

3E2072**3E2072**

B.Tech. IIIrd Semester (Main/Back) Examination, Feb. - 2011
Common for Computer Engg. & IT
Electronic Devices & Circuits

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

Attempt overall **five** questions, selecting one question from **each** unit. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.

Unit - I

1. a) What do you understand by clamping circuit with neat diagram explain the action of
 - i) Positive clamping and
 - ii) Negative clamper
- b) Describe the Hall effect? What properties of a semiconductor are determined From a Hall effect experiment? (8+8)

2. a) Find the output of a clipper as shown in Fig. (i). Assume that $V_f = 0$ and $r_f = 0$ for both diode

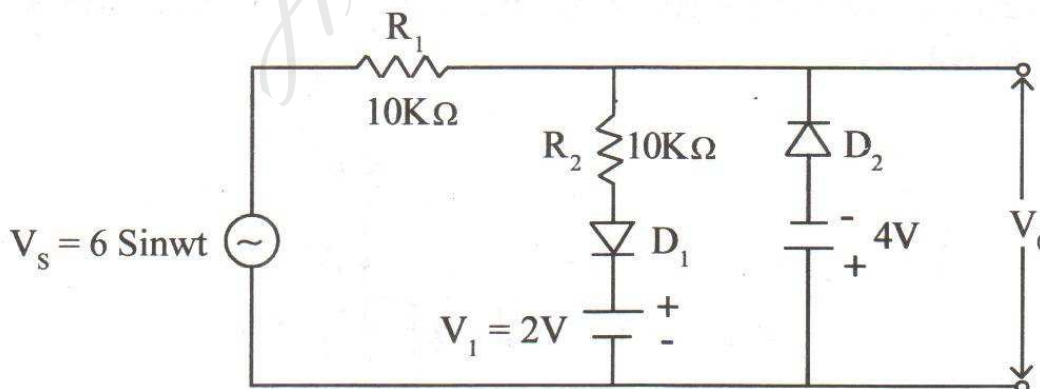


Fig. (1.)

- b) Explain the significance of Fermi level in intrinsic and extrinsic semiconductor energy band distributions? (8+8)

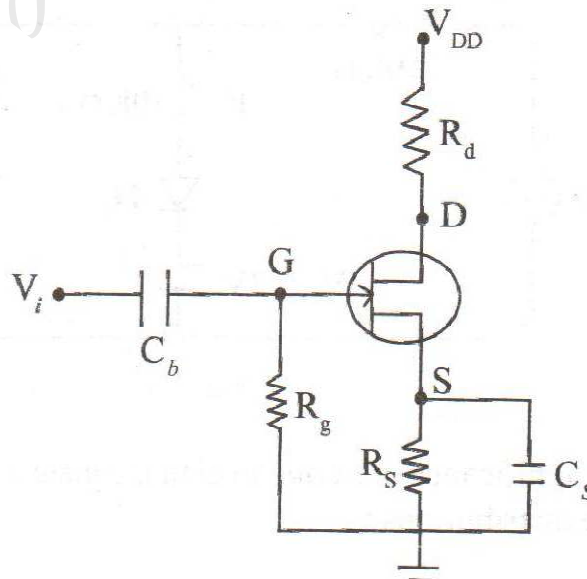
Unit - II

3. a) Find out the expression of S , S' and S'' for Potential divider biasing circuit (For C.E. configuration)
- b) Draw and explain Ebers Molls representation of BJT? Also define the voltage and current used in Ebers Molls Equation for PNP transition. **(8+8)**
4. a) Draw the circuit of transistor in common emitter configuration of BJT and sketch the output characteristics indicate the active, saturation and cutoff region. Derive the relationship between α and β for BJT?
- b) h - parameter for CE amplifier has $h_{ie} = 1100\Omega$, $h_{fe} = 50$, $h_{oe} = 25 \times 10^{-6} \text{ Mho}$, $h_{re} = 2.5 \times 10^{-4}$ if $R_L = 1\text{K}\Omega$ Determine the following parameters
 - i) current gain
 - ii) voltage gain
 - iii) power gain
 - iv) input impedance **(8+8)**

Unit - III

5. a) Draw the R-C coupled amplifier circuit? Calculate the current gain for low, middle and high frequencies region?
- b) The amplifier of Fig. (2) Utilizes an N-channel FET for which $V_p = -2\text{V}$, $g_{mo} = 1.60 \text{ mA/V}$ and $I_{DSS} = 1.65\text{mA}$. It is desired to bias the circuit at $I_D = 0.8 \text{ mA}$ using $V_{DD} = 24\text{V}$ assume $r_d \gg R_d$ Determine
 - i) V_{GS}
 - ii) g_m
 - iii) R_s
 - iv) R_d

such that the voltage gain is atleast 20 dB with R_s bypassed with a very large capacitance C_s **(8+8)**



6. a) Explain the working of n-channel MOSFET. What is the difference between enhancement and depletion mode of operation.
- b) Explain Miller's theorem. Define Boot strapping with its electrical equivalent circuit? (8+8)

Unit - IV

7. a) Explain the Brakhausem criterion for sustained oscillations.
- b) Prove that in a negative Feedback amplifier

$$\left| \frac{dA_F}{A_F} \right| = \frac{1}{|1 + \beta A|} \left| \frac{dA}{A} \right|$$

Where A_F = gain with feedback, A = transfer gain, β = feedback factor.

(8+8)

8. a) Draw the circuit diagram of voltage shunt Feedback amplifier with its necessary effects? What are the difference between voltage shunt and voltage series Feedback amplifier?
- b) Determine the operating frequency of a Hartley oscillator if $L_1 = 100 \mu\text{H}$, $L_2 = 1\text{mH}$ mutual inductance between coils $M = 10 \mu\text{H}$ and $C = 10 \text{PF}$

(8+8)

Unit - V

9. a) Draw the circuit of the wein bridge oscillator. Derive the expression for frequency of oscillation for such as oscillator
- b) The parameter of a crystal oscillator equivalent circuit are $L_s = 0.8 \text{ H}$, $C_s = .08 \text{ PF}$, $R_s = 5 \text{ K}\Omega$ and $C_p = 1.9 \text{ PF}$ Determine the resonance frequencies F_s and F_p (8+8)
10. a) With the help of circuit diagram explain the working of "Astable multivibrator" give its waveform what are the basic difference among the three types of multivibrator circuits
- b) Draw the circuit of a Schmitt Trigger using BJT and explain its working with input voltage versus the output voltage curve. (8+8)