CO2015

Exercise – BJT

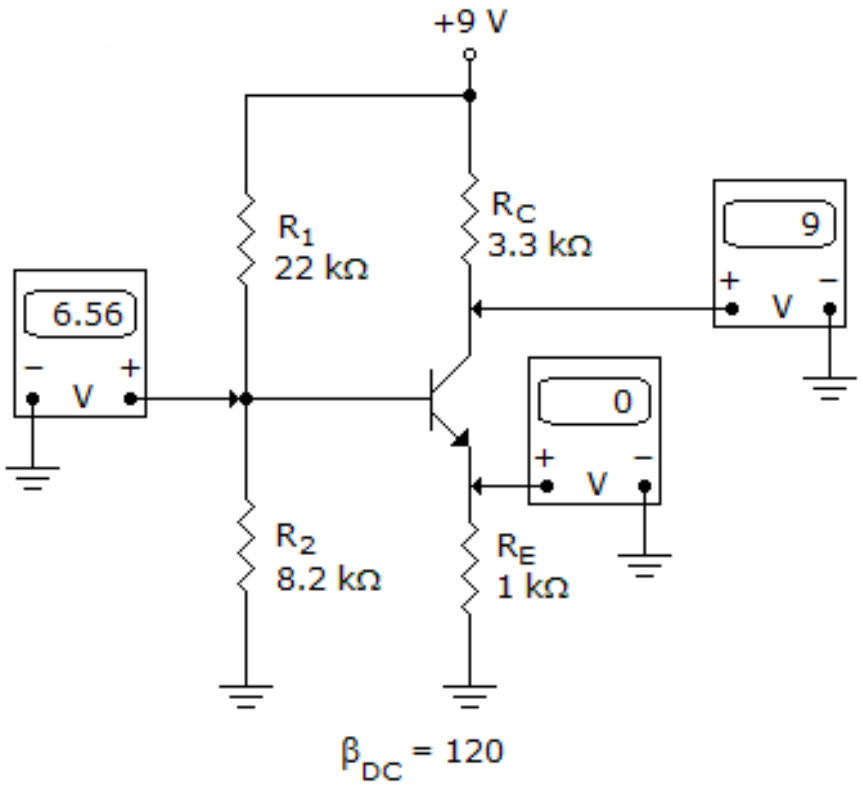
DCE
DEPT. OF COMPUTER ENGINEERING

- When a transistor is used as a switch, it is stable in which two distinct regions?
  - saturation and active
  - active and cutoff
  - saturation and cutoff
  - none of the above

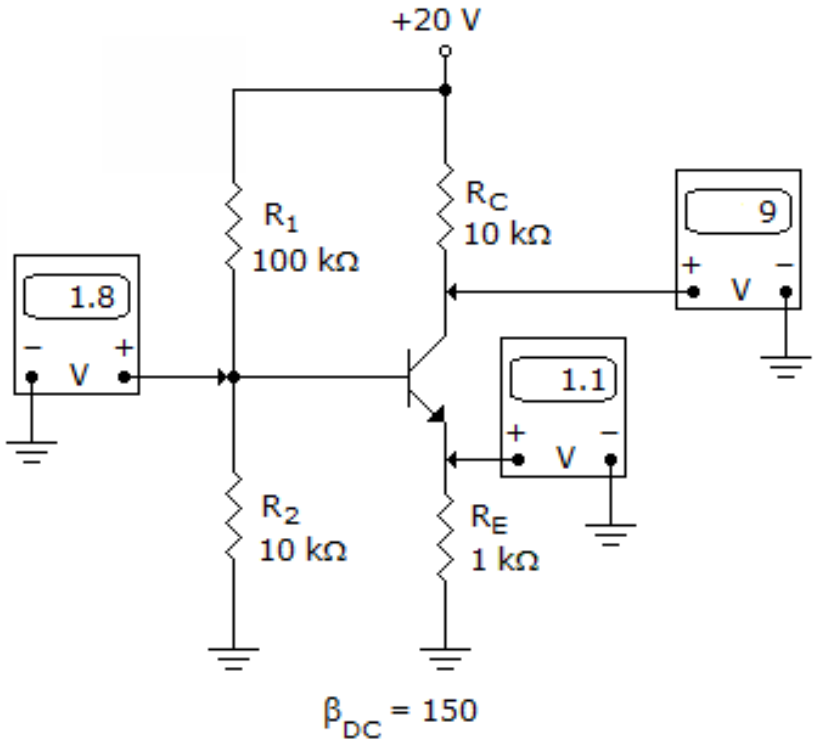
- For a silicon transistor, when a base-emitter junction is forward-biased, it has a nominal voltage drop of
  - 0.7
  - 0.3
  - 0.2
  - V_{CC}

- A certain BJT has I_B = 167uA, I_C = 15mA, the amplifier DC factor is:
  - 15
  - 167
  - 90
  - All are not correct

