D. J. SANGHVI COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRONICS ENGINEERING
ELX302: ELECTRONIC DEVICES AND CIRCUITS I SEM III
Home Work 01

15^{nd} **September, 2017** **[Maximum Benefit: Knowledge]**

1. **Attempt the following questions**

1. For the voltage-divider configuration of figure 1, determine:
    1. I_{DQ}, V_{GSQ} and V_{DSQ}
    2. V_D and V_S

    MOSFET parameters: $K_n = 4mA/V^2$, $V_{TN} = 1.2V$

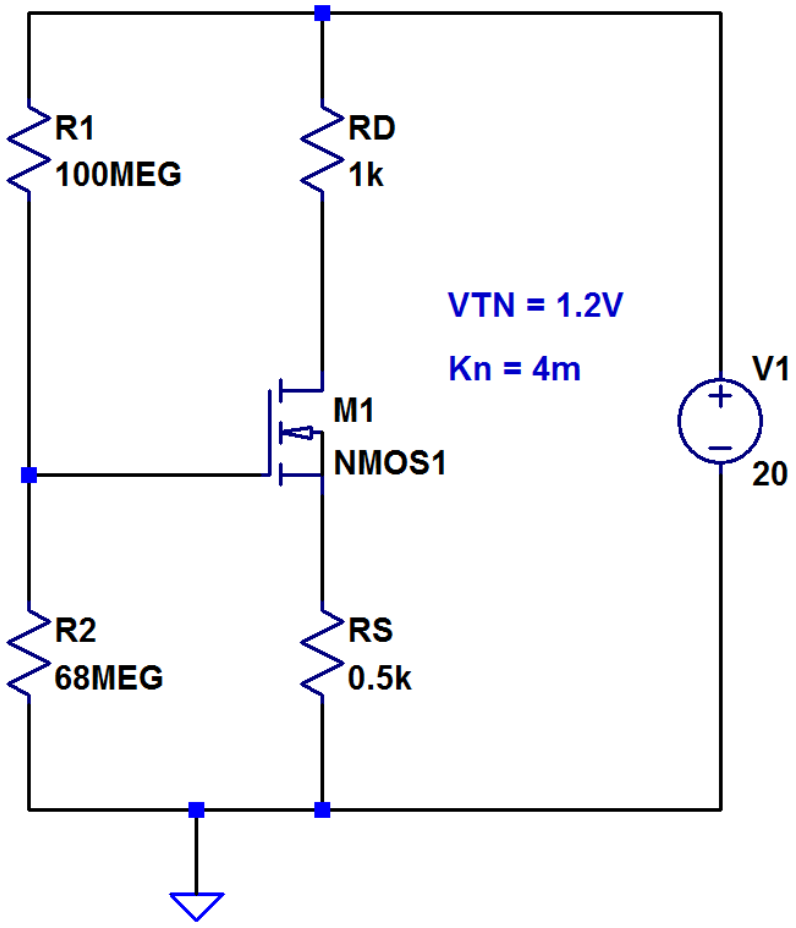

Figure 1: Question 1

2. For the configuration of figure 2, determine:
    1. I_{DQ}, V_{GSQ} and V_{DSQ}
