— SE-III | Analog Electronics |

08-12-14

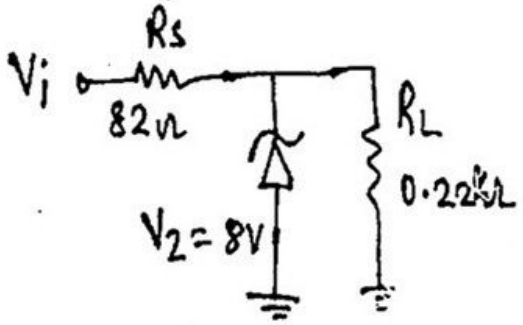
QP Code :14647

(3 Hours) **[Total Marks : 80**

N.B.: (1) Question No. **1** is **compulsory**.
(2) Attempt any **three** questions from the remaining.
(3) **Figures** to the **right** indicate **full** marks.
(4) Assume **suitable** data if needed.

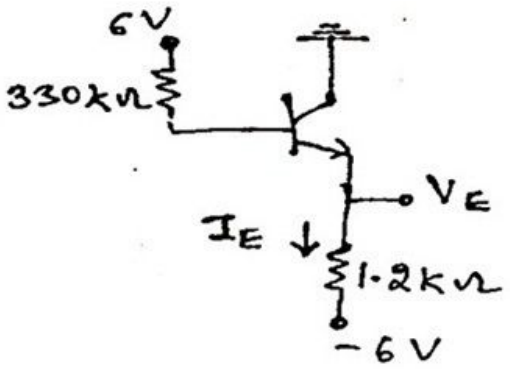
1. Attempt any **four** from the following. Each question carries equal marks. 20

(a) For the given network find the range of Vi that will maintain V_L at 8V and not exceed the power rating (maximum value) of the Zener diode.



$P_{Z_{max}} = 400mW$

(b) Find V_E and I_E for the circuit given below :–



$\beta = 120$

(c) Draw and explain atleast one circuit that can improve the CMRR of opamp.

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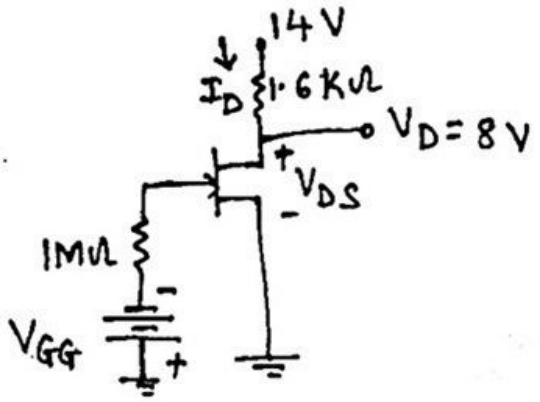
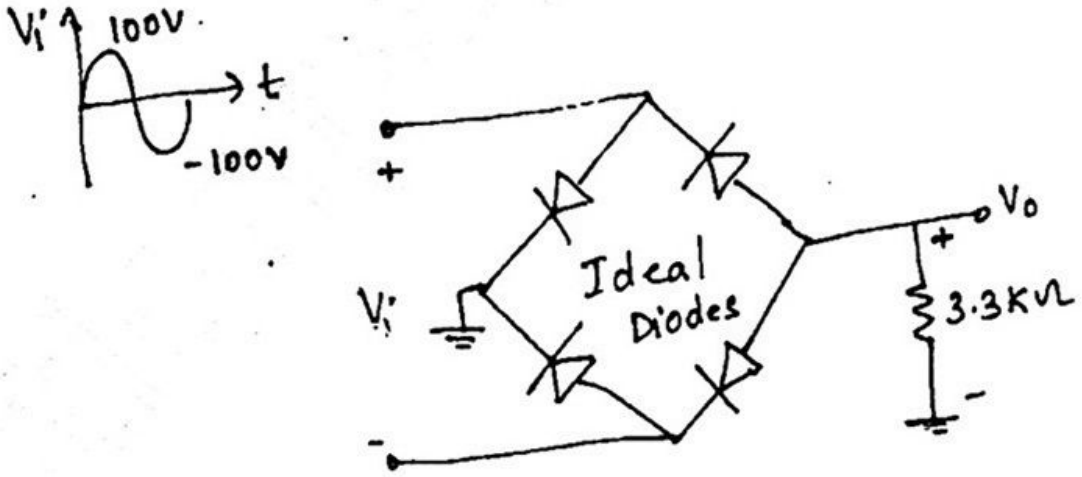
(d) For the circuit given below find I_D, V_{DS}, V_{GG}.



(e) What is harmonic distortion in power amplifiers ? How can you calculate the tot harmonic distortion in a signal ?

2. (a) Determine V_o and the required PIV rating of each diode for the circuit given below



(b) For a series fed class A amplifier, find the efficiency and the maximum efficiency.

(c) Draw a class B power amplifier. Explain its opeation and find the value for maximur efficiency.

3. (a) How can transistors be used as switches ?

(b) What do you understand by thermal runaway ?

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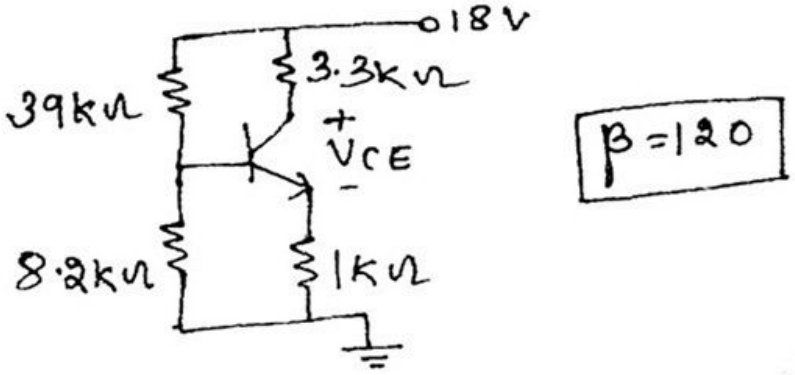
(c) For the following circuit find I_C, V_{CE}, I_B, V_E and V_B. 10



4. (a) Explain the working and V-I characteristic of any one type of a MOSFET. 10
   (b) List atleast 4 biasing configurations for FET's and derive the necessary equations for any two types. 10

5. (a) Write down the conditions for stable oscillations. Draw the circuit for a Wein Bridge Oscillator and derive the equations for frequency and amplifier gain. 10
   (b) Draw and explain the circuit of a schmitt trigger. Draw the Input and Output waveforms. Explain advantages of this circuit. Also explain the hysteresis with respect to this circuit. 10

6. (a) Draw the circuits for integrator and differentiator. Derive the necessary equations. Draw the frequency response of these circuits. Also show the input and ouput waveforms. 10
   (b) Draw and explain the controlled sources that can be formed using operational amplifiers. (Four types). 10