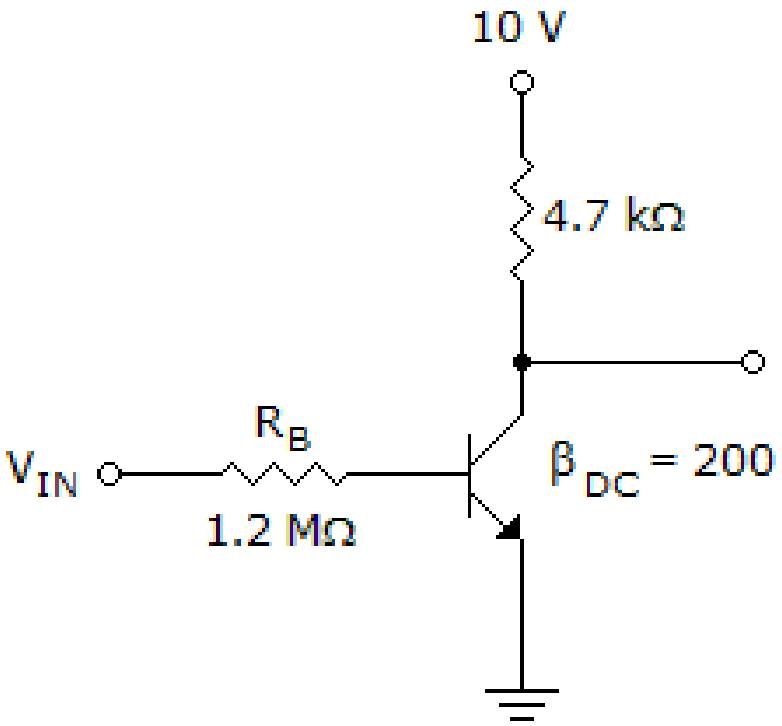
- Refer to the given figure. The most probable cause of trouble, if any, from these voltage measurements is



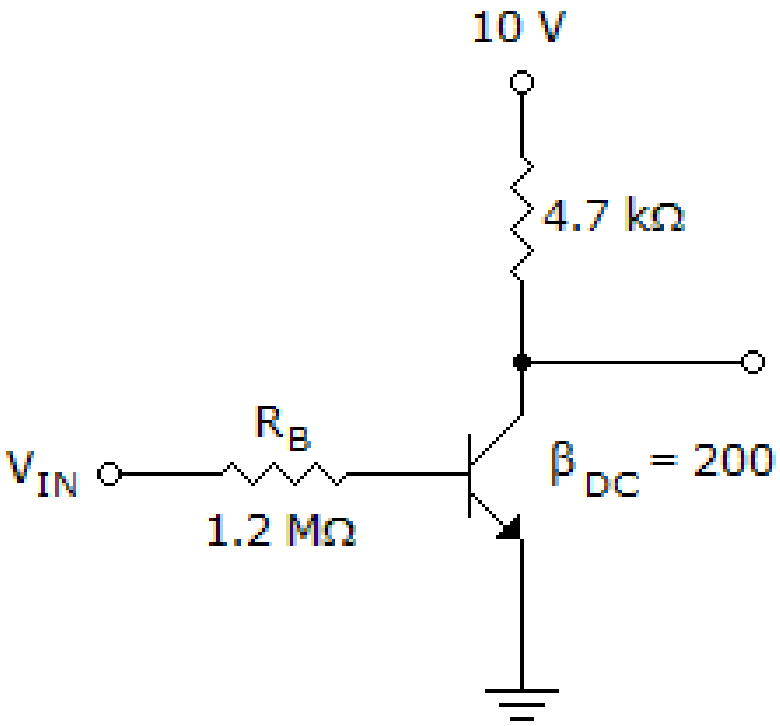
- Refer to the given figure. The most probable cause of trouble, if any, from these voltage measurements is



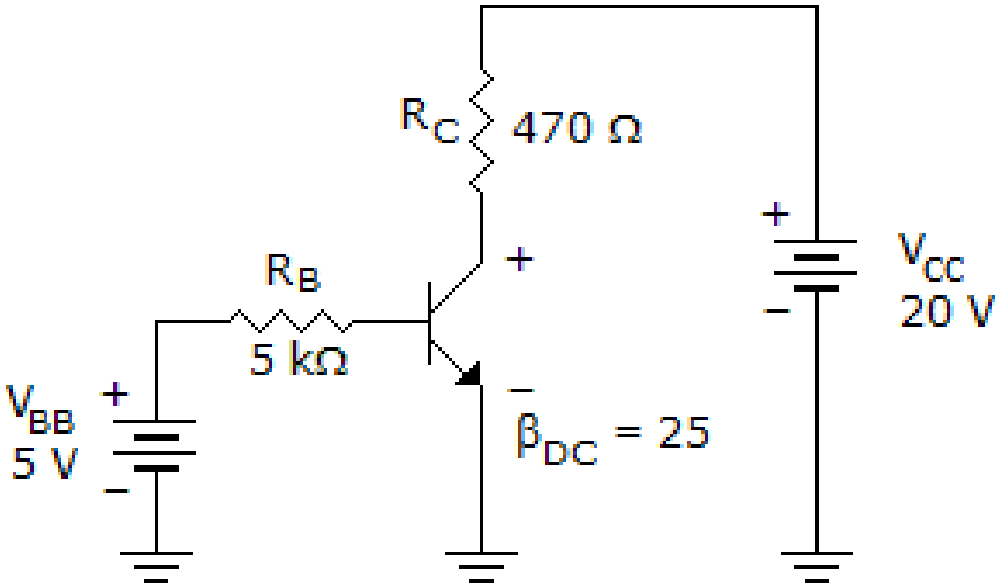
- Refer to this figure. If $V_{CE} = 0.2$ V, $I_{C(sat)}$ is



- Refer to this figure. Determine the minimum value of I_B that will produce saturation ($V_{CE}(sat) = 0.2V$).



