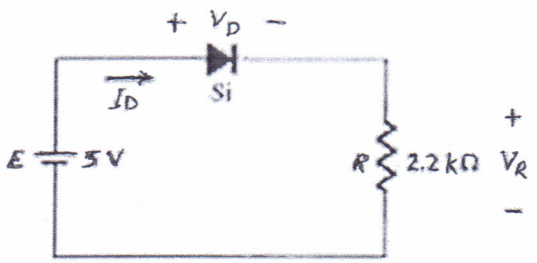
Electronics 1
Course Code: ECE 261
Fall Semester Exam.

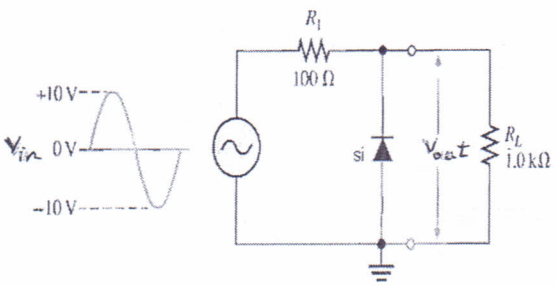
BME Program - Level 200
Exam Date: 10-1- 2019
Allowed Time: 2 Hours

Attempt all questions. Assume any missed data. Full mark is 50.

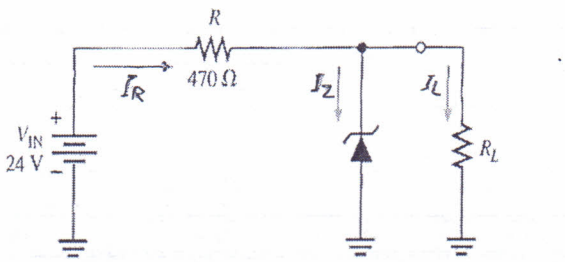
Q.1.a) Use graphical solution to determine V_{DQ}, I_{DQ} and V_R for the circuit shown. **[5 Marks]**



Q.1.b) Determine and sketch V_o for the configuration shown below. **[5 Marks]**



Q.1.c) Determine the minimum and the maximum load currents and the minimum value of R_L for which the zener maintains regulation. $V_z = 12V$ $I_{z_{min}} = 1mA$ $I_{z\max} = 50mA$ **[5 Marks]**

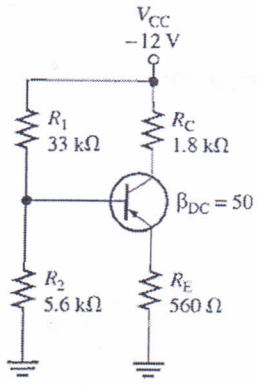


Q.1.d) Sketch the circuit diagram for an OR gate with negative logic. Assume that $V_H = 0V$, $V_L = -5V$. Verify the truth table. **[5 Marks]**

Q.2.a) Using neat sketches, compare between the output characteristics for the common-emitter configuration and the output characteristics for the common-base configuration. Define the parameters α and β for BJT. **[5 Marks]**

Q.2.b) Design an emitter-stabilized circuit at $I_{CQ} = 0.5I_{C(sat)}$, $V_{CEQ} = 0.5V_{CC}$. Use $V_{CC} = 20V$, $I_{C(sat)} = 10mA$, $\beta = 120$, and $R_C = 4R_E$ **[5 Marks]**

Q.2.c) For the voltage divider network shown, find $I_B, I_C, I_E, V_{CE}, V_{BC}$ **[5 Marks]**

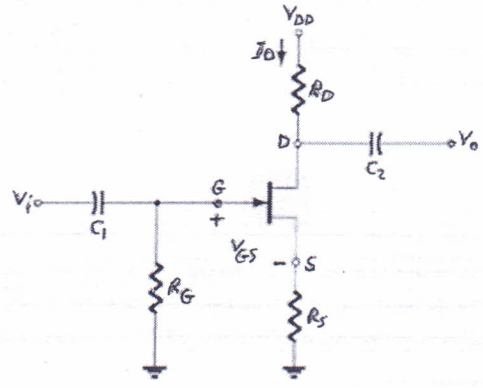


Q.3.a) Give a short comparison between bipolar junction transistor, (BJT), and field-effect transistor, (FET), from the following points of view: charge carriers – contact between controlling and controlled terminals – input impedance – sensitivity – temperature effect – size. **[5 Marks]**

Q.3.b) Using neat sketches, explain the basic operation of an n-channel JFET. **[5 Marks]**

Q.3.c) For the circuit shown $V_{DD} = 20V$, $R_D = 3.3K\Omega$, $R_s = 1K\Omega$, $I_{DSS} = 8mA$ and $V_p = -6V$. Use graphical solution for the network shown to determine the values of $I_D, V_{GS}, V_{DS}, V_{DG}$. **[5 Marks]**

ملحوظة: يجب الحل فى ورقة الرسم البيانى باستخدام مقياس رسم مناسب.



Q.3.d) Using neat sketches, compare between the structure of the enhancement type MOSFET and the depletion-type MOSFET. Sketch the transfer characteristics of depletion type MOSFET with $I_{DSS} = 8mA$ and $V_p = -6V$. **[5 Marks]**

☺*My best wishes to all of you*☺

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