

Code No: RR10205

RR

Set No. 2

I B.Tech Examinations, December 2010
ELECTRONICS DEVICES AND CIRCUITS
Common to IT, EIE, CSE, ECE, EEE

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Define the following terms and explain.
 - i. Emitter efficiency
 - ii. Transport factor.
 - iii. Large signal current gain.
- (b) The reverse leakage current of the transistor when connected in CB configuration is $0.2\mu A$ while it is $18\mu A$ when the same transistor is connected in CE configuration. Calculate α_{dc} and β_{dc} of the transistor.
- (c) If $\alpha_{dc} = 0.99$ and $I_{CBO} = 50\mu A$, find Emitter current. [6+6+4]
2. (a) Draw the circuit diagram of fixed bias circuit in CE configuration and obtain the expression for I_B . Why the circuit is not suitable if the β of the transistor is changed.
- (b) How to obtain bias stability in CE configuration circuit.
- (c) Briefly explain about thermal stability. [8+4+4]
3. (a) An electron is moving perpendicular to magnetic field 'B'. Derive the expression for radius 'R' of the trajectory and period of rotation T.
- (b) Derive the expression for the electro magnetic deflection sensitivity in the case of the CRT. [8+8]
4. (a) With reference to the semiconductor diode, explain the following with the help of relevant wave forms.
 - i. Diode reverse recovery time
 - ii. Storage and transition time.
- (b) What is the difference between dynamic and static resistance of a semiconductor diode. [10+6]
5. (a) Draw the circuit diagram of voltage series feedback and derive expressions for input resistance and output resistance.
- (b) For the circuit shown below (figure 4b) $h_{fe} = 100$, $h_{ie} = 1k\Omega$ and other two parameters are negligible and $R_e = 1K$. Find the value of $A_V = \frac{V_o}{V_i}$, $A_{vs} = \frac{V_o}{V_s}$, R_{if} and R_{of} . [8+8]

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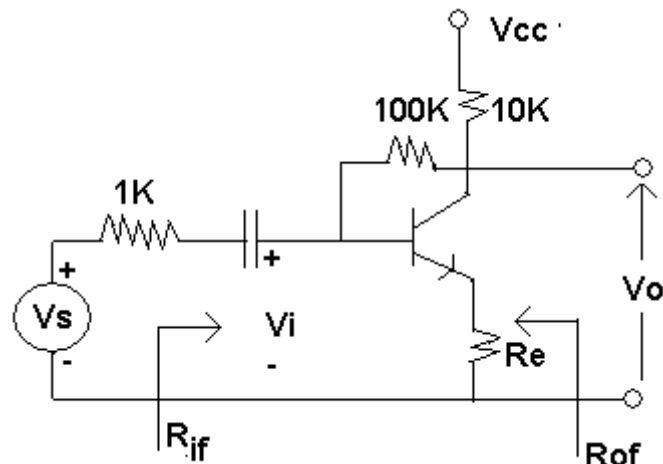


Figure 4b

6. (a) Compare JFET and MOSFET with respect to various features.
 (b) Draw the biasing circuit suitable for JFET and if the JFET is replaced by a MOSFET for what mode of operation it is valid and explain about the function of each component used in the circuit. [8+8]
7. (a) Calculate the percent ripple for the voltage developed across a $120\ \mu f$ filter capacitor when providing a load current of 80mA. The full wave rectifier operating from the 60 HZ supply develops a peak rectified voltage of 25V.
 (b) Design a CLC or π section filter for $V_{dc} = 10V$, $I_L = 200mA$ and $\tau = 2\%$. [6+10]
8. (a) Draw the circuit diagram of a RC phases shift oscillator using BJT. Derive the expression for frequency of oscillators.
 (b) Classify different type of oscillators based on frequency range.
 (c) Why RC oscillators are not suitable for high frequency applications. [8+4+4]

