Problem 1 (each part is worth 5 points)

(a) The opportunity cost of holding money is the interest rate forgone. Meaning, the interest you could earn by putting that money in some interest bearing account or investment.

(b) 5 points were given for a graph as shown below (though you didn’t need to include the fast money transaction on this graph, you could have drawn a separate graph for part (e)). Points were deducted for mistakes, such as having the wrong numbers.

Trans. balances

(c) One point was given for saying what the opportunity cost is of doing the STCM as shown in the graph. 3 points was given for the earnings from doing the STCM as shown in the graph. 1 point was given for saying something about whether it is a lot of money or not. Partial credit was given if you were on the right track or close when calculating the earnings, but made some mistake along the way.

Opportunity Cost of holding money when doing 4 STCM transactions per month:

\[ OC = 0.005 \times 100 = 0.50 \]$  

To see how much interest that is being earned from doing this STCM, you need to compare the opportunity cost of not doing STCM to the opportunity cost calculated above.

OC of no STCM = 0.005 * 400 = 2.00$ where 400$ is the average transactions demand when no STCM is done.

Therefore, this person earns, 2.00$ - 0.50$ = 1.50$ by doing 4 STCM per week.

(d) 5 points were given for the calculation below. Partial credit was given if you were close, or were somehow trying to use that 40,000 to figure out some opp.cost.

The opportunity cost of holding 40,000: \[ OC = 0.005 \times 40,000$ = 200.00$\]  

This is a lot of money compared to part (c).
(e) See the graph in part (b). 5 points were given for showing the FM transaction close to something as shown above.

(f) Since $V \equiv$ turnover of the average dollar = average of $V_{FM}$ and $V_{SM}$, then the turnover of the average dollar will increase when fast money transactions increase. That is, $V_{FM} = \infty$ then overall velocity will increase.

4 points were given for a very complete answer. 1 point was given for the barrels. Partial credit was given for an answer somewhere in the ballpark.

**Problem 2 (10 points for each part)**

(a) $V \equiv \frac{X}{M^S}$ and, if the money market is in equil., then, $V \equiv \frac{X}{M^S} = \frac{X}{M^D}$

Then we can show that velocity is a constant as follows,

$$V \equiv \frac{X}{M^D} = \frac{X}{kX} = \frac{1}{k}$$

and we were given that $k$ is a constant, so $V$ is a constant.

10 points were given for the above answer, which as the question asked, PROVES that $V$ will be a constant in the classical economy. Partial credit was also given for answers that provided a written explanation. 4 points were given for simply stating the definition of $V$ and more points were given based on the strength of your written explanation. However, only an answer that shows the above proof received the full ten points.

(b) Use the condition $\frac{M^D}{P} = \frac{M^S}{P}$ to solve for the LM curve.

Since $\frac{M^D}{P} = kY$ then write $\frac{M^S}{P} = kY$ now solve for $Y$.

$$Y = \frac{M^S}{P} \frac{1}{k}$$ which is the equation for the LM Curve

8 points were given for solving for the LM curve and 2 points were given for showing the graph—for a total of 10 points. Partial credit was given for getting close but not being able to go the whole way. It was not correct to write the LM curve as a function of $M^D$. This would be logically incorrect since only the money supply can shift the LM curve.
Problem 3 (a. 6 points, b. 9 points, c. 5 points, d. 5 points)

(a)

\[ X = C + I + G + NX \]
\[ X = (200 + 600) + 400 + 0 + 0 = 1200 \]
\[ S = I = 400 \]

3 points were given for \( X = 1200 \) and 3 points for \( S = 400 \).

(b)

The Flow diagram was worth 3 points. Each barrel was worth two points, with full credit given for a clear label of both the stock and the flow and a label for the leakage (whether it was depreciation or a reverse leakage). You could have drawn your barrels anywhere around or in the circular flow as long as they were properly labeled.

(c)

The fall in shares is a depletion of the Wealth stock.

5 points were given for the above answer. Stock shares are part of household wealth and not included in the capital stock or in Investment. It was incorrect to say that Investment fell because \( I = 400 \) is the investment in machinery, buildings, etc. Also, it was incorrect to say that Savings fell because savings comes from Income, which is unrelated to the value of a person’s stock portfolio (i.e., wages don’t fluctuate with the stock market). The problem also gave you a hint by saying “but consumption and other expenditures do not change, how would your CFD change?” Other expenditures includes \( I = 400 \).
(d) It is more realistic that consumption expenditures would fall since it is likely consumption is a function of both income and wealth.

5 points were given for saying something close to the above. Many good answers included some discussion about the effect a fall in household wealth would have on their willingness to purchase big-ticket items, and on their general expectations about the future.

Problem 4 (a. 6 points, b. 6 points, c. 6 points, d. 7 points)

(a)

\[
\begin{align*}
M^D &= 600 + 600 = 1200 \\
M^D &= M^S = 1200 \\
V &= \frac{X}{M} = \frac{1200}{1200} = 1
\end{align*}
\]

2 points were given for a correctly drawn graph; 2 points for calculating \( M \); 2 points for \( V \).

(b)

\[
\begin{align*}
M^D &= 300 + 300 = 600 \\
M^D &= M^S = 600 \\
V &= \frac{X}{M} = \frac{1200}{600} = 2
\end{align*}
\]

Point distribution same as in (a).
(c)  
X falls to 1000 (with C^{ND} = 600, C^D = 100, I = 300). As in part (a) all transactions are slow money. With X = 1000, M^D = M^S = 1000.

\[ V = \frac{X}{M} = \frac{1000}{1000} = 1 \]

Since velocity is unchanged from part (a) (with identical conditions, no STCM, all transactions are slow), this recession is consistent with the classical money demand function where velocity is constant (where V = 1/k). We can say this may be a classical island suffering a recession caused solely by a monetary shock.

4 points were given for correctly showing the new money demand (and supply), new X, and the Velocity. 2 points were given for explaining why an unchanged velocity implies this island seems to conform to classical assumptions.

(d)  
X falls to 1000, but the decline in expenditure only changes the fast money transactions, C^D and I. Since neither of these expenditures affects average transactions demand (see graph from part (b)), and consumer non-durables have not changed, total money demand and money supply will be unchanged from part (b). Hence,

\[ V = \frac{X}{M} = \frac{1000}{600} = \frac{2}{3} \]

Velocity has slowed down following the decline in fast money purchases. This is inconsistent with the classical assumption of a constant velocity and the classical theory of business cycles. Here we have a recession without a monetary shock (since the money supply and money demand are unchanged following the decline in X).

4 points were given for correctly showing that money demand and money supply are unchanged while X falls to 1000 (and then calculating the new velocity). 3 points were given for explaining the implications of this result.