Answers

1. $Y = 160 + 0.8\times(0.75\times Y - 200) + 200 + 200$
   $Y = 400 + 0.6\times Y$
   $0.4\times Y = 400$
   $Y = 1000$.

   a. $T = 0.25\times Y + 200 = 450$.
      $S_g = T - G = 250$.

   b. $Y = 480 + 0.6\times Y = 1200$.
      Lump sum tax multiplier $= \Delta Y/\Delta Z = 200/(-100) = -2$.
      $T = 0.25\times 1200 + 100 = 400$.
      $S = 200$.

   c. Decrease in tax receipts is only 50, instead of the full 100, because the expansion in output increases the amount of receipts from the income tax.

   d. No, it cannot. The change in tax receipts that result from the change in lump-sum taxes is given by

   $$\Delta T = t\times\Delta Y + \Delta Z$$
   $$\Delta T = t\times(\alpha\times\Delta Z) + \Delta Z$$

   where $\alpha = -b/[1 - b\times(1 - t)]$ is the lump sum tax multiplier and b is the MPC. Thus,

   $$\Delta T = [1 - b]/[1 - b\times(1 - t)]\times\Delta Z$$

   Since the fraction must be positive, we know that ΔT and ΔZ have the same sign. Thus, a tax cut ($\Delta Z < 0$) must decrease tax revenue ($\Delta T < 0$) so long as $0 < b$ and $t < 1$. The spending balance model ignores the possibility that tax policy can affect labor supply and thus potential GDP. Supply-siders would object to this omission.

2.
   a. $S_p = Y_d - C$
      $S_p = -a + (1 - b)\times Y_d$.

   b. With no investment or foreign saving, private saving plus government saving sum to zero, or private saving must equal the government budget deficit.

   c. $Y = \dfrac{a + G}{1 - b\times(1 - t)}$; Gov. Def. $= G - t\times Y = G - \dfrac{t\times(a + G)}{1 - b\times(1 - t)}$.

   $S_P = -a + (1 - b)(1 - t)Y = -a + \dfrac{(1 - b)(1 - t)(a + G)}{1 - b\times(1 - t)}$

   $S_P = G - \dfrac{t\times(a + G)}{1 - b\times(1 - t)}$.

   The expressions are the same.

3.

    a. True. The increase in *g* raises exports and lowers the trade deficit. Income rises, and this leads to a rise in imports; however, it is not enough to offset the increase in exports as can be seen by the expression for X. After solving for *Y*, net exports is given by

$$X = g - m \frac{a + g + G + I}{1 - b \times (1 - t) + m}.$$

An increase in g will increase X. The increase in Y reduces the government budget deficit through the increase in taxes.

    b. True. An increase in investment leads to an increase in incomes raising both taxes and imports.

    c. False. If G and t are both raised such that the change in G equals the change in t×Y, Y must increase. To see this, just treat taxes as a lump sum T. We know that the balanced budget multiplier is positive. Therefore, the trade deficit must worsen. The government deficit of course remains the same.

4.

    a. Government spending is endogenous because it depends on income, and income is endogenous.

    b. The multiplier is of course larger. When exogenous spending increases and income increases, government spending will increase, leading to further increases in output.

    c. When t increases Y must increase. This is because the increase in government spending adds more to aggregate demand than the reduction in spending caused by higher taxes. This is because part of the increase in taxes comes out of savings.

5.

    a. Capital stock, labor force, and technology.

    b. Government spending and other endogenous spending parameters, such as the constants in the consumption, investment, or net export functions.

    c. Employment is endogenous. Once the level of output is determined, employment is given by the labor required to produce that output. This in turn depends on the underlying technology.

    d. In the spending balance model, demand creates its own supply. It is implicitly assumed that whatever level of output is demanded, it will be supplied. In the long-run growth model, supply creates its own demand. The level of output is determined by considering supply factors only, and the output is split among competing uses. Prices are assumed to be sufficiently flexible that they will adjust to ensure all output is demanded.