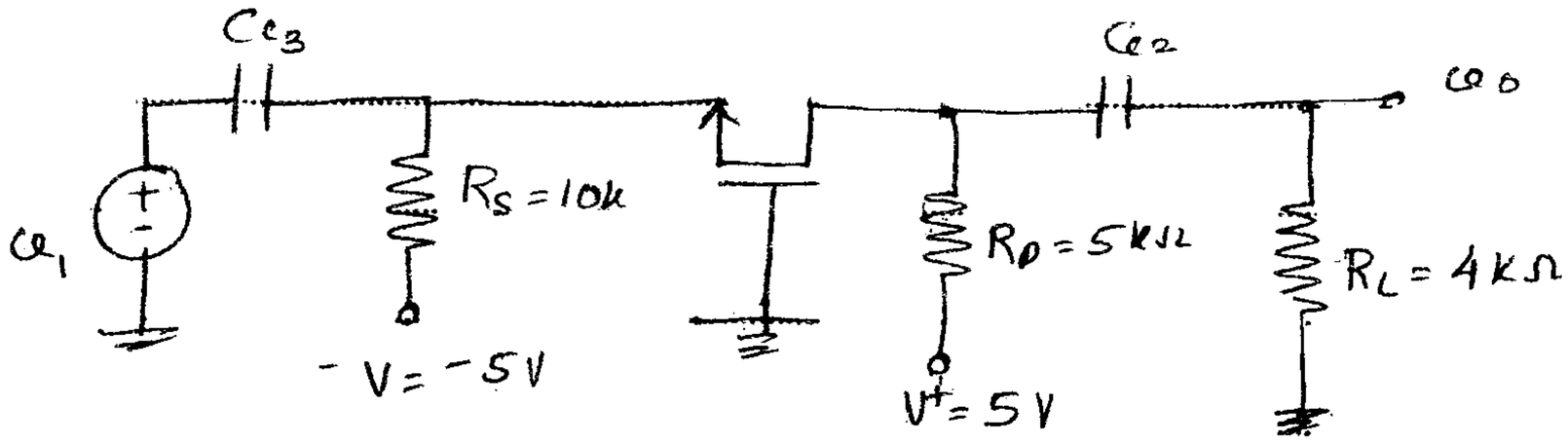
b) With neat circuit diagram explain an RC coupled amplifier, functions of different components and its frequency response. **10**

Module – II

13. a) For the circuit shown the NMOS transistor parameters are $V_t = 1V$, $K_n = 3\ mA / V^2$ and $\lambda = 0$. Determine: **12**

a) I_{DQ} and V_{DQ} and

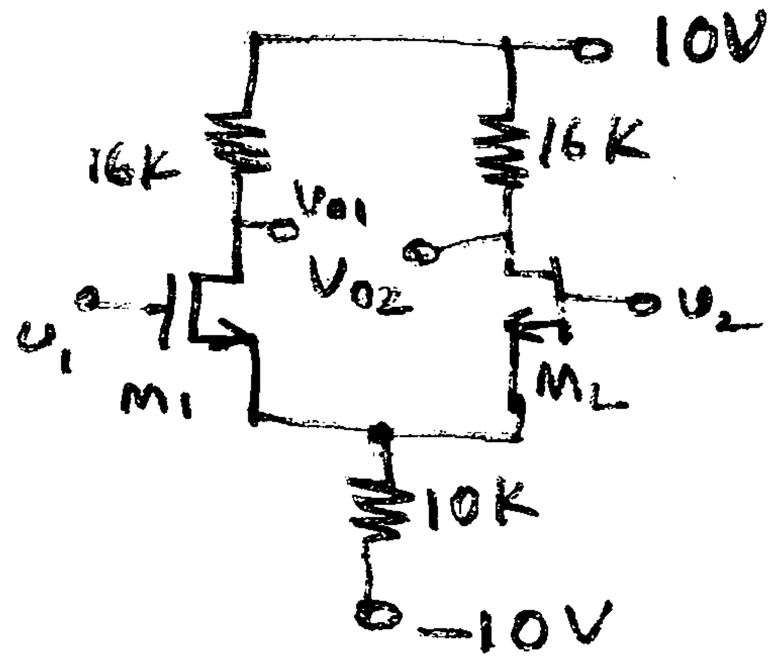
b) Find the small signal voltage gain.



b) Explain current source biasing of MOSFET. Discuss on current mirror circuit. **8**

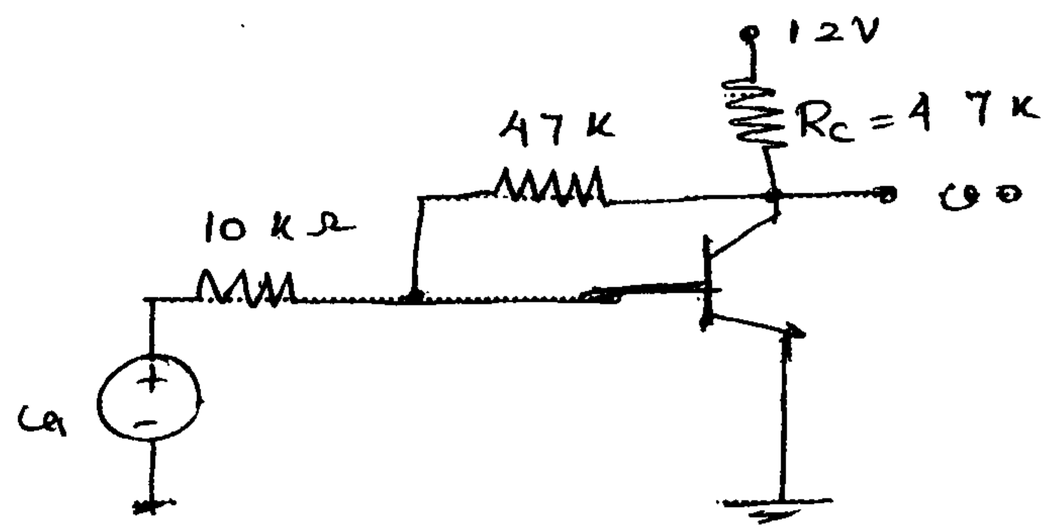
14. a) Obtain expression for voltage gain, input impedance and output impedance of a CD amplifier. **10**

b) The differential amplifier shown in Fig. has $K_{n1} = K_{n2} = 0.1$ mA/V^2 and for all transistors, $\lambda = 0$ and $V_t = 1$V. Draw the equivalent circuit and determine differential gain. **10**



Module – III

15. a) Determine the transconductance gain V_o/I_i, of the circuit. Given $\beta = 100$. **10**



b) Explain how crystal oscillator produces stable oscillation. Obtain expression for frequency of oscillation. **10**

16. a) Obtain expression for voltage gain of single tuned BJT amplifier. **10**

b) Draw the small signal equivalent of a voltage series feedback amplifier and obtain expression for voltage gain, input resistance and output resistance. **10**

Module – IV

17. a) An ideal Class – B push-pull power amplifier with input and output transformers has $V_{CC} = 20$V, $N_2 = 2N$, and $R_L = 20\Omega$. The transistor have $\beta = 20$. For the maximum output signal at $V_m = V_{CC}$, determine : **10**

1) Output signal power 2) Collector dissipation in each transistor and 3) Conversion efficiency.

b) Explain with sketches the working of bootstrap circuit. **10**

18. a) Draw the circuit of a series voltage regulator and explain its working. **10**

b) Obtain expression for conversion efficiency, total load power, collector dissipation of a transformer coupled Class A power amplifier. **10**