Electronic Circuits II – Assignment 03

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#	Student ID	Student Name	Grade (10)
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Delivery Date	

١. يتم تسليم التمرين محلولا في خلال أسبوع من تاريخ التمرين، و يتم حذف درجتين من التمرين عن كل أسبوع تأخير
٢. يتم التسليم لمعيد المقرر مباشرة
٣. تتم أجابه التمرين في نفس ورق الأسئلة

T & F

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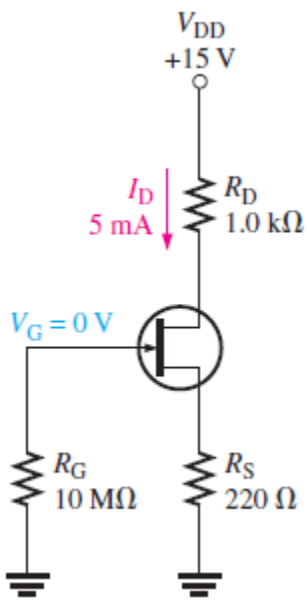
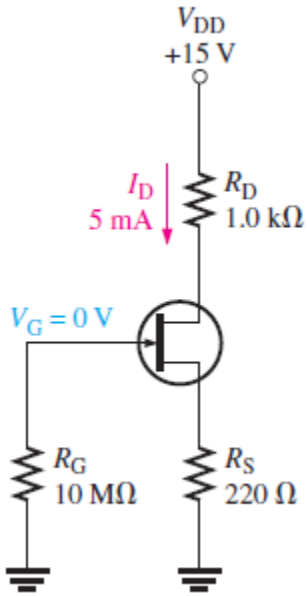
1	The JFET always operates with a reverse-biased gate-to-source *pn* junction.	
2	The channel resistance of a JFET is a constant.	
3	The gate-to-source voltage of an *n*-channel JFET must be negative.	
4	I_D becomes zero at the pinch-off voltage.	
5	V_{GS} has no effect on I_D.	
6	$V_{GS(off)}$ and V_P are always equal in magnitude but opposite in polarity.	
7	The JFET is a square-law device because of the mathematical expression of its transfer characteristic curve	
8	Forward transconductance is the change in drain voltage for a given change in gate voltage.	

MCQ

#	Question	
1	If the drain current in Figure 8–17 is increased, V_{DS} will  **(a)** increase **(b)** decrease **(c)** not change	

2	If the drain current in Figure is increased, V_{GS} will  **(a)** increase **(b)** decrease **(c)** not change	
3	For V_{GS} _ 0 V, the drain current becomes constant when V_{DS} exceeds **(a)** cutoff **(b)** V_{DD} **(c)** V_P **(d)** 0 V	
4	The constant-current region of a FET lies between **(a)** cutoff and saturation **(b)** cutoff and pinch-off **(c)** 0 and I_{DSS} **(d)** pinch-off and breakdown	
5	In a certain FET circuit, $V_{GS} = 0$ V, $V_{DD} = 15$ V, $I_{DSS} = 15$ mA, and $R_D = 470\ \Omega$. If R_D is decreased to 330 Ω, I_{DSS} is (a) 19.5 mA (b) 10.5 mA (c) 15 mA (d) 1 mA	
6	At cutoff, the JFET channel is (a) at its widest point (b) completely closed by the depletion region (c) extremely narrow (d) reverse-biased	

Problems

Q1	The V_{GS} of a p-channel JFET is increased from 1 V to 3 V. (a) Does the depletion region narrow or widen? (b) Does the resistance of the channel increase or decrease?
Sol 1	.....

Q2	. Draw the schematic diagrams for a *p*-channel and an *n*-channel JFET. Label the terminals.
Sol 2	.....

Q3	A JFET has a specified pinch-off voltage of 5 V. When $V_{GS} = 0$, what is V_{DS} at the point where the drain current becomes constant?
Sol 3	.....

Q4	A certain JFET datasheet gives $V_{GS(off)} = -8$ V and $I_{DSS} = 10$ mA. When $V_{GS} = 0$, what is I_D for values of V_{DS} above pinch off? $V_{DD} = 15$ V.
Sol 4	.....

Q 5	The JFET in Figure has a $V_{GS(off)} = -4$ V. Assume that you increase the supply voltage, V_{DD}, beginning at zero until the ammeter reaches a steady value. What does the voltmeter read at this point?
Sol 5	.....