    2. V_D and V_S

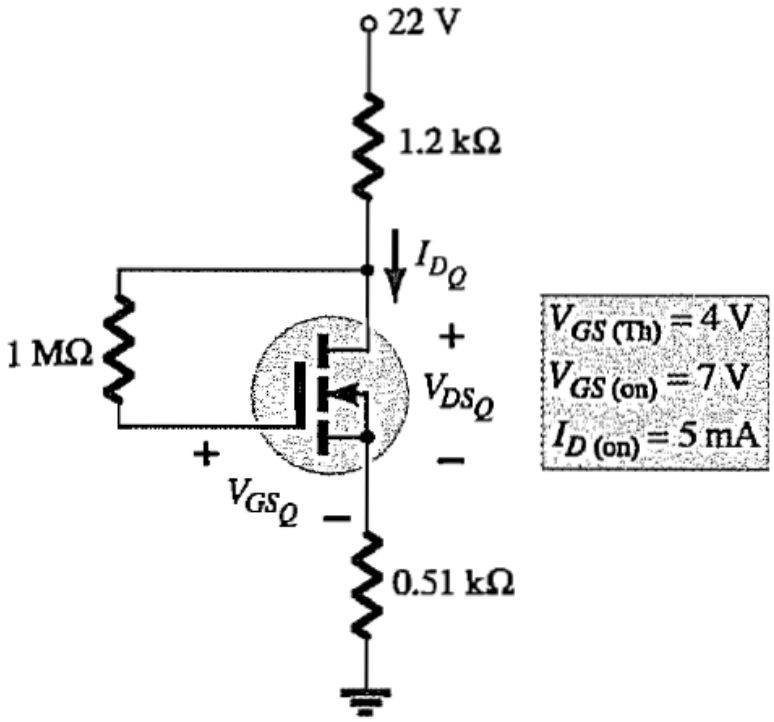

Figure 2: Question 2

3. For the self bias NMOS-D configuration of figure 3, determine:
    1. I_{DQ} and V_{GSQ}
    2. V_D and V_{DS}

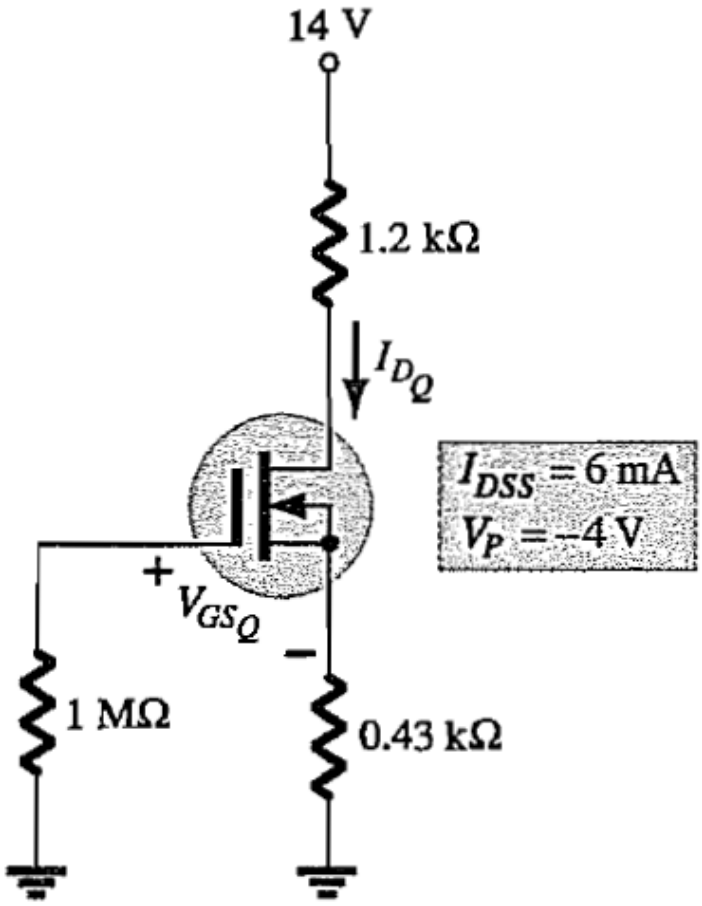

Figure 3: Question 3

4. For the configuration of figure 4, determine:
    1. I_{DQ} and V_{GSQ}
    2. V_D and V_{DS}

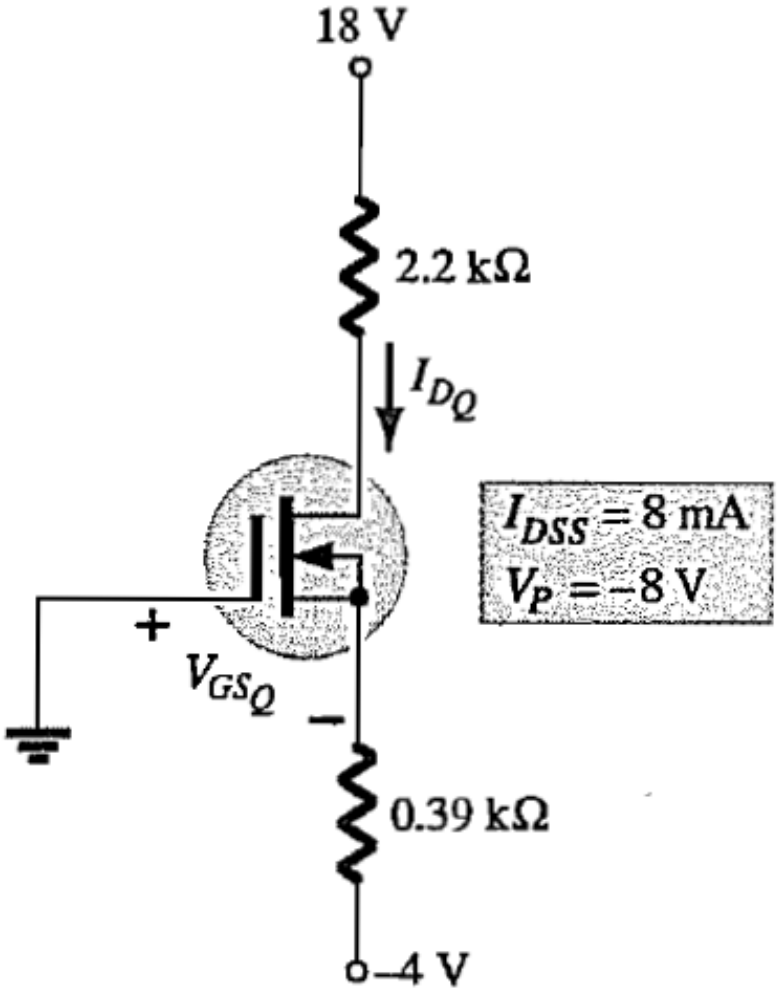

Figure 4: Question 4

5. For the configuration of figure 5, determine:
    1. I_{DQ} and V_{GSQ}
    2. V_D and V_{DS}

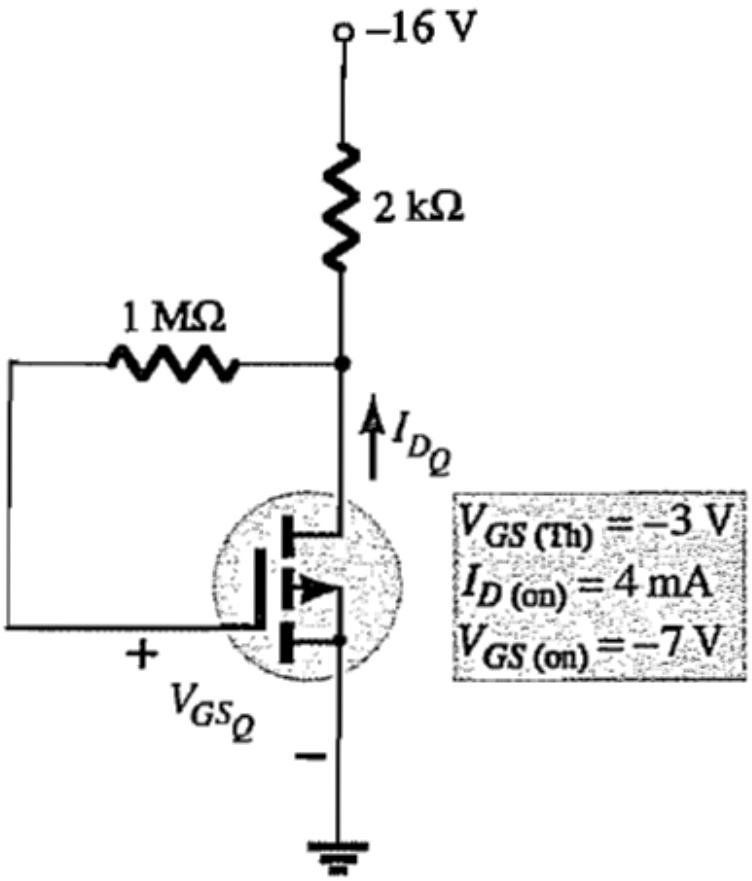

Figure 5: Question 5

6. Design a voltage-divider bias network using depletion-type MOSFET with $I_{DSS} = 10mA$ and $V_P = -4V$ to have a Q point at $I_{DQ} = 2.5mA$ using a supply of 24V. In addition, set $V_G = 4$ V and use $R_D = 2.5R_S$ with $R_1 = 22M\Omega$. Use standard values.

7. Design a drain feedback bias network using an enhancement type MOSFET with $V_{TN} = 4V$ and $k_n = 0.5 \times 10^{-3} \frac{A}{V^2}$ to have a Q point of $I_{DQ} = 6mA$. Use a supply of 16V and standard values.

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