17201012

Answer to the Q. NO. 1

Given,

$\beta = 17201012$

$V_{gs} = 0.5v, 2v$

$V_t = 1v$

We know,

for, $V_{gs} = as$

$V_{GT} = V_{gs} - V_t$

$= 0.5 - 1$

$= -0.5$

For saturation,

$V_{GT} = V_{ds}$

$\therefore V_{ds} = -0.5v$

$I_{ds} = \frac{\beta}{2} V_{GT}^2 = 0$ As $gs < V_t$

$= \frac{17201012}{2} (-0.5)^2$

$= 2150126.5$

For,

$V_{gs} = 2V$

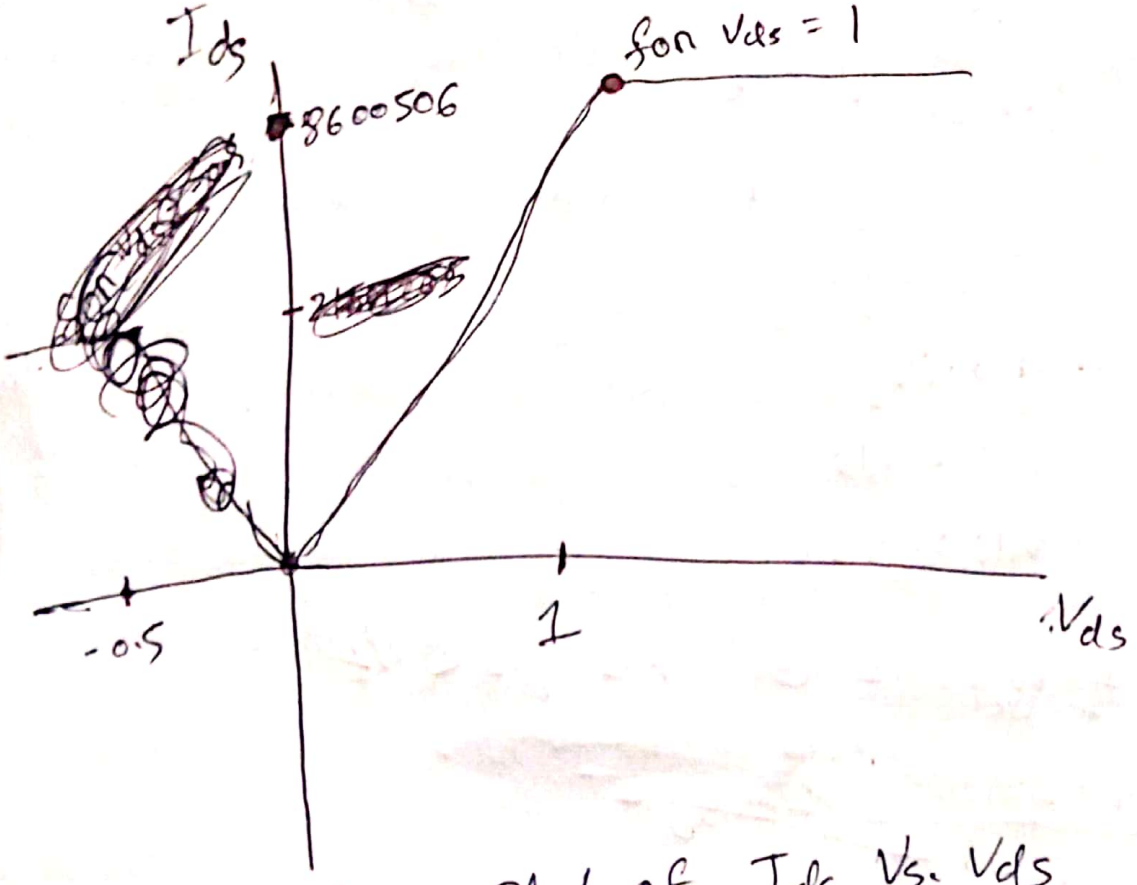
$V_{GT} = V_{gs} - V_T$

$= 2 - 1$

$= 1 = V_{ds}$

$\therefore I_{ds} = \frac{17201012}{2} \times (1)^2$

$= 8600506$



fig(1): Plot of Ids Vs. Vds

Answer to the Q.No.2

Fig shown in (1) shows the I-V characteristics for the transistor. According to the first order model the current is 0 when $V_{gs} < V_t$ and it increases linearly when V_{ds} is increased. We get a point in the region. This point is saturation point. We get saturation point for a positive V_{ds}. When V_{ds} is positive that is 1 we get I_{ds} of 2150126.5 and when V_{ds} is negative that is 0.5 we get I_{ds} of 2600506.

When V_{ds} increases I_{ds} also increases linearly. But at a point $V_{at} = V_{ds}$ happen that point is called saturation point after. These two points is given in (1). After this point increasing V_{ds} won't have any effect on I_{ds}, I_{ds} will remain same cause it has reached the saturation point.

Same goes for decreasing the V_{ds}.