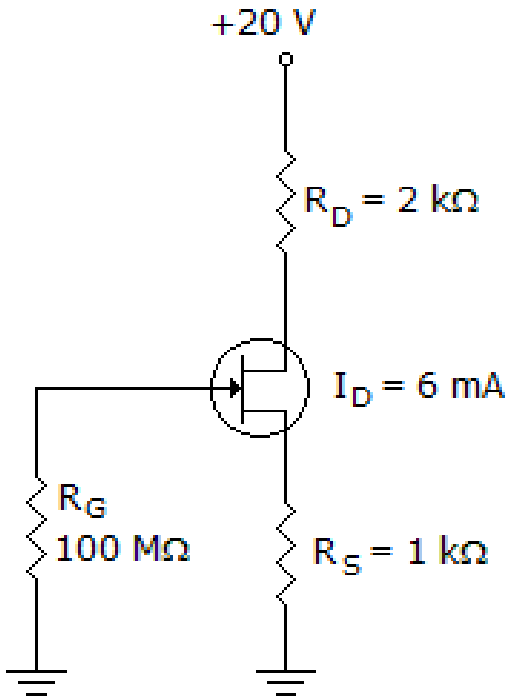
- Refer to this figure. The value of V_{BC} is



CO2015

Exercise – FET

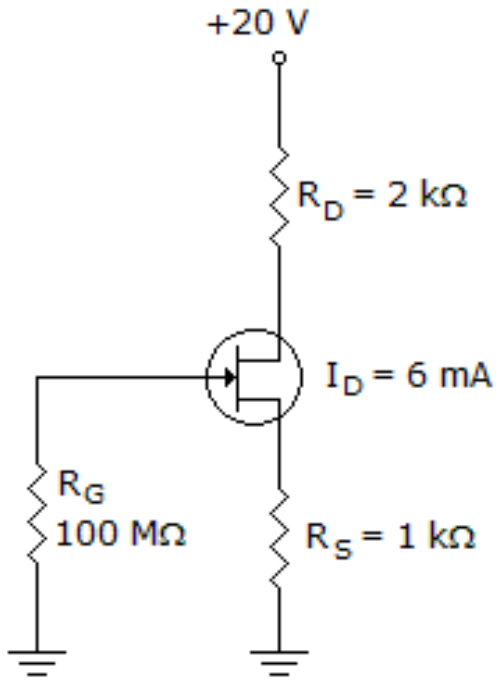
- Refer to the given figure. Calculate the value of V_{DS}



Answer

- 2V

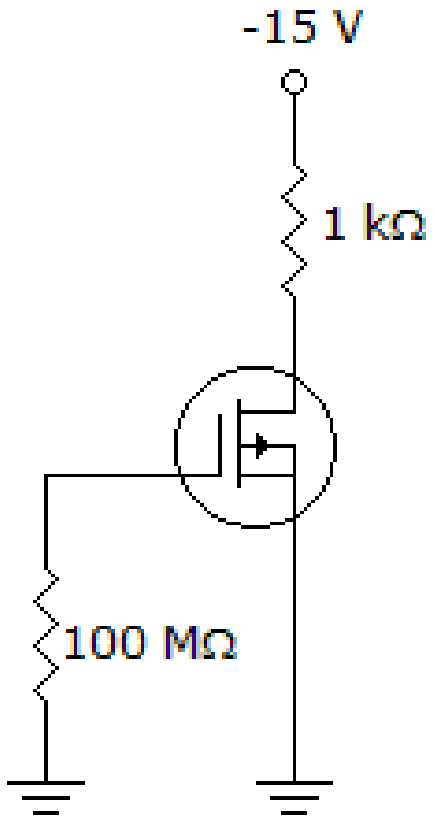
- Refer to figure shown below. Determine the value of V_S.



Answer

- 6V

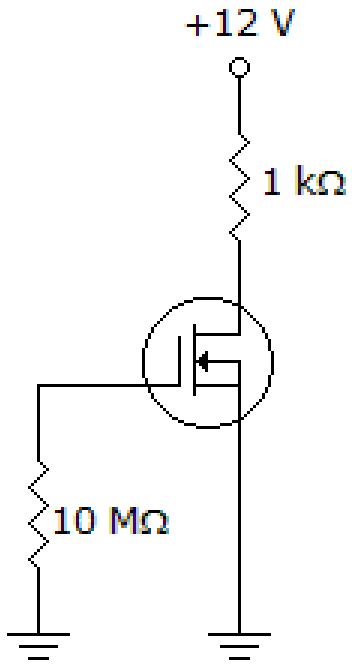
- Refer to the given figure. $I_D = 6$ mA. Calculate the value of V_{DS}



- -9V

- In general $V_{DS} = V_{DD} - (I_D * R_D)$
  But in figure direction of FET transistor is out of drain so, Id becomes negative .

