The money demand function is given as
\[
\left( \frac{M}{P} \right)_d = L(i, Y) = \frac{Y}{5i}
\]

a. If output Y grows at rate g, then real money balances \((M/P)_d\) must also grow at rate g, given that the nominal interest rate \(i\) is a constant. Keep in mind that:
\[
\frac{\Delta \left( \frac{M}{P} \right)_d}{\Delta Y} = \frac{\Delta(5i)}{5i}
\]
As long as interest rate is constant, real money balances will increase at the same rate as the output.

b. To find the velocity of money, start with the quantity equation \(MV = PY\) and rewrite the equation as \(V = (PY)/M = (P/M)Y\). Now, note that \(P/M\) is the inverse of the real money supply, which is equal to real money demand. Therefore, the velocity of money is \(V = (5i/Y) \times Y\), or \(V = 5i\).

c. If the nominal interest rate is constant, then the velocity of money must be constant.

d. A one-time increase in the nominal interest rate will cause a one-time increase in the velocity of money. There will be no further changes in the velocity of money.