The MOSFET "on" resistance and the motor R (found empirically) is given by:

$$R_{DS(on)} = 5.3m\Omega, R_m \approx 15\Omega$$

From Kirchhoff's voltage law:

$$21V = V_m + i_{stall}R_{DS(on)}$$

where V_m is the voltage across the motor terminals. When the motor is stalled (i.e. on startup) there is no back EMF from moving coils and V_m is given by:

$$V_m = i_{stall}R_m$$

so

$$i_{stall} = \frac{21V}{R_m R_{DS(on)}} = 1.4A$$

and the stall torque can be found by:

$$\tau_{stall} = K_\tau i_{stall} \approx \frac{10mNm}{A} * 1.4A = 14mNm$$

To determine if this torque is enough to pull a ping pong ball up to the hopper, we can do a worst case scenario of carrying the entire weight of the ball. Of course, this will never happen because the friction on the inner wall of the ball collector will provide an upward force to stop the ball from sliding. By the same token, this calculation is also using the stall torque, which is the highest torque the motor can output. We could have gone more in depth by using a desired rotational speed ω and finding the torque required at that speed and the torque output by the motor, but this would be overkill for back of the envelope calculations.

The torque required in this worst case is given by

$$\tau = m_{ball}gr_{shaft} = (0.026N)\left(9.8\frac{m}{s^2}\right)(0.003175m) = 0.8mNm$$

From this, we were able to assume that the motor had more than enough torque to pull a ping pong ball into the hopper.