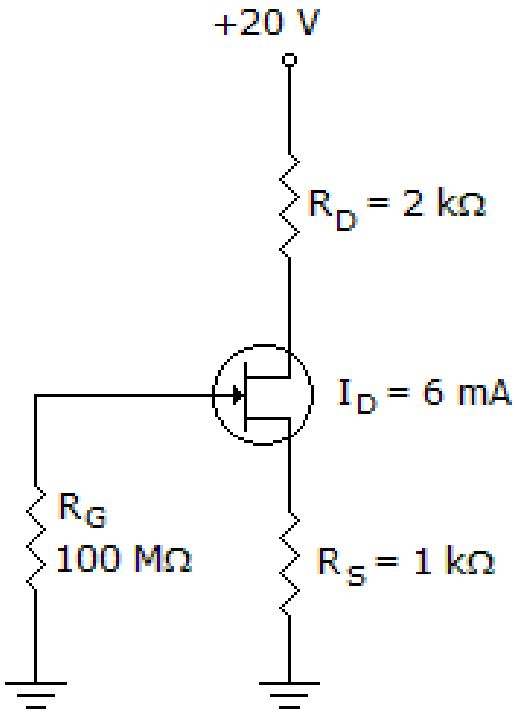
- Refer to the given figure. $I_D = 6$ mA. Calculate the value of V_{DS}



Answer

- 6V

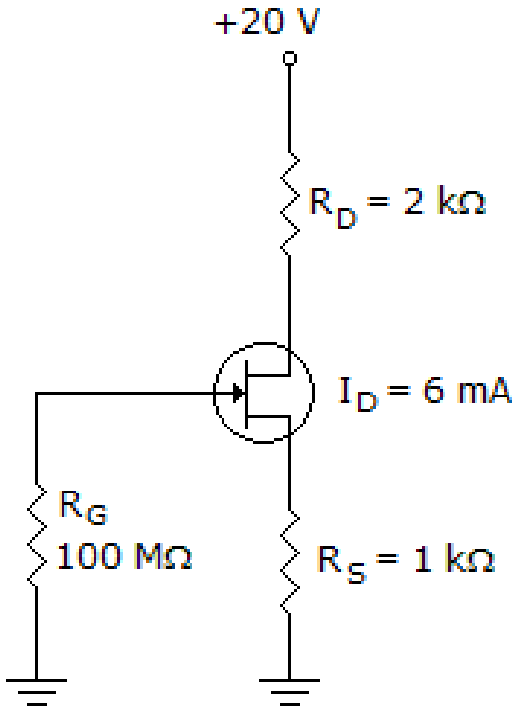
- Refer to figure given below. Determine the value of V_{GS}



