

II B.Tech I Semester Examinations, May/June 2012

ELECTRONICS CIRCUIT ANALYSIS

Common to Electronics And Telematics, Electronics And Communication Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What are the specifications necessary for designing amplifiers. Explain them. Give their typical values for any specific application.
- (b) For the Common Gate amplifier shown in figure 1b, derive expressions for voltage gain, input impedance and output impedance. Power supplies are omitted for simplicity. Neglect capacitances. [8+8]

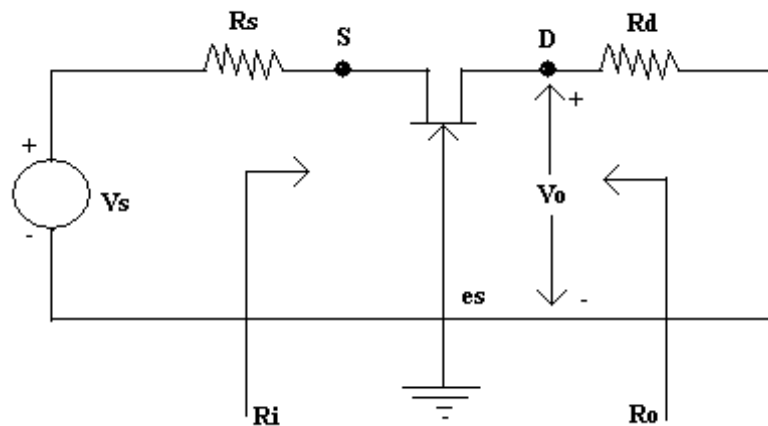


Figure 1b

2. (a) Draw the circuit diagram of Difference amplifier and explain its operation.
 - (b) For the Cascode transistor configuration, which consists of CE stage in series with CB stage, verify that the cascode combination acts like a single CE transistor with negligible internal feedback. [8+8]
3. For the circuit shown in figure 5:
- (a) Draw the small signal equivalent circuit.
 - (b) Derive Voltage gain (A_V).
 - (c) Derive the expression for resonant frequency.
 - (d) Voltage gain at resonant frequency (A_{res}).
 - (e) Quality factor of the resonant circuit. [16]

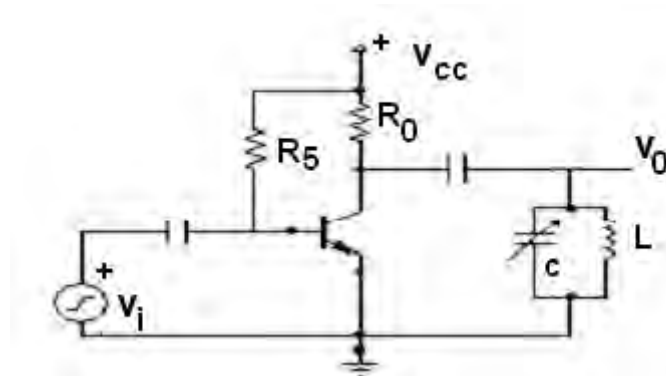


Figure 5

4. (a) What is meant by current limiting in power supplies? Explain the load voltage and current characteristics.
(b) Determine the value of series resistor and the maximum zener diode current for a regulator designed to provide a load current of 10mA stabilized at 12V. Input to the regulator varies from 24V to 20V. Assume that the minimum zener diode current is 2mA. [8+8]
5. (a) Draw push-pull amplifier circuit. Show that the output current in push pull amplifier contains only odd harmonics. [8]
(b) A single transistor is operating as an ideal class B amplifier with a 1-K load. A dc meter in the collector circuit reads 10mA. How much signal power is delivered to the load? [8]
6. Explain in detail the effect of cascading tuned amplifiers and hence derive the expression for bandwidth of n-stage amplifier. Also draw the frequency response and explain what happens as the number of stages increases? [16]
7. (a) Draw Hybrid - π model for a transistor in the CE configuration and explain the significance of every component in this model.
(b) Given a germanium p-n-p transistor whose basewidth is 10^{-4} cm. At room temperature and for a dc emitter current of 2 mA, find
 - i. emitter diffusion capacitance,
 - ii. f_T [Assume Diffusion constant as $47 \text{ cm}^2/\text{sec}$]. [8+8]
8. (a) Draw the block diagram of IC 723 and explain its operating principle.
(b) Draw and explain the Fullwave voltage Doubler and give its applications. [8+8]

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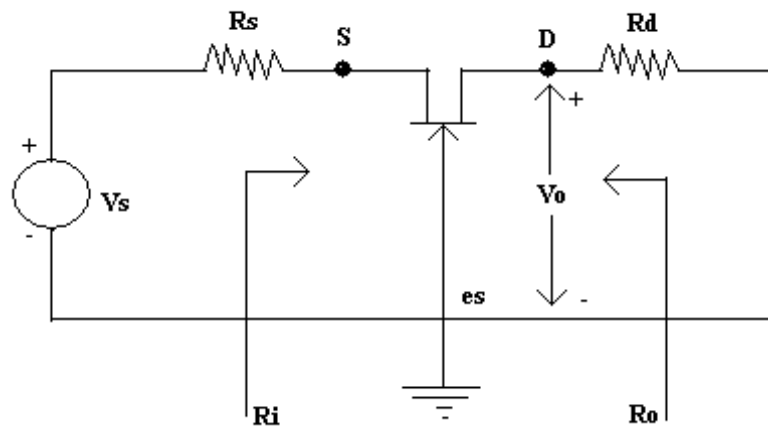


