Code :R5100207

R5

B.Tech I Year (R05) Supplementary Examinations, May 2011
ELECTRONIC DEVICES & CIRCUITS
(Common to Electrical & Electronics Engineering, Electronics & Communication Engineering, Computer Science & Engineering, Electronics & Instrumentation Engineering, Biomedical Engineering, Information Technology, Electronics & Control Engineering, Electronics & Computer Engineering, Computer Science & Systems Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Derive the expression for the electro static deflection sensitivity in the case of CRT.
   (b) Compare electro static and electro-magnetic deflection sensitivity in all respects.
2. (a) Derive an expression for the conductivity of an extrinsic semi conductor.
   (b) A bar of instrinsic silicon has a cross-sectional area of $2.5\times10^{-4}m^2$. The electron density is 1.5×10^{6} per m^3. How long the bar be in order that current in the bar will be 1.2mA when 9 voth are applied across it.
3. (a) Draw the circuit diagram of bridge rectifier with L-section L-C filter and explain its working in brief.
   (b) A bridge rectifier with capacitor filter in fed from 230V to 50V step down transformer. If average d.c. current is load in 1 AMP and capacitor filter of 1000μF. Calculate load regulation and ripple factor. Assume power line frequency of 50Hz. Neglect diode forward resistance and d.c resistance of secondary of transformer.
4. (a) Describe a set up to obtain the output characteristics of a transistor in CE configuration. Indicate the various regions of operation on the output characteristics.
   (b) Explain the principle of MOSFET in depletion mode. With neat sketches and o/p characteristics.
5. (a) Draw a BJT self bias circuit and obtain the expression for the stability factor 'S'.
   (b) A Germanium transistor is used in a self biasing circuit configuration as shown in figure 1, with V_{cc} = 16V, R_c = 1.5k and β = 50. The operating point desired is V_{CE} = 8V and I_C = 4mA. If a stability factor S = 10 is desired, calculate values of R_1, R_2 and R_E of the circuit. (figure 1)

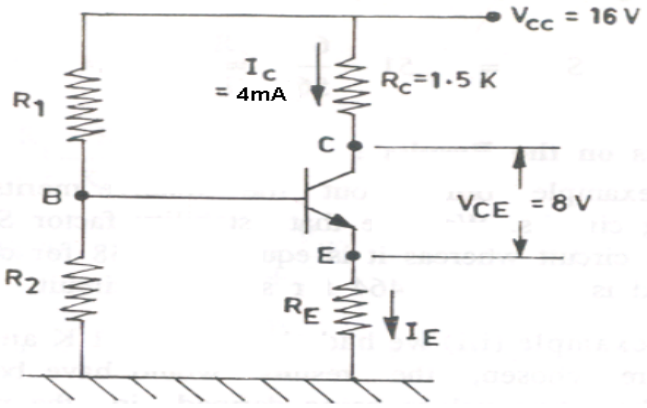

Figure 1:

Code :R5100207

R5

6. (a) Explain millers theorem with an example.

   (b) The input and output resistances of the FET amplifier are shown in the figure 2. Calculate the value of voltage gain. The FET amplifier has g_m=2mA/V and r_d=40KΩ.

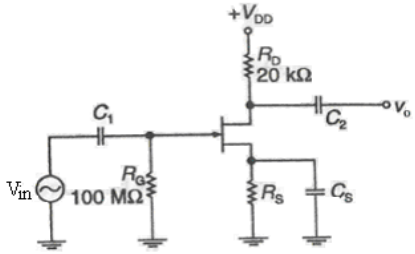

Figure 2:

7. (a) Draw the circuit diagram of voltage series feedback and derive expressions for input and output resistances.

   (b) Calculate the voltage gain, input and output resistances of a voltage series feedback amplifier having A_V=300, R_i=1.5K, R_O=50K and β=1/15.

8. (a) What is the basis on which the classification may be done for oscillators.

   (b) What are the requirements on which the oscillator depends upon.

   (c) Why RC phase shift oscillators are needed?

   (d) Calculate the operating frequency of BJT phase shift oscillator for R = 6K ohms, C =1500pf and R_c = 18kΩ.

★★★★★