Answer

- -6V

- Refer to figure show below. Calculate the value of V_D

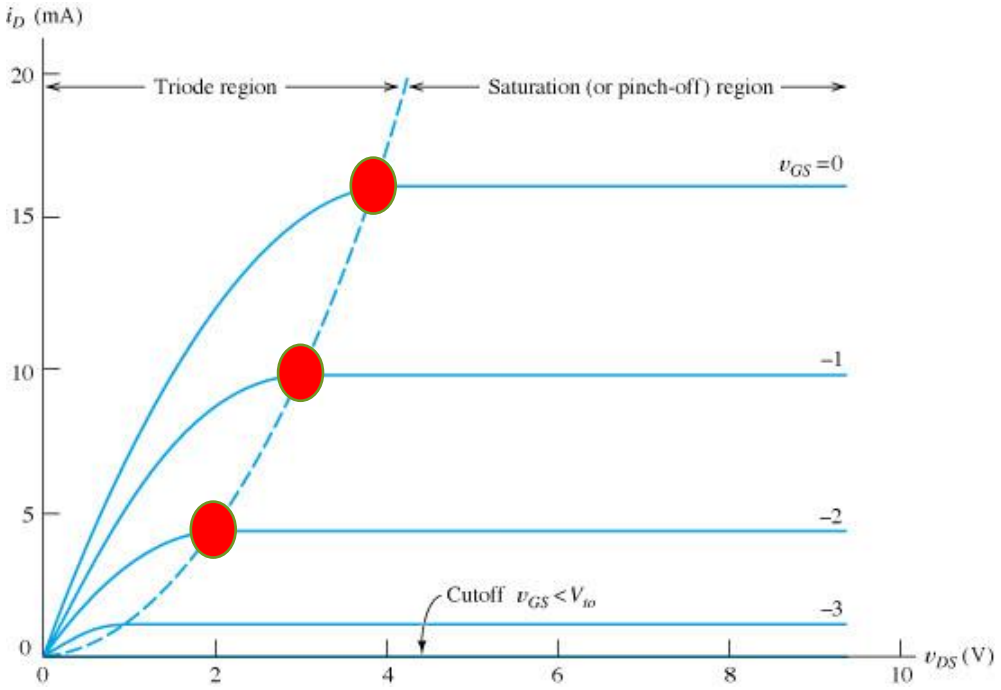


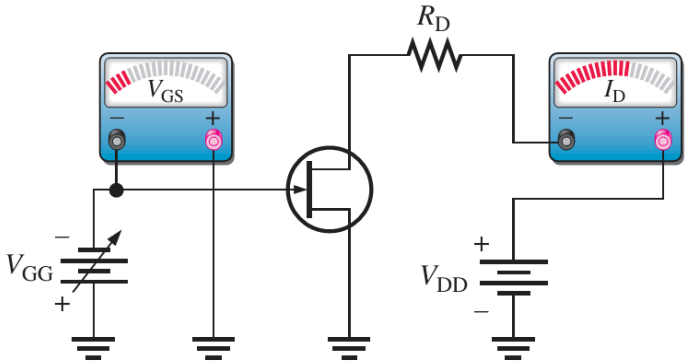
Answer

- 8V

- For a JFET, the value of V_{DS} at which I_D becomes essentially constant is the
  - pinch-off voltage.
  - cutoff voltage.
  - breakdown voltage.
  - ohmic voltage.

Answer: A


i_D (mA)
20
15
10
5
0
Triode region
Saturation (or pinch-off) region
v_{GS} =0
–1
–2
–3
Cutoff $v_{GS} < V_{to}$
0
2
4
6
8
10
v_{DS} (V)


R_D
V_{GS}
I_D
V_{GG}
V_{DD}

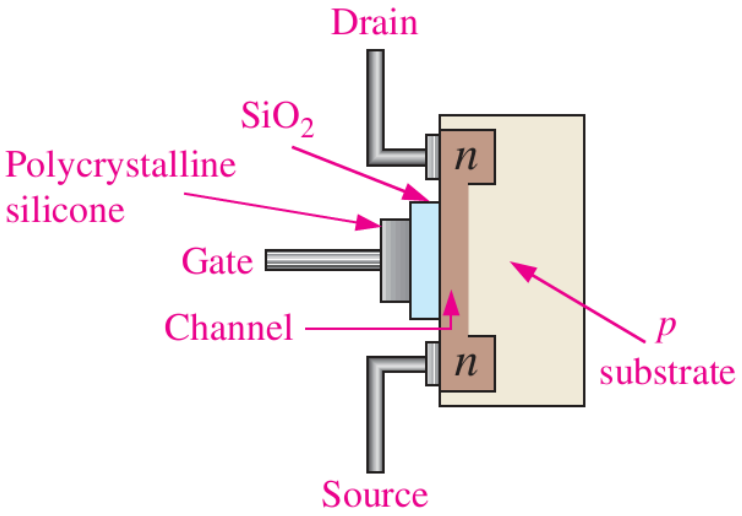
- The value of V_{GS} that makes I_D approximately zero is the
  - Pinch-off voltage
  - Cut-off voltage
  - Breakdown voltage

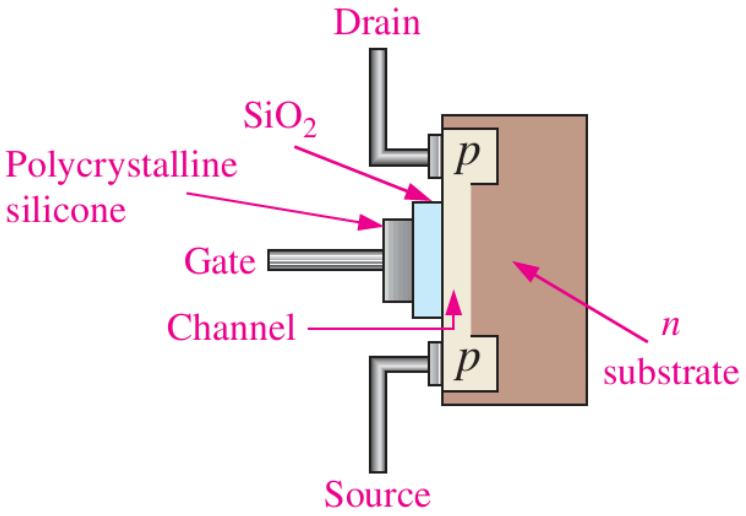
Answer

- B

- The _____ has a physical channel between the drain and source.
  - DFET
  - EFET
  - VFET

