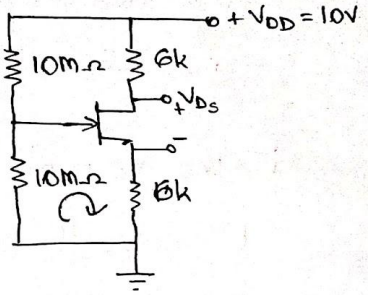
Ans to the qu no - 03

a) Given,

$V_t = 1V$

$\mu_n = 10 mA/V^2$



Applying voltage divider rule we get,

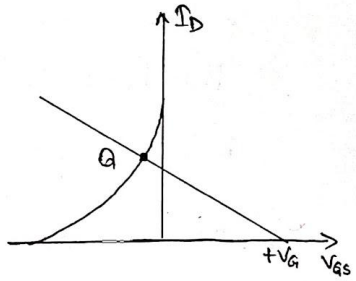
$$V_G = \frac{R_2 \cdot V_{DD}}{R_1 + R_2} = \frac{10}{20} \cdot 10 = 5V$$

Applying KVL in the lower loop,

$$V_G - V_{GS} - V_{RS} = 0$$

$$\Rightarrow V_{GS} = V_G - V_{RS}$$

$$\Rightarrow V_{GS} = V_G - I_D R_S$$



From the graph,

$$I_D = \frac{V_G}{R_S}$$

$$= \frac{5}{6k} = 0.833mA$$

So,

$$V_D = V_{DD} - I_D R_D$$

$$= 10 - 0.833 \times 10^{-3} \times 6 \times 10^3$$

$$= 5.002V$$

And,

$$V_S = I_D R_S$$

$$= 0.833 \times 10^{-3} \times 6 \times 10^3$$

$$= 4.998V$$

Ans: $V_G = 5V$, $I_D = 0.833mA$,
$V_D = 5.002V$, $V_S = 4.998V$

e) We have employed voltage divide biasing in the given circuit.

d) The current through gate of MOSFET is zero ~~becas~~ because the resistances in the voltage ~~dive~~ divider segment is very high.

f) Threshold voltage refers to the minimum voltage that is ~~req~~ required to build a thin layer of ~~n-channel~~ electrons in n-channel MOSFET or thin layer of holes in P-channel MOSFET (~~En~~ Enhancement) and make the MOSFET conducting or switch ON. Normally it operates in the Inversion region.