The challenge is closed book. The following formulas may be useful.

Inflation and Interest Rates

$$\text{GDP Deflator} = \frac{P_{1,t}Q_{1,t} + P_{2,t}Q_{2,t} + \ldots + P_{n,t}Q_{n,t}}{P_{1,b}Q_{1,t} + P_{2,b}Q_{2,t} + \ldots + P_{n,b}Q_{n,t}} \cdot 100,$$

$$\text{CPI} = \frac{P_{1,t}Q_{1,b} + P_{2,t}Q_{2,b} + \ldots + P_{n,t}Q_{n,b}}{P_{1,b}Q_{1,b} + P_{2,b}Q_{2,b} + \ldots + P_{n,b}Q_{n,b}} \cdot 100, \quad \pi = \frac{P_{t+1} - P_t}{P_t}, \quad R_t = r_t + \pi_t$$

$$\text{ave. nominal return} = (1 - rrr)R + rrrR_0 - R_c$$

Money Supply

$$M = (cr + 1)D, \quad H = (cr + rd)D, \quad cr = \frac{C}{D}, \quad rd = rrr + e(R - R_0) = \frac{TR}{D},$$

$$M = Hk(R), \quad \Delta M = \Delta H k(R), \quad k(R) = \frac{cr + 1}{cr + rrr + e(R - R_0)}, \quad rrr = \frac{RR}{D}$$

$$\frac{M}{P} = \frac{H}{P}k(R), \quad TR = ER + RR, \quad \text{Lending} = (1 - rd)D, \quad e(R - R_0) = \frac{ER}{D}$$

$$M2 = C + D + S = (cr + 1 + sr)D, \quad M2 = H \cdot k_{M2}(R), \quad k_{M2}(R) = \frac{cr + 1 + sr}{cr + rd}.$$

$$sr = \frac{S}{D}, \quad \text{Lending with savings} = (1 - rd)D + S$$

Money Demand

$$\frac{M}{P} = \sqrt{\frac{\delta C}{2R}}, \quad n = \sqrt{\frac{RC}{2\delta}}, \quad MV = PC, \quad V = \sqrt{\frac{2RC}{\delta}}, \quad V = 2n, \quad MD = a - b\pi_{t+1}^e$$

Short answer questions (1-2 sentences)

Question 1 (12 points)

Consider a decrease in the interest rate. According to the BT model, explain intuitively what happens to:

a. The number of withdraws.

b. Money Demand.

c. Velocity.

Question 2 (16 points)

For each of the following, does M2 increase, decrease, or remain unchanged?

a. A bank adds to excess reserves to take advantage of an increase in the reserve rate.

b. The US Treasury issues tbills to pay for the stimulus package.

c. Ralph moves $100 from his checking account to his savings account.

d. A bank borrows from the FED's term auction facility to make a loan.

e. A bank has extra cash in ATMs, which the bank deposits at the FED.

f. Eco 403 students withdraw cash from their checking accounts to go out after their quiz.

g. Tim buys Freakonomics with a credit card.

h. Apple Computer enters into a repo agreement with a commercial bank.

Question 3 (12 points)

In class, we saw an example of Russian workers at a coffin making factory being paid in coffins.

a. Workers paid with coffins is an example of which of the following:

- Commodity money.
- Impure commodity money.
- barter.
- all of the above.
- none of the above.

b. Would you expect inflation is high or low in Russia? Explain.

c. Would you expect money demand is high or low in Russia? Explain.

d. Would you expect velocity is high or low in Russia? Explain.

e. Is being paid with coffins consistent with the assumptions of the BT model? Explain briefly.

Question 4 (8 points)

According to the article, did a fall in the discount rate generate a significant increase in discount rate lending? Give two reasons why or why not.

Longer Questions

Question 5 (34 points) .

The FED has announced they will raise the reserve rate after the economy recovers. Graph the money market using the BT model of money demand. Show on the graph the effect of an increase in the reserve rate. Explain what happens to:

a.
- The equilibrium interest rate.
- The supply of real money balances.
- The number of withdraws per period.
- Total excess reserves.
- Total checking deposits.
- Total bank lending.
- Consumption velocity.

b. Is the FED's policy consistent with each of the following FED policy goals? Explain.

- Discourage bank runs.
- Encourage banks to lend.
- Raise interest rates.

Question 5 (18 points) .

Consider the following monetary situation:

- Currency to deposit ratio is $\frac{1}{4}$.

- The savings to deposit ratio is 1.

- The required reserve ratio is 0.

- Banks hold excess reserves $e\left(R - R_0\right) = \frac{1}{5} - \left(R - R_0\right)$.

- The interest rate is $R = \frac{1}{5}$.

- The reserve rate is $R = \frac{1}{8}$.

- The high powered money is equal to $9 trillion.

a. Calculate the money multiplier and the money supply.

b. Calculate the amount of currency held by the public, the amount of currency held in reserve by banks, and total checking deposits.

c. Of the currency held in reserve by banks, how much is required reserves and how much is excess reserves?

d. In one of the articles the FED stated it might let some of the mortgages being held by the FED mature (rather than selling the mortgages). Suppose households make $0.5 trillion worth of mortgage payments to the FED. Calculate the change in the money supply. Does the money supply rise or fall?