Answer: A

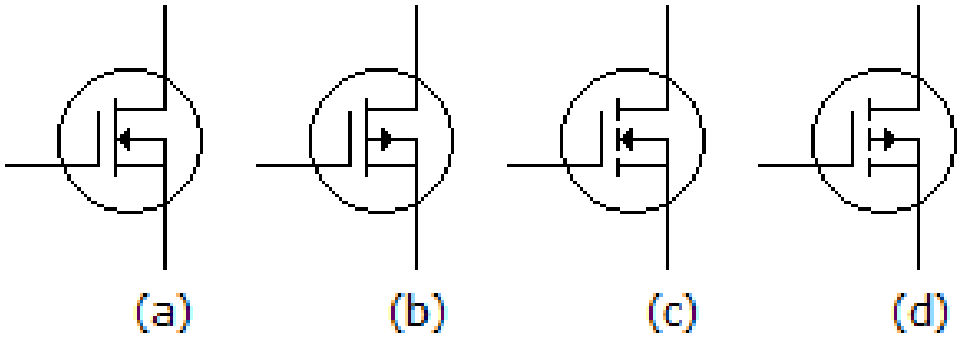

Drain
SiO_2
Polycrystalline silicone
Gate
Channel
Source
n
n
p
substrate


Drain
SiO_2
Polycrystalline silicone
Gate
Channel
Source
p
p
n
substrate

- What type(s) of gate-to-source voltage(s) can a depletion MOSFET (D-MOSFET) operate with?
  - Zero
  - Positive
  - Negative
  - All of them

- Midpoint bias for a D-MOSFET is I_D = _____, obtained by setting $V_{GS} = 0$
  - $I_{DSS} / 2$
  - $I_{DSS} / 3.4$
  - I_{DSS}