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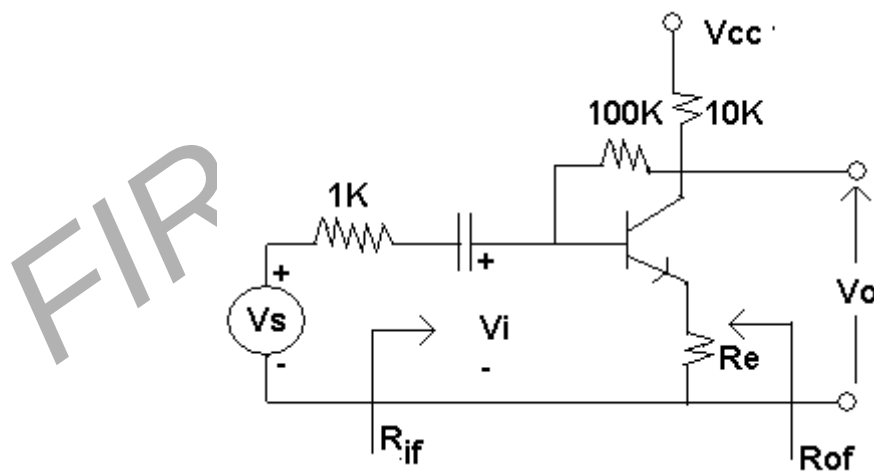


Figure 4b

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5. (a) An electron is moving perpendicular to magnetic field 'B'. Derive the expression for radius 'R' of the trajectory and period of rotation T.
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- (c) Briefly explain about thermal stability. [8+4+4]
8. (a) Calculate the percent ripple for the voltage developed across a $120\mu f$ filter capacitor when providing a load current of 80mA. The full wave rectifier operating from the 60 HZ supply develops a peak rectified voltage of 25V.
- (b) Design a CLC or π section filter for $V_{dc} = 10V$, $I_L = 200mA$ and $\tau = 2\%$. [6+10]

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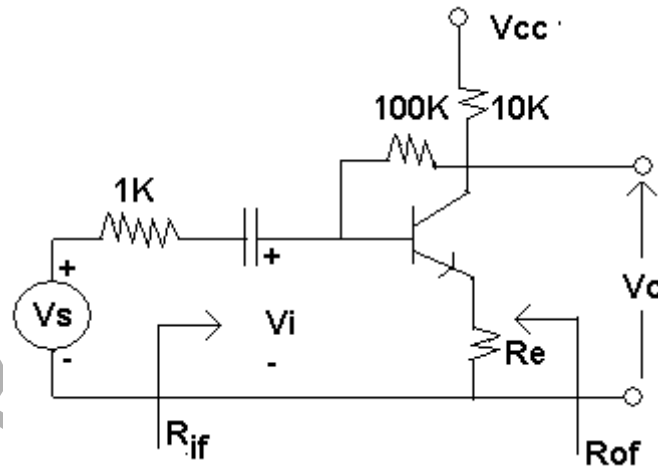


Figure 4b

2. (a) With reference to the semiconductor diode, explain the following with the help of relevant wave forms.
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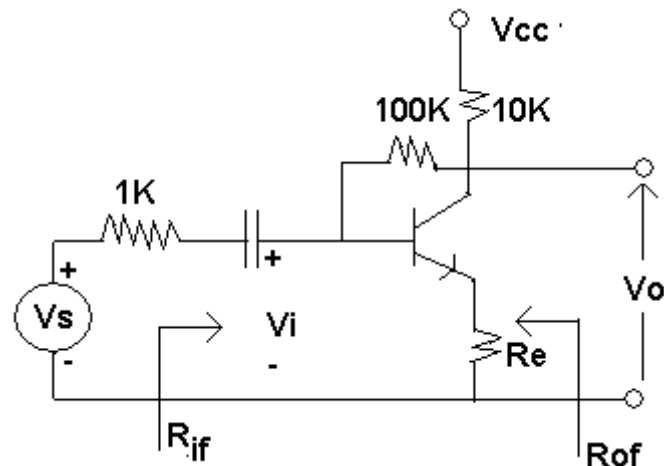


Figure 4b

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