Code No: R05210404 **R05** **Set No. 2**

II B.Tech I Semester Examinations,November 2010
ELECTRONIC 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

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1. (a) What are the main advantages of class-C operating mode in RF applications?
   (b) Draw the circuit of class-C radio frequency amplifier and explain its operation with necessary waveforms? [8+8]

2. For the circuit shown in figure 3:
   (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]

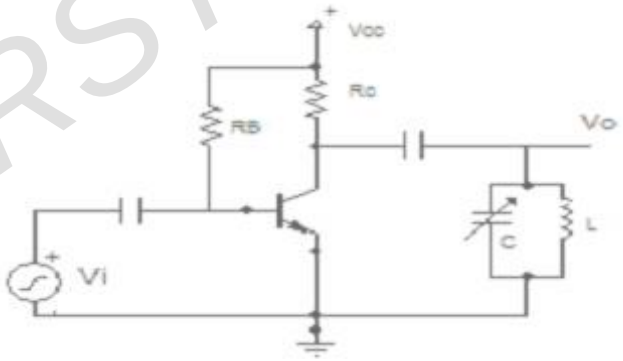

Figure 3

3. (a) Explain why voltage regulators are required for a DC power supply operating from an AC source?
   (b) A power supply has a voltage regulation of 1% If the no load voltage is 30V What is the full load voltage?
   (c) Give the differences between Load and Line Regulations. [6+4+6]

4. (a) Using three pin voltage regulator, design a current source that will deliver 0.25A current to 48 ohms 10W load. From data sheet I_Q =4.2 mA and V_R =5V [6]
   (b) Compare IC 723 and IC78XX Voltage Regulators [4]
   (c) What is UPS and explain how it differs from regulated power supply? [6]

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5. (a) Sketch the circuit of a Common Source amplifier. Derive an expression for the Voltage gain at low frequencies. What is the maximum value of A_V.

   (b) Calculate the voltage gain$A_V = V_o/ V_i$ at 1KHz for the circuit shown 7b. The FET parameters are g_m=2 mA and rd=10K. Neglect capacitances. If the capacitance 0.003 μF is also considered , calculate the voltage gain.

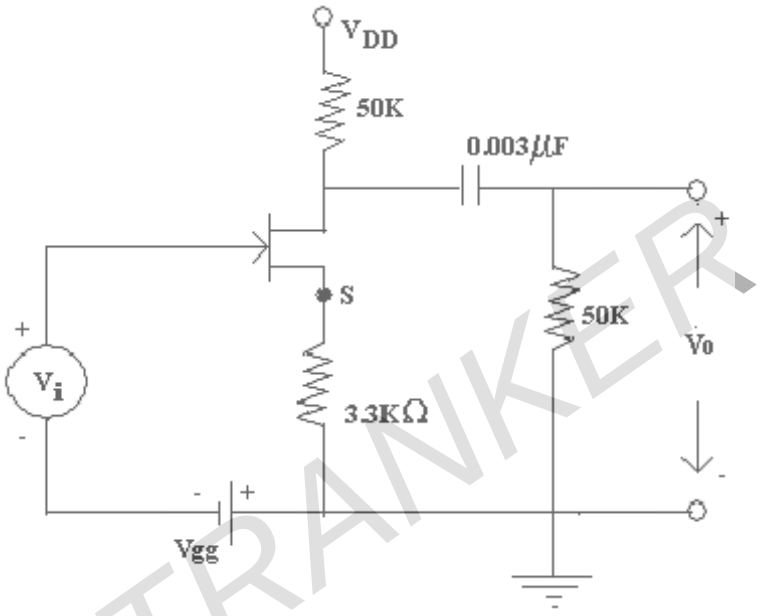

Figure 7b

6. (a) When 2-stages of identical amplifiers are cascaded, obtain the expressions for overall voltage gain, current gain and power gain.