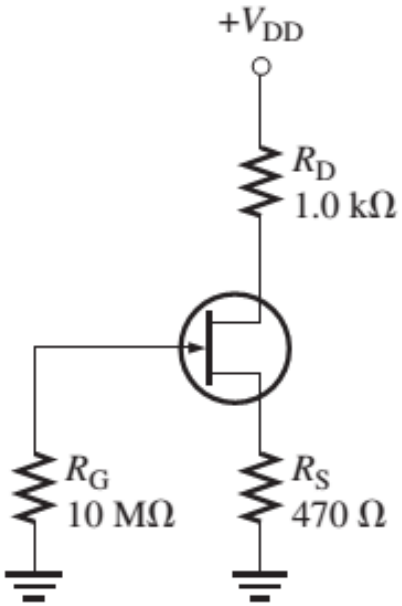
- Identify D-FET p channel

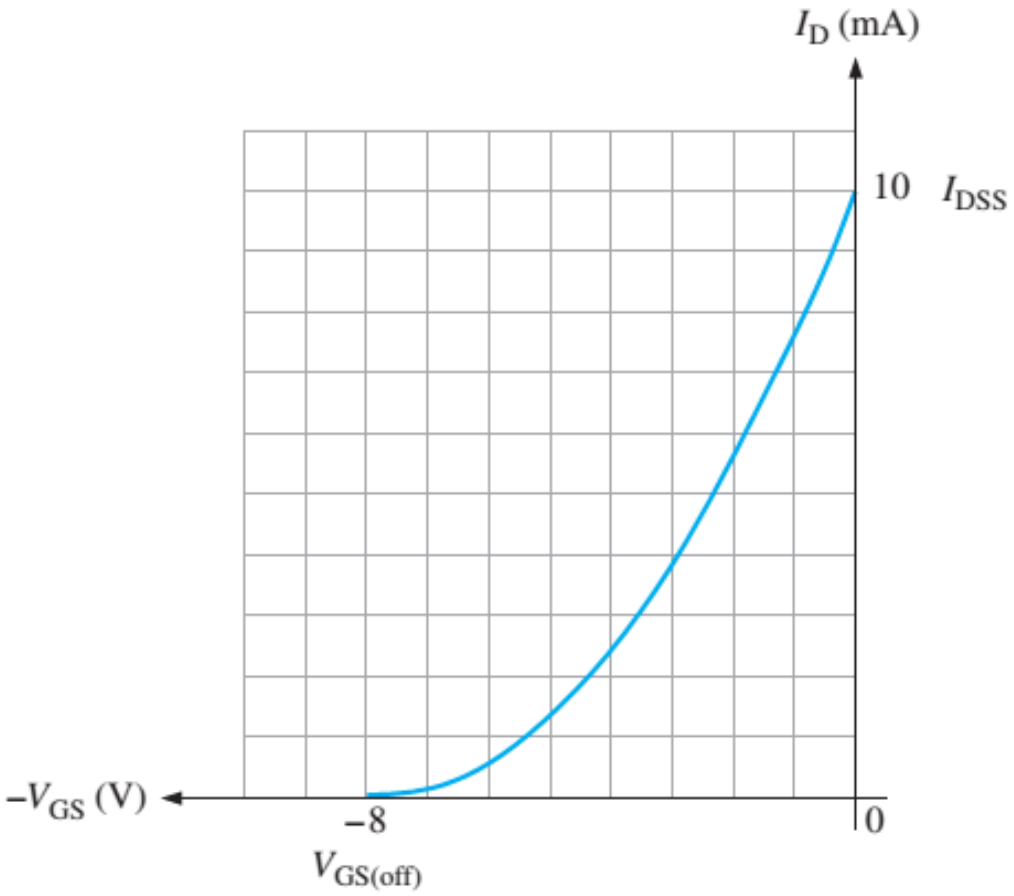


Answer

- B

- Determine V_{GS} and I_D





Answer

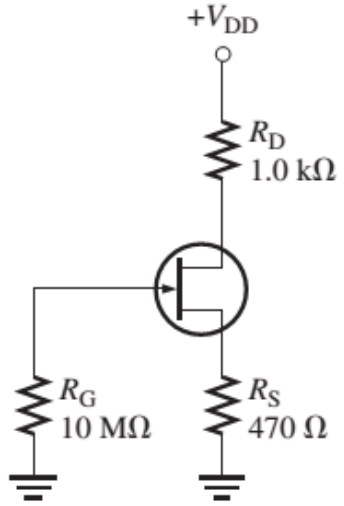
- Determine the Load line
  - $I_D = 0$

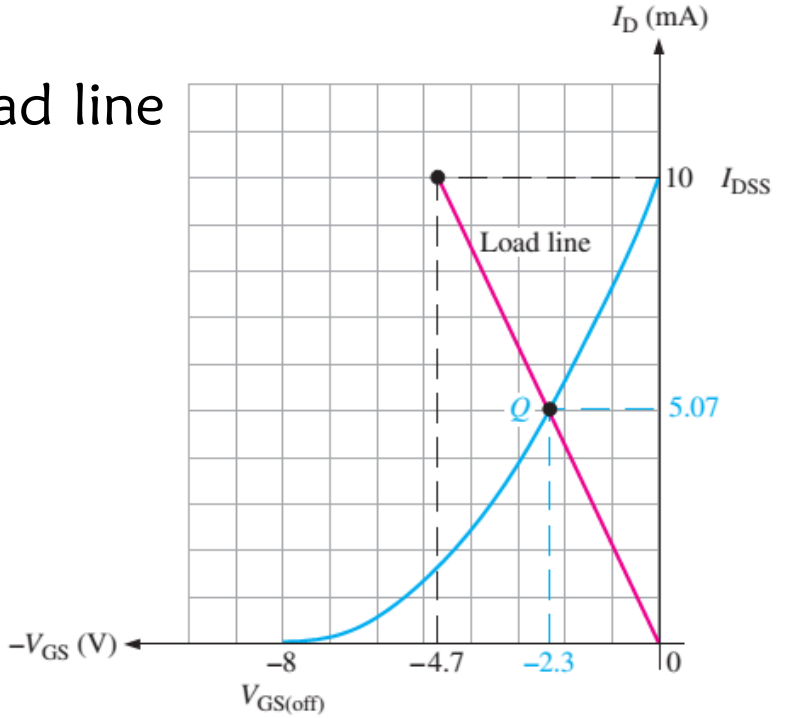
$$V_{GS} = -I_D R_S = (0)(470\ \Omega) = 0\ \text{V}$$

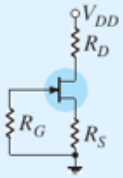
  - $I_D = I_{DSS}$

$$V_{GS} = -I_D R_S = -(10\ \text{mA})(470\ \Omega) = -4.7\ \text{V}$$

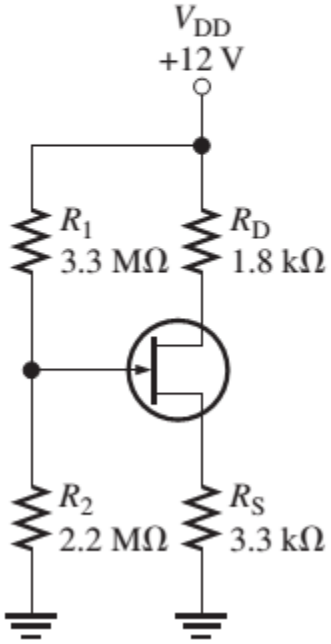
  - Q is the intersection point of the load line & transfer curve.
    - $I_D = 5.07$ mA
    - $V_{GS} = -2.3$V

