11) (10 points)
   a) (5 points)

For Japan, an appreciation of the Yen makes Japanese goods more expensive relative to foreign goods. Thus demand for exports from Japan will fall and demand for imports to Japan will rise. An exogenous rise in the exchange rate for Japan, thus leads to a decline in its net exports. As a result, the aggregate demand curve in Figure 1 shifts to the left from AD1 to AD2. The appreciation of the Yen also acts as a temporary positive supply shock for Japan to the short-run aggregate supply curve because it makes imports less expensive and thus lowers the inflation rate. As a result, the short-run aggregate supply curve shifts down and to the right from AS1 to AS2. Because the shift in the short-run aggregate supply curve typically small relative to the shift in the aggregate demand curve, Japanese economy moves from point 1 to point 2. Aggregate output falls and inflation falls.

For the US, an appreciation of the Yen means a depreciation of the dollar. A depreciation of dollar makes US goods cheaper relative to foreign goods. Thus the demand for exports will rise and the demand for imports will fall. An exogenous fall in the exchange rate for US, thus leads to an increase in its net exports. As a result, the aggregate demand curve in Figure 2...
shifts to the right from AD1 to AD2. The depreciation of the dollar also acts as a temporary negative supply shock to the short-run aggregate supply curve, so the short-run aggregate supply curve shifts up and to the left from AS1 to AS2. Because the shift in the short-run aggregate supply curve typically small relative to the shift in the aggregate demand curve, US economy moves from point 1 to point 2. Aggregate output rises and inflation rises.

**Figure 2**

Inflation rate, π

b) (5 points)

If the Bank of Japan wants to intervene in the foreign exchange market to remove appreciation pressure on the Yen, it needs to purchase the dollar assets (international reserves) and sell the yen assets in the foreign exchange market. The purchase of dollars increases the holding of international reserves by the Bank of Japan. At the same time, the sale of the Yen increases the liquidity of Japanese financial system because it increases reserves of commercial banks held by the Bank of Japan. As a result, monetary base and money supply increase in Japan.

The Trilemma states that any central banks must give up one of the following 3 goals.
1. Free capital mobility
2. Fixed exchange rate
3. Independent monetary policy

In the case of Japan, with the free capital mobility, the Bank of Japan has to give up the independent monetary policy in order to remove appreciation pressure on the Yen and to attempt to fix exchange rate.
This utility function results in consumption smoothing such that consumption today is the same as consumption in the future. To see why, we can start from the intertemporal budget line (IBL):

\[ C_1 + \frac{C_2}{1 + r} = Y_1 + \frac{Y_2}{1 + r} \]

The IBL is the line that crosses the income point or Point Y in Figure 4. The slope of the IBL is negative, and its absolute value is \( 1 + r \) or the gross world real interest rate. Hence, the gross world real interest rate is the price of today consumption relative to future consumption.

We can use the IBL to rewrite the utility function as follows.

\[ u(C_1) = \ln(C_1) + \frac{1}{1 + r} \ln \left( (1 + r)(Y_1 - C_1) + Y_2 \right) \]

To maximize utility, the consumer chooses \( C_1 \) to satisfy the following condition:

\[ \frac{du}{dC_1} = 0 \]

Based on this utility function,

\[ \frac{du}{dC_1} = \frac{1}{C_1} + \frac{1}{C_2} \frac{1 + r}{1 + r} = 0 \]

Therefore, \( C_1 = C_2 \). The equality of today consumption and future consumption is captured by the intersection between the 45-degree line and the indifference curve in Figure 4. The consumption point is denoted by Point C.

The income point lies on the southeast of the consumption point, because it is given that today income is higher than future income. Clearly, this consumer is a saver, because today consumption is below today income.

When the real interest rate falls, the budget line becomes flatter. As a result, this consumer will reduce both today consumption and future consumption. The reason is that, a fall in the real interest rate reduces the interest earnings from savings. This implies that this consumer has to increase savings in order to consume more than the income level in the future.
b) (5 points)

A time-inconsistency problem is the situation in which a policy is considered optimal ex ante, but suboptimal ex post. In the context of monetary policy, it characterizes the ineffectiveness of monetary policy in the short run as a result of adjustments in expectations about inflation. When the central bank has low credibility, market participants see a monetary expansion as inflationary, even though the central bank announces that the monetary expansion is temporary.

In Figure 5, suppose the economy falls into a recession, from Point 1 to Point 2. This can be driven by a fall in demand for US exports in the world market, for example. In this case, the AD curve shifts down from AD1 to AD2. The economy moves from Point 1 to Point 2. Then the central bank responds to the recession by a temporary money expansion, which shifts the AD curve from AD2 back to AD1.

The time-inconsistency arises when people expect this policy to be inflationary, due to a lack of credibility of the central bank. Then the AS curve shifts up from AS1 to AS2. Hence, the equilibrium becomes Point 3 instead of Point 1. Then the central bank responds again by another money expansion. Such policy will validate people’s expectations that this money expansion is not a one-shot policy. Then inflation expectations continue to rise and that shifts the AS curve from AS2 to AS3. The economy is then now at Point 4, which still implies a recession. For this reason, the adjustment of inflation expectations can make monetary policy ineffective even in the short run.