   (b) Four identical cascaded stages have an overall upper 3-dB frequency of 20 KHz and a lower 3-dB frequency of 20 Hz. What are f_L and f_H of each stage? Assume non interacting stages? [8+8]

7. (a) Define thermal resistance of a power BJT.

   (b) A transistor with a maximum junction temperature specification of 150^0C dissipates a maximum power of 40 watts at a case temperature of 25^0C and 2 watts at an ambient temperature of 25^0C. Find

   i. The thermal resistance between the junction and the case.

   ii. The thermal resistance between the junction and ambient.

   iii. Maximum power dissipation capability for safe operation in free space at a temperature of 50^0C. [4+4x3]

8. (a) Define f_β. What is its relationship with f_T? Show that in a transistor in CE configuration, show that the current gain is dependent on diffusion and transistion capacitances.

   (b) In transistor common emitter amplifier with a resistive load R_L, show that the voltage gain is $-g_m R_L$. (Use Hybrid - πmodel). [8+8]

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Code No: R05210404 **R05** **Set No. 4**

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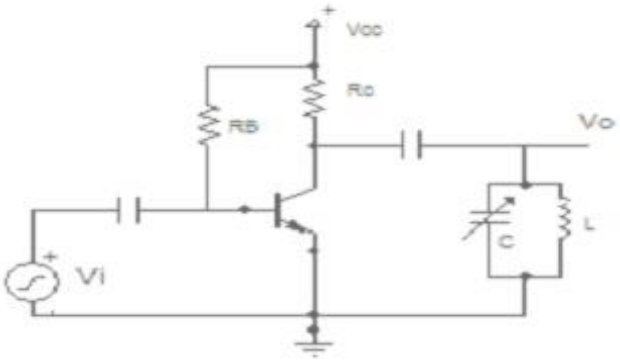

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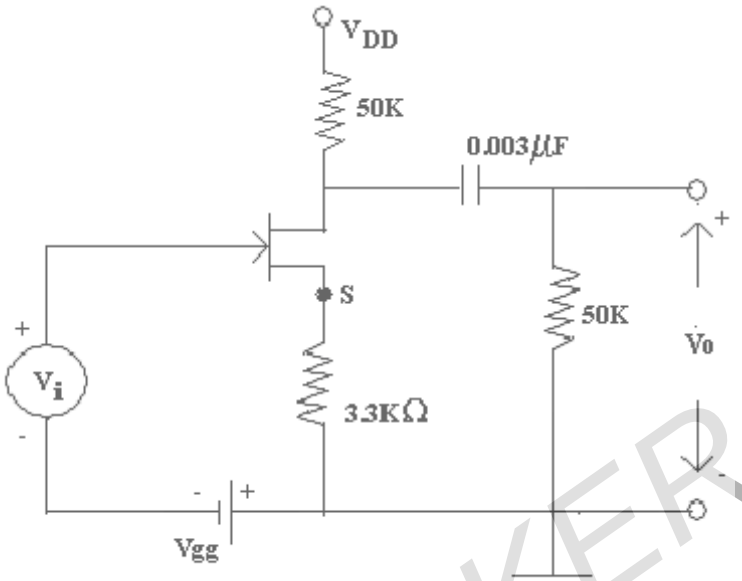

Figure 7b

4. (a) Explain why voltage regulators are required for a DC power supply operating from an AC source?
   (b) A power supply has a voltage regulation of 1% If the no load voltage is 30V What is the full load voltage?
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Code No: R05210404 **R05** **Set No. 1**