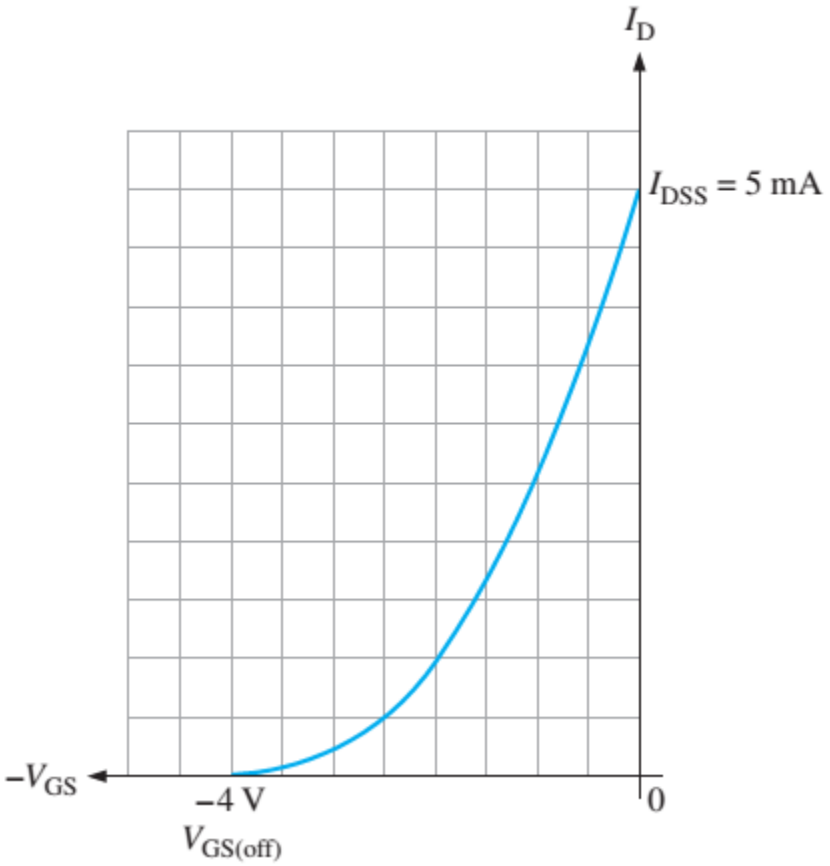




JFET Self-bias		$V_{GS} = -I_D R_S$ $V_{DS} = V_{DD} - I_D(R_D + R_S)$

- Determine V_{GS} and I_D for the given JFET, where
  - I_{DSS} = 5mA and $V_{GS(off)}$ = -4V



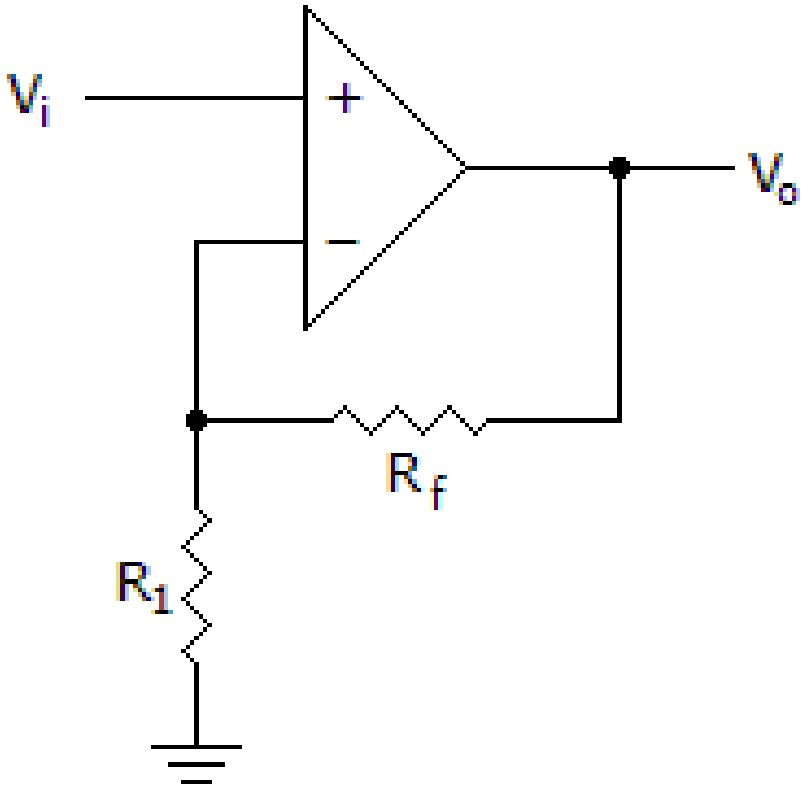


CO2015

Exercise – Op Amp

DCE
DEPT. OF COMPUTER ENGINEERING

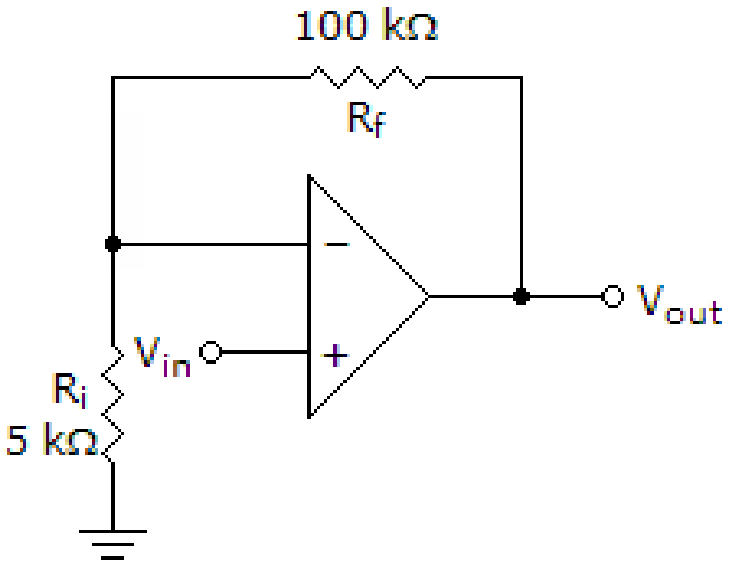
- Calculate the output gain of the circuit if R1 = 100(Ohm) and Rf = 1(KOhm)



Answer

- 11

- Refer to the given figure. A dc input signal of –50 mV is applied. You would measure _____ from the inverting input to ground.
  - 50mV
  - 1.05V
  - -1.05V
  - -50mV



- Calculate the input voltage if the final output is 10.08 V
  - ***0.168V***