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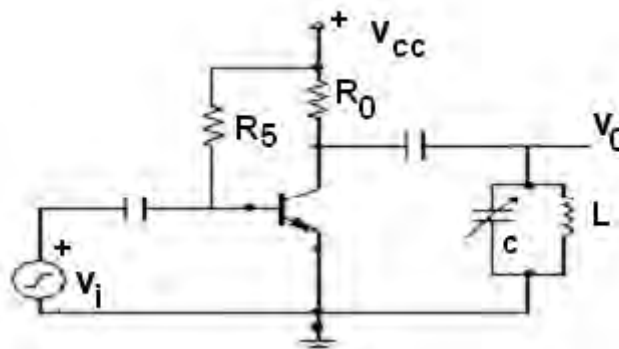


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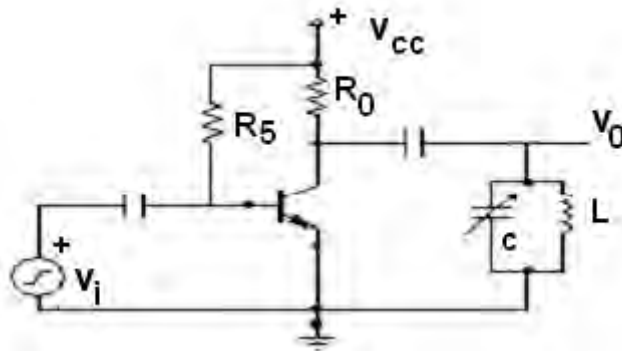


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7. (a) Draw Hybrid - π model for a transistor in the CE configuration and explain the significance of every component in this model.
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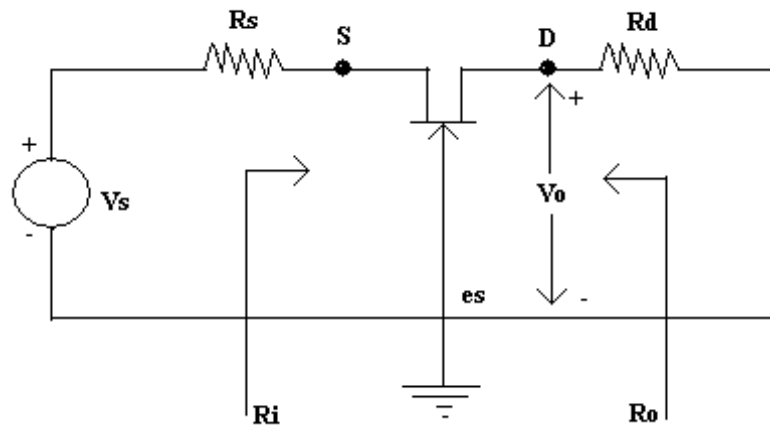


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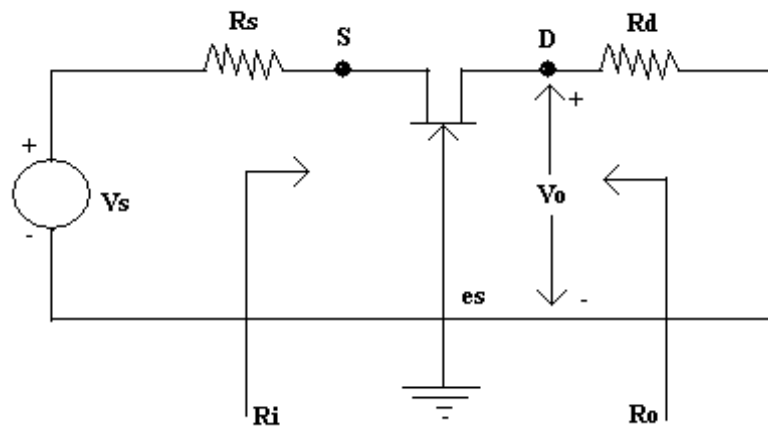


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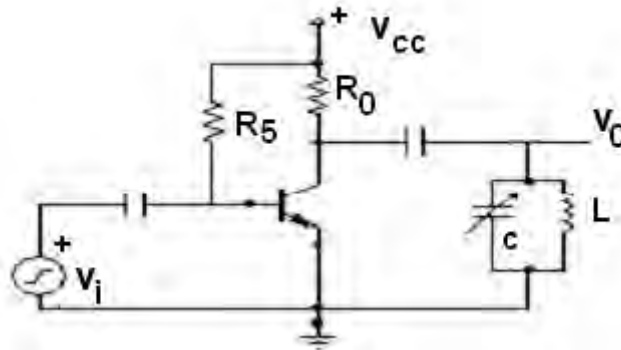


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