HW9

1. In the Solow growth model with population growth ($n$) and technological progress ($g$), the steady-state growth rate of output per effective worker is:
   - A. 0.
   - B. $n$.
   - C. $g$.
   - D. $n + g$.

   **Answer:** A

2. In the Solow growth model with population growth ($n$) and technological progress ($g$), the steady-state growth rate of output per worker is:
   - A. 0.
   - B. $n$.
   - C. $g$.
   - D. $n + g$.

   **Answer:** C

3. A permanent change in the growth rate of total output can arise from a change in the:
   - A. rate of technological progress.
   - B. saving rate.
   - C. ratio of capital per worker.
   - D. number of workers.

   **Answer:** A

4. In the Solow growth model with population growth and technological progress, the economy experiences a 5 percent "labor-augmenting technological progress" if:
   - A. the economy and the population grows by 5 percent.
   - B. the economy does not grow while the population grows by 5 percent.
   - C. the population grows by 5 percent.
   - D. the economy grows by 5 percent while the population stays the same.

   **Answer:** D

5. In the Solow model with technological progress, an increase in the rate of technological change will:
   - A. shift the investment curve upward.
   - B. shift the investment curve downward.
   - C. leave the investment curve unchanged.
   - D. lead to a lower level of consumption at the steady state.

   **Answer:** C

6. In the Solow growth model, the steady state level of income per person in a country is a function of all the following EXCEPT:
   - A. the rate of saving.
   - B. the current level of income in the country.
   - C. the efficiency with which the economy employs the factors of production.
D. the population growth rate.

**Answer:** B

7. In the basic endogenous growth model, usually called the \( Y = AK \) model, as long as the saving rate times the constant \( A \) is greater the rate of depreciation, income will grow:

- A. at an increasing rate.
- B. at a decreasing rate.
- C. until it reaches its steady state.
- D. forever.

**Answer:** D

8. In the Solow model, increased saving leads to _______ growth, but in the \( Y = AK \) model, increased saving can lead to _______ growth.

- A. negative; eternal
- B. temporary; persistent
- C. exogenous; endogenous
- D. consumption; technological

**Answer:** B

9. Advocates of the \( Y = AK \) model interpret capital as:

- A. consisting solely of the stock of plants and equipment.
- B. being inversely related to technological progress.
- C. including knowledge.
- D. being determined by exogenous forces.

**Answer:** C

10. In the two-sector model, the proportion of labor devoted to research universities determines the:

- A. steady-state stock of physical capital.
- B. marginal product of capital.
- C. steady-state saving rate.
- D. steady-state growth rate of income.

**Answer:** D

11. The efficiency of labor:

- A. is the marginal product of labor.
- B. is the rate of growth of the labor force.
- C. includes the knowledge, health, and skills of labor.
- D. equals output per worker.

**Answer:** C

12. In the Solow model with technological progress, the steady-state growth rate of output per effective worker is:

- A. 0.
- B. \( g \).
- C. \( n \).
13. In the Solow model with technological progress, by increasing the efficiency of labor at rate $g$:

- **A.** the real wage and the real rental price of capital both grow at rate $g$.
- **B.** the real wage grows at rate $g$ but the real rental price of capital is constant.
- **C.** the real wage is constant but the real rental price of capital grows at rate $g$.
- **D.** both the real wage and the real rental price of capital are constant.

**Answer:** B

14. The Solow model predicts that two economies will converge if the economies start with the same:

- **A.** capital stocks.
- **B.** populations.
- **C.** steady states.
- **D.** production functions.

**Answer:** C

15. In the Solow growth model, technological change is ______, whereas in endogenous growth theories, technological change is ______.

- **A.** assumed; explained
- **B.** explained; assumed
- **C.** persistent; constant
- **D.** constant; persistent

**Answer:** A

16. If the production function is $y = k^{1/2}$, the steady-state value of $y$ is:

- **A.** $y = \frac{((s + g)/(\delta + n))^{1/2}}{2}$.
- **B.** $y = \frac{(s + g)/(\delta + n)}{2}$.
- **C.** $y = \frac{(2/(\delta + n + g))^{1/2}}{2}$.
- **D.** $y = \frac{s}{(\delta + n + g)}$.

**Answer:** D

17. If the U.S. production function is Cobb–Douglas with capital share 0.3, output growth is 3 percent per year, depreciation is 4 percent per year, and the capital–output ratio is 2.5, the saving rate that is consistent with steady-state growth is:

- **A.** 12.5 percent.
- **B.** 14 percent.
- **C.** 17.5 percent.
- **D.** 20 percent.

**Answer:** C

18. Suppose a government is able to permanently reduce its budget deficit. Use the Solow growth model of Chapter 9 to graphically illustrate the impact of a permanent government deficit reduction on the steady-state capital–labor ratio and the steady-state level of output per worker. Be sure to label the: a. axes; b. curves; c. initial steady-state levels; d. terminal steady-state
19. Two countries, Highland and Lowland, are described by the Solow growth model. Both countries are identical, except that the rate of labor-augmenting technological progress is higher in Highland than in Lowland.
   a. In which country is the steady-state growth rate of output per effective worker higher?
   b. In which country is the steady-state growth rate of total output higher?
   c. Does the Solow growth model predict that the two economies will converge to the same steady state?

Answer:
   a. The steady-state growth rate of output per effective worker is zero in both countries.
   b. The steady-state growth rate of total output will be higher in Highland because of the higher rate of technological progress.
   c. No, the Solow growth model predicts that the economies will converge to different steady states because they have different rates of technological progress.