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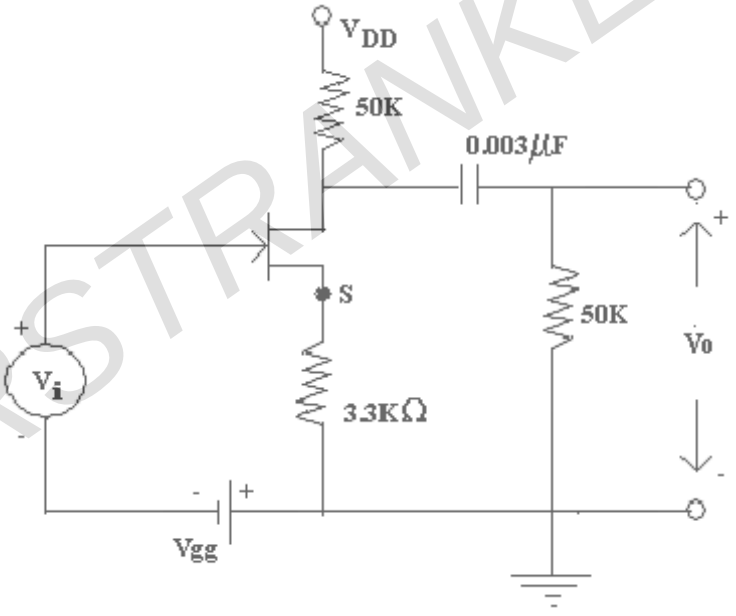

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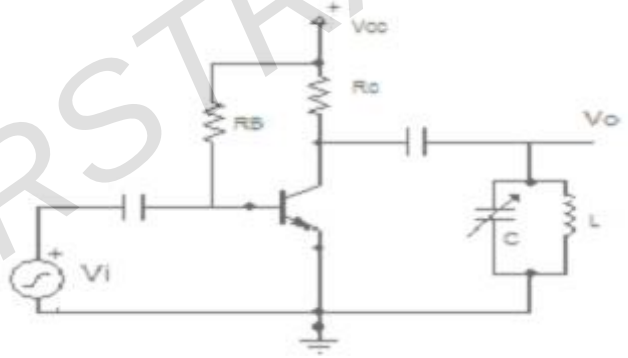

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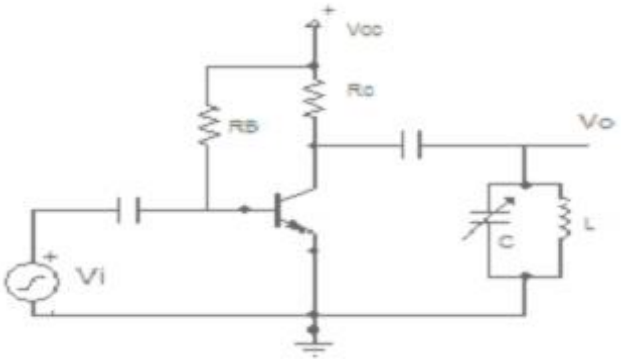

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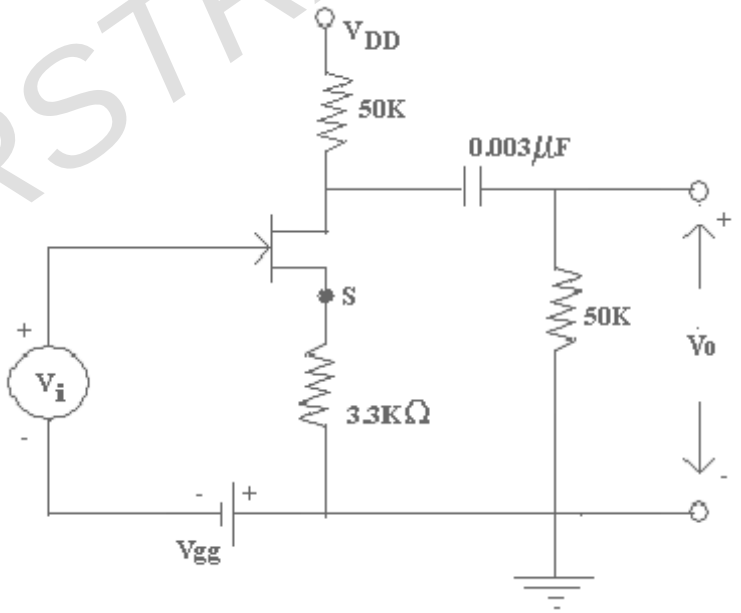

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