Name: _____ Date: _____

1. The circular flow model shows that households use income for:
   A) consumption, saving, and factor payments.
   B) consumption, taxes, and factor payments.
   C) taxes, saving, and factor payments.
   D) consumption, taxes, and saving.

2. In the circular flow diagram, firms receive revenue from the _____ market, which is used to purchase inputs in the _____ market.
   A) goods; financial
   B) factor; financial
   C) goods; factor
   D) factor; goods

3. In the circular flow model, households receive income from the _____ market and save through the _____ market.
   A) goods; financial
   B) factor; financial
   C) goods; factor
   D) factor; goods

4. In the long run, the level of national income in an economy is determined by its:
   A) factors of production and production function.
   B) real and nominal interest rate.
   C) government budget surplus or deficit.
   D) rate of economic and accounting profit.

5. An economy's factors of production and its production function determine the economy's:
   A) labor force participation rate.
   B) budget surplus or deficit.
   C) population growth rate.
   D) output of goods and services.

6. In the long run, what determines the level of total production of goods and services in an economy?
   A) the interest rate and the amount of national saving
   B) the quantity of capital, quantity of labor, and production technology
   C) consumption, investment, and government spending
   D) the marginal products of capital and labor, constant returns to scale, and competition

7. The two most important factors of production are:
   A) goods and services.
   B) labor and energy.
   C) capital and labor.
   D) saving and investment.

8. Unlike the real world, the classical model with fixed output assumes that:
   A) all factors of production are fully utilized.
   B) all capital is fully utilized but some labor is unemployed.
   C) all labor is fully employed but some capital lies idle.
   D) some capital lies idle and some labor is unemployed.

9. A production function is a technological relationship between:
   A) factor prices and the marginal product of factors.
   B) factors of production and factor prices.
   C) factors of production and the quantity of output produced.
   D) factor prices and the quantity of output produced.

10. The production function feature called "constant returns to scale" means that if we:
    A) multiply capital by z_1 and labor by z_2, we multiply output by z_3.
    B) increase capital and labor by 10 percent each, we increase output by 10 percent.
    C) increase capital and labor by 5 percent each, we increase output by 10 percent.
    D) increase capital by 10 percent and increase labor by 5 percent, we increase output by 7.5 percent.

11. If an increase of an equal percentage in all factors of production results in an increase in output of the same percentage, then a production function has the property called:
    A) constant marginal product of labor.
    B) increasing marginal product of labor.
    C) constant returns to scale.
    D) increasing returns to scale.

12. If bread is produced by using a constant returns to scale production function, then if the:
    A) number of workers is doubled, twice as much bread will be produced.
    B) amount of equipment is doubled, twice as much bread will be produced.
    C) amounts of equipment and workers are both doubled, twice as much bread will be produced.
    D) amounts of equipment and workers are both doubled, four times as much bread will be produced.

13. At any particular point in time, the output of the economy:
    A) is fixed because the supplies of capital and labor and the technology are fixed.
    B) is fixed because the demand for goods and services is fixed.
    C) varies because the supplies of capital and labor vary.
    D) varies because the technology for turning capital and labor into goods and services varies.

14. The neoclassical theory of distribution:
    A) was developed by Karl Marx.
    B) is rejected by most economists today.
    C) shows that the national income of an economy is not equal to total output.
    D) is a theory of how national income is divided among the factors of production.

15. The price received by each factor of production for its services is determined by:
    A) demand for output and supply of factors.
    B) demand for factors and supply of output.
    C) demand and supply of output.
    D) demand and supply of factors.

16. When factor supply is fixed and quantity of the factor is graphed on the horizontal axis while factor price is graphed on the vertical axis, the factor:
    A) supply curve is horizontal.
    B) supply curve is vertical.
    C) supply curve slopes up to the right.
    D) demand curve slopes up to the right.

17. A competitive firm:
    A) is small relative to the market in which it trades.
    B) has to charge a lower price when it wants to sell more goods.
    C) has several large competitors with whom it engages in fierce competition.
    D) can set the wage at which it hires workers.

