Name : .....

Third Semester B.Tech. Degree Examination, April 2015

(2013 Scheme)

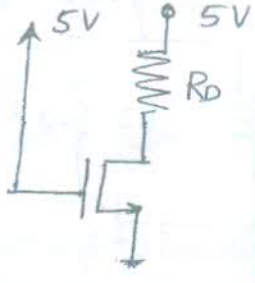
13.305 : ELECTRONIC CIRCUITS (T)

Time: 3 Hours Max. Marks: 100

PART – A

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

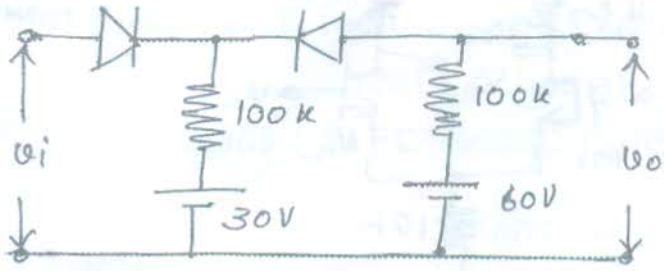
1. Explain how a LPF acts as an integrator.
2. Obtain the circuit of a double clipper clipping at +3 and – 3 volts. Assume ideal diodes.
3. Calculate the bandwidth and capacitance $C\pi$ of a bipolar transistor.$f_T = 500$ MHz at $I_C = 1$mA, $\beta_0 = 100$ $C_y = 0.3$ PF.
4. Draw the small signal equivalent 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, $V_t = 1$V, $K_n = 1$ 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.

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



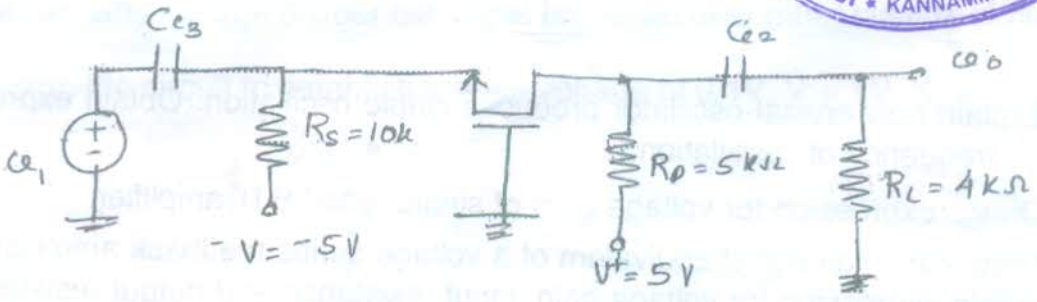
b) With neat circuit diagram explain an RC coupled amplifier, functions of different components and its frequency response. 10

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

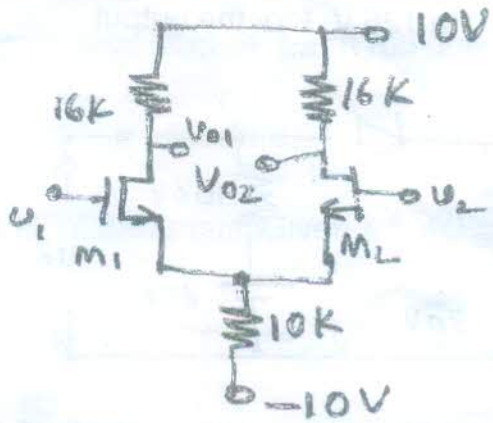
b) Find the small signal voltage gain.



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

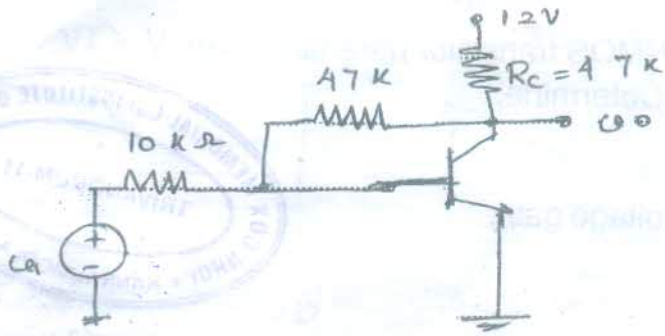
14. a) Obtain expression for voltage gain, input impedance and output impedance of a CD amplifier. 10

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