Benha University
Faculty of Engineering- Shoubra
Communications and Computer Engineering Program
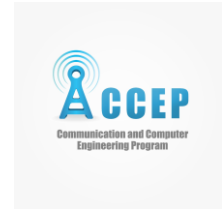
Final Exam – Term 191   **Date:** 23/01/2019
Academic Year 2018-2019   **Duration:** 2 hours
Course: Solid State Electronic Devices   **Code:** CCE201

- Answer all the following questions
- Illustrate your answers with sketches when necessary.
- No. of questions: 4
- Total Mark: 40 Marks

[1] A red, a yellow and a green LED in series as shown in Fig. 1.

(a) Specify the supply voltage (V_S) at least you should connect so that they are light on if each one needs voltage drops of 2 V, 2.5 V, and 2.5 V respectively.

(b) Specify the value of resistor R to have current I = 15 mA.

(c) Assume V_S = 10V. Reconstruct the circuit again so that we can add another two LEDs (yellow & green), series in one branch, and passing current I_2 = 10 mA while the current passing through the first three LEDs I_1 = 20 mA.
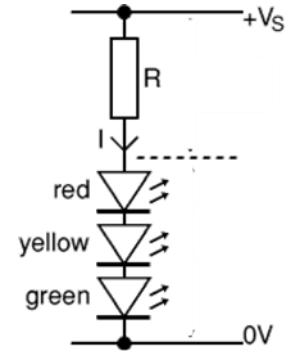

Figure 1

(10 Marks)

[2] The voltage-regulator circuit, shown in Fig. 2 is designed to provide a constant voltage of 5V to a load from a variable supply voltage. The load current varies from 0 to 100mA and the source voltage varies from 8 to 10V. If the Zener diode is ideal, specify the value of the resistance R.
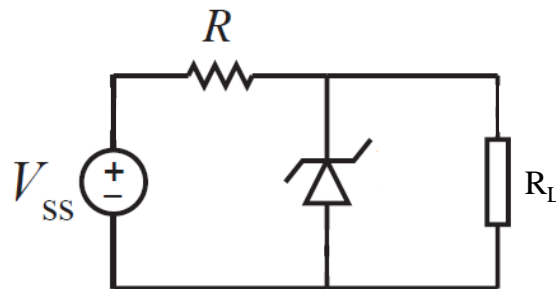

Figure 2

(10 Marks)

[3] Design two different clipper circuits to clip the portions of input voltage that are above (5V) or below (-3V). Assume that ideal diodes are available. Ideal Zener diodes of any breakdown voltage required are also available.

(5 Marks)

[4] Consider the common-emitter BJT amplifier circuit shown in Fig. 3.

Assume $V_{CC} = 15$ V, $\beta = 150$, $V_{BE} = 0.7$ V, $R_E = 1$ kΩ, $R_C = 4.7$ kΩ, $R_1 = 47$ kΩ, $R_2 = 10$ kΩ, $R_L = 47$ kΩ, $R_S = 100$ Ω.

a) Determine I_{CQ} and V_{CEQ}.

b) What is the maximum (peak to peak) output voltage swing available in this amplifier?

c) Draw the AC equivalent circuit and determine the AC model parameters.

d) Find R_{in}, R_{out}, and A_v.
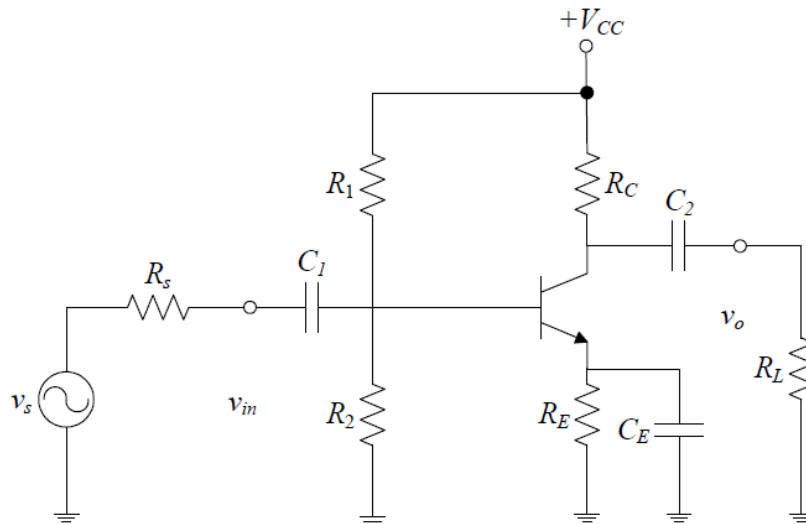

Figure 3

(15 Marks)

Good Luck

Dr. Sherif Hekal