18. A firm's economic profit is:
    A) the price of output minus the wage minus the rental price of capital.
    B) revenue minus costs.
    C) revenue plus capital costs.
    D) the price of output minus labor costs.

19. A competitive firm chooses the:
    A) price at which to sell the product produced.
    B) wage to pay labor.
    C) quantity of labor and capital to employ.
    D) rental price to pay capital.

20. The marginal product of labor is:
    A) output divided by labor input.
    B) additional output produced when one additional unit of labor is added.
    C) additional output produced when one additional unit of labor and one additional unit of capital are added.
    D) value of additional output when one dollar's worth of additional labor is added.

21. The property of diminishing marginal product means that, after a point, when additional quantities of:
    A) a factor are added, output diminishes.
    B) both labor and capital are added, output diminishes.
    C) both labor and capital are added, the marginal product of labor diminishes.
    D) a factor is added when another factor remains fixed, the marginal product of that factor diminishes.

22. A competitive, profit-maximizing firm hires labor until the:
    A) marginal product of labor equals the wage.
    B) price of output multiplied by the marginal product of labor equals the wage.
    C) real wage equals the real rental price of capital.
    D) wage equals the rental price of capital.

23. The real wage is the return to labor measured in:
    A) dollars.
    B) units of output.
    C) units of labor.
    D) units of capital.

24. The marginal product of capital is:
   A)   output divided by capital input.
   B)   additional output produced when one additional unit of capital is added.
   C)   additional output produced when one additional unit of capital and one additional unit of labor are added.
   D)   value of additional output when one dollar's worth of additional capital is added.

25. The real rental price of capital is the price per unit of capital measured in:
   A)   dollars.
   B)   units of output.
   C)   units of labor.
   D)   units of capital.

26. The real wage will increase if:
   A)   the supply of labor increases.
   B)   the productivity of labor increases.
   C)   the price of output increases.
   D)   the supply of capital decreases.

27. An increase in the supply of capital will:
   A)   increase the real rental price of capital.
   B)   decrease the real rental price of capital.
   C)   increase the productivity of capital.
   D)   decrease the real interest rate.

28. In the classical model, what adjusts to eliminate any unemployment of labor in the economy?
   A)   the average price level
   B)   the interest rate
   C)   the real rental price of capital
   D)   the real wage

29. The neoclassical theory of distribution explains the allocation of:
   A)   output between goods and services.
   B)   output among consumption, investment, and government spending.
   C)   income among factors of production.
   D)   income between saving and investment.

30. Economic profit is zero if:
    A) all factors are paid their marginal products and the law of diminishing returns is valid.
    B) all factors are paid their marginal products and there are constant returns to scale.
    C) all firms maximize profits and none are competitive.
    D) all firms maximize profits and all factors are paid their marginal products.

31. According to Euler's theorem, if competitive firms pay each factor its marginal product and the production function has constant returns to scale, the sum of all factor payments will equal:
    A) total investment.
    B) total saving.
    C) total profits.
    D) total output.

32. Accounting profit is:
    A) economic profit minus the return to capital.
    B) equal to economic profit.
    C) economic profit plus the return to capital.
    D) equal to the economic return to capital.

33. According to the neoclassical theory of distribution, if firms are competitive and subject to constant returns to scale, total income in the economy is distributed:
    A) only to the labor used in production.
    B) partly between labor and capital used in production, with the surplus going to the owners of the firm as profits.
    C) equally between the labor and capital used in production.
    D) between the labor and capital used in production, according to their marginal productivities.

34. According to the neoclassical theory of distribution, total output is divided between payments to capital and payments to labor depending on their:
    A) supply.
    B) equilibrium growth rates.
    C) relative political power.
    D) marginal productivities.

