Analogue Electronics 1 (EE204FZ)

Tutorial 1

Q1. Circle the correct answer.

1. In applications where _____ input resistance is needed, the JFET is preferred to the bipolar transistor.
A. Low
B. Very low
C. Zero
D. High

2. A JFET always operates with _____.
A. the drain connected to ground
B. the gate-to-source p-n junction forward-biased
C. the gate-to-source p-n junction reverse-biased
D. the gate connected to the source

3. An n-channel depletion-type MOSFET with a positive V_{GS} is operating in _____.
A. the depletion mode
B. the enhancement mode
C. the cutoff region
D. saturation

4. All MOSFETs are subject to damage from _____.
A. excessive heat
B. electrostatic discharge
C. excessive voltage
D. All of the above

5. In an enhancement-type MOSFET, there is no drain current until V_{GS} _____.
A. reaches the threshold voltage V_T
B. is positive
C. is negative
D. equals to 0 V

Q2. Answer the following questions.

1. Describe the two types of MOSFETs and explain briefly how they function.

2. Describe the three regions of operation of an enhancement-type MOSFET.

Q3. Sketch the transfer curve (I_D vs. V_{GS} in the saturation region) of a p-channel JFET with I_{DSS} = 4 mA and V_P = 3 V. Label I_{DSS} and V_P in the graph.

Q4. Find V_{GS} and V_{DS} for the enhancement-type MOSFET in Figure Q4. Datasheet information is listed with the circuit.

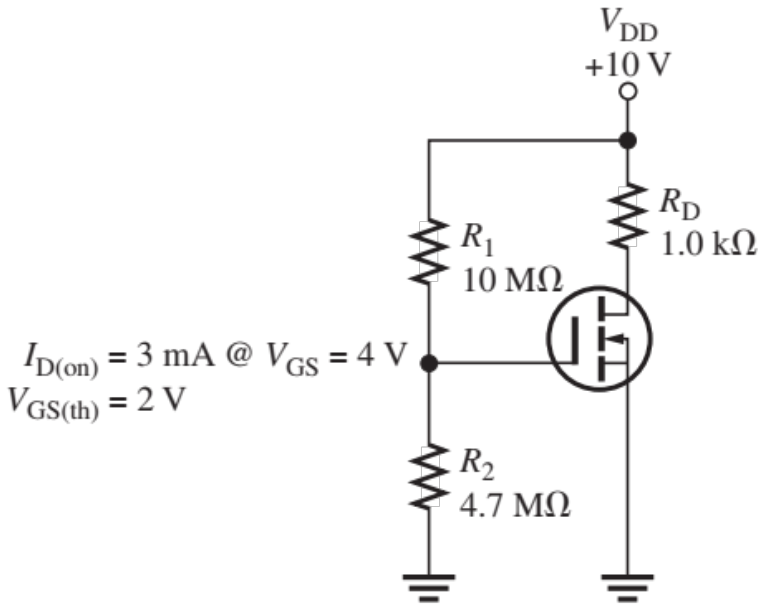

Fig Q4

Q5. Based on the V_{GS} measurements, determine the drain current and drain-to-source voltage for the circuit in Figure Q5.

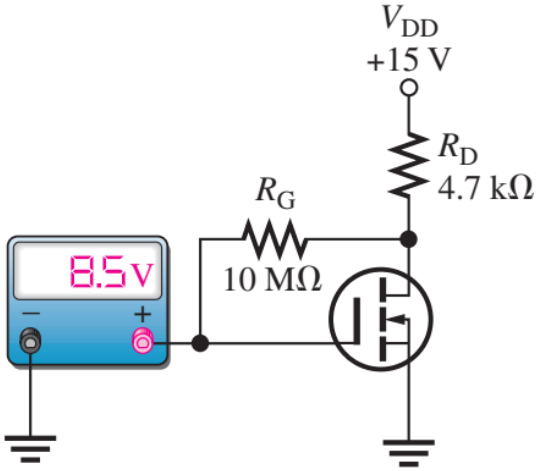

Fig Q5