35. What determines the distribution of national income between labor and capital in a competitive, profit-maximizing economy with constant returns to scale?
    A)   the relative quantity of labor to capital
    B)   the interest rate
    C)   the ratio of public saving to private saving
    D)   the marginal productivity of labor relative to the marginal productivity of capital

36. In fourteenth-century Europe, the bubonic plague:
    A)   reduced the population of Europe by about one-half.
    B)   substantially increased economic output in Europe.
    C)   substantially increased real rentals on land in Europe.
    D)   substantially increased real wages in Europe.

37. With a Cobb–Douglas production function, the share of output going to labor:
    A)   decreases as the amount of labor increases.
    B)   increases as the amount of labor increases.
    C)   increases as the amount of capital increases.
    D)   is independent of the amount of labor.

38. If output is described by the production function $Y = AK^{0.2}L^{0.8}$, then the production function has:
    A)   constant returns to scale.
    B)   diminishing returns to scale.
    C)   increasing returns to scale.
    D)   a degree of returns to scale that cannot be determined from the information given.

39. If $Y = AK^{0.5}L^{0.5}$ and A, K, and L are all 100, the marginal product of capital is:
    A)   50.
    B)   100.
    C)   200.
    D)   1000.

40. Since 1960, the U.S. ratio of labor income to total income has:
    A)   been about 2.5 to 1.
    B)   been about 0.7.
    C)   increased steadily.
    D)   decreased steadily.

41. If the production function describing an economy is $Y = 100\ K^{.25}L^{.75}$, then the share of output going to labor:
    A) is 25 percent.
    B) is 75 percent.
    C) depends on the quantities of labor and capital.
    D) depends on the state of technology.

42. In a Cobb–Douglas production function the marginal product of labor will increase if:
    A) the quantity of labor increases.
    B) the quantity of capital increases.
    C) capital's share of output increases.
    D) average labor productivity decreases.

43. In a Cobb–Douglas production function the marginal product of capital will increase if:
    A) the quantity of labor increases.
    B) the quantity of capital increases.
    C) labor's share of output increases.
    D) average capital productivity decreases.

44. According to Goldin and Katz, the increasing income inequality of recent decades is the result of:
    A) increases in the rates of technological advance and educational attainment.
    B) decreases in the rates of technological advance and educational attainment.
    C) a steady pace of technological advance and a slowdown in educational advance.
    D) a decrease in the rate of technological advance and an increase in the rate of educational advance.

45. Skill-biased technological change _____ the demand for high-skilled workers, while the slowdown in the pace of educational advancement reduces the supply of skilled workers, resulting in relatively _____ wages for skilled workers.
    A) increases; higher
    B) increases; lower
    C) decreases; higher
    D) decreases; lower

46. The public policy implication of Goldin and Katz's analysis of growing income inequality is that reversing this trend will require that more of society's resources be put into:
    A) space exploration.
    B) capital expenditures.
    C) education.
    D) transfer payments.

47. Estimates by Goldin and Katz indicate that the financial returns of a year of college _____ between 1980 and 2005.
    A) increased.
    B) decreased.
    C) did not change.
    D) were negative.

48. According to the neoclassical theory of distribution, in an economy described by a Cobb–Douglas production function, workers should experience high rates of real wage growth when:
    A) real interest rates are high.
    B) real interest rates are low.
    C) average labor productivity is growing rapidly.
    D) capital's share of income is growing rapidly.

49. According to the neoclassical theory of distribution, in an economy described by a Cobb–Douglas production function, when average labor productivity is growing rapidly:
    A) labor's share of total income will be increasing.
    B) labor's share of income will be decreasing.
    C) workers will experience high rates of real wage growth.
    D) economic profits will be positive.

50. In a closed economy, the components of GDP are:
    A) consumption, investment, government purchases, and exports.
    B) consumption, investment, government purchases, and net exports.
    C) consumption, investment, and government purchases.
    D) consumption and investment.

51. The demand for output in a closed economy is the sum of:
    A) public saving and private saving.
    B) the quantity of capital and labor and production technology.
    C) consumption, investment, and government spending.
    D) government purchases and transfer payments minus tax receipts.

52. Disposable personal income is defined as income after the payment of all:
    A) taxes.
    B) interest.
    C) loans.
    D) social insurance contributions.

53. A consumption function shows the relationship between consumption and:
    A) income.
    B) personal income.
    C) disposable income.
    D) taxes.

54. Consumption depends _____ on disposable income, and investment depends _____ on the real interest rate.
    A) positively; positively
    B) positively; negatively
    C) negatively; negatively
    D) negatively; positively

55. The marginal propensity to consume is:
    A) normally expected to be between zero and one.
    B) equal to consumption divided by disposable income.
    C) normally assumed to decrease as disposable income increases.
    D) normally assumed to increase as disposable income increases.

56. If the consumption function is given by $C = 500 + 0.5(Y – T)$, and Y is 6,000 and T is given by $T = 200 + 0.2Y$, then C equals:
    A) 2,500.
    B) 2,800.
    C) 3,500.
    D) 4,200.

57. If the consumption function is given by the equation $C = 500 + 0.5Y$, the production function is $Y = 50K^{0.5}L^{0.5}$, where $K = 100$ and $L = 100$, then C equals:
    A)   1,000.
    B)   2,500.
    C)   3,000.
    D)   5,000.

58. If the consumption function is given by $C = 150 + 0.85Y$ and Y increases by 1 unit, then C increases by:
    A)   0.15 units.
    B)   0.5 units.
    C)   0.85 units.
    D)   1 unit.

59. If the consumption function is given by $C = 150 + 0.85Y$ and Y increases by 1 unit, then savings:
    A)   decreases by 0.85 units.
    B)   decreases by 0.15 units.
    C)   increases by 0.15 units.
    D)   increases by 0.85 units.

60. If the consumption function is given by $C = 150 + 0.85(Y - T)$ and T increases by 1 unit, then savings:
    A)   decreases by 0.85 units.
    B)   decreases by 0.15 units.
    C)   increases by 0.15 units.
    D)   increases by 0.85 units.

61. Assume that the consumption function is given by $C = 150 + 0.85(Y - T)$ and the tax function is given by $T = t_0 + t_1Y$. If t_0 increases by 1 unit, then consumption:
    A)   decreases by 0.85 units.
    B)   decreases by 0.15 units.
    C)   increases by 0.15 units.
    D)   increases by 0.85 units.

62. Assume that the consumption function is given by $C = 150 + 0.85(Y - T)$, the tax function is given by $T = t_0 + t_1Y$, and Y is 5,000. If t_1 decreases from 0.3 to 0.2, then consumption increases by:
  A) 85.
  B) 425.
  C) 500.
  D) 525.

63. Assume that the consumption function is given by $C = 200 + 0.7(Y - T)$, the tax function is given by $T = 100 + t_1Y$, and $Y = 50K^{0.5}L^{0.5}$, where $K = 100$ and $L = 100$. If t_1 increases from 0.2 to 0.25, then consumption decreases by:
  A) 70.
  B) 140.
  C) 175.
  D) 250.

64. Assume that the consumption function is given by $C = 200 + 0.7(Y - T)$, the tax function is given by $T = 100 + 0.2Y$, and $Y = 50K^{0.5}L^{0.5}$, where $K = 100$. If L increases from 100 to 144, then consumption increases by:
  A) 560.
  B) 840.
  C) 1,120.
  D) 2,120.

65. Investment goods as measured in the GDP are purchased by:
  A) business firms alone.
  B) households alone.
  C) business firms and households.
  D) business firms, households, and governments.

66. Total investment in the United States averages about _____ percent of GDP.
  A) 10
  B) 15
  C) 20
  D) 25

67. Other things equal, an increase in the interest rate leads to:
    A) a decrease in the quantity of investment goods demanded.
    B) no change in the quantity of investment goods demanded.
    C) an increase in the quantity of investment goods demanded.
    D) sometimes an increase and sometimes a decrease in the quantity of investment goods demanded.

68. When economists speak of "the" interest rate, they mean:
    A) the rate on 90-day Treasury bills.
    B) the rate on 30-year government bonds.
    C) the "prime" rate on loans.
    D) no particular interest rate, since it is assumed that various interest rates tend to move up and down together.

69. Assume that a firm wants to build a factory that will cost $5 million. It believes that it can get a return of $600,000 in one year and then can sell the used factory for its original cost. The rate of return on this investment would be:
    A) 6 percent.
    B) 12 percent.
    C) 18 percent.
    D) 30 percent.

70. Assume that a firm is considering building a factory that will cost $5 million. It believes that it can get a profit from this factory of $600,000 per year for many years. The interest rate at which the firm can borrow money is 15 percent. After evaluating whether it should build the factory, the firm decides that it should:
    A) not build because the rate of return on the factory is only 6 percent.
    B) not build because the rate of return on the factory is only 12 percent.
    C) build because the rate of return on the factory is 30 percent.
    D) build because the rate of return on the factory is 35 percent.

71. The home that would have the highest mortgage payment on a 30-year fixed-rate mortgage would be a home with a mortgage of:
    A) $200,000 at 8 percent.
    B) $100,000 at 12 percent.
    C) $100,000 at 8 percent.
    D) $200,000 at 12 percent.

72. The *nominal* interest rate is the:
    A) rate of interest that investors pay to borrow money.
    B) same as the real interest rate.
    C) rate of inflation minus the real rate of interest.
    D) real rate of interest minus the rate of inflation.

73. The *real* interest rate is the:
    A) rate of interest actually paid by consumers.
    B) rate of interest actually paid by banks.
    C) rate of inflation minus the nominal interest rate.
    D) nominal interest rate minus the rate of inflation.

74. Assume that the investment function is given by $I = 1,000 - 30r$, where r is the real rate of interest (in percent). Assume further that the nominal rate of interest is 10 percent and the inflation rate is 2 percent. According to the investment function, investment will be:
    A) 240.
    B) 700.
    C) 760.
    D) 970.

75. The investment function slopes _____ because there are _____ investment projects that are profitable as the interest rate decreases.
    A) upward; fewer
    B) upward; more
    C) downward; fewer
    D) downward; more

76. Consumption depends positively on _____ and investment depends negatively on _____.
    A) disposable income; the real interest rate
    B) the real interest rate; disposable income
    C) private saving; public saving
    D) public saving; private saving

77. The government spending component of GDP includes *all* of the following *except*:
    A) federal spending on goods.
    B) state and local spending on goods.
    C) federal spending on transfer payments.
    D) federal spending on services.

78. If government purchases exceed taxes minus transfer payments, then the government budget is:
   A) balanced.
   B) in deficit.
   C) in surplus.
   D) endogenous.

79. *All* of the following actions increase government purchases of goods and services *except* the:
   A) federal government's sending a Social Security check to Betty Jones.
   B) federal governments sending a paycheck to the president of the United States.
   C) federal government's buying a Patriot missile.
   D) city of Boston's buying a library book.

80. Government transfer payments:
   A) are included as part of government purchases, *G*.
   B) can be viewed as negative tax payments, *T*.
   C) are received as payment for inputs in the factor market.
   D) do not affect the level of public or private saving.

81. In examining the impact of fiscal policy, it is assumed that:
   A) consumption, investment, and the interest rate are endogenous variables.
   B) consumption, investment, and the interest rate are exogenous variables.
   C) government purchases, taxes, and interest rates are endogenous variables.
   D) government purchases, taxes, and interest rates are exogenous variables.

82. In a classical model with fixed factors of production and flexible prices, the amount of consumption spending depends on _____ , the amount of investment spending depends on _____, and the amount of government spending is determined _____.
   A) the interest rate; disposable income; by tax revenue
   B) the real wage; the real rental price of capital; by factor prices
   C) labor's share of output; capital's share of output; by the interest rate
   D) disposable income; the interest rate; exogenously

83. In the classical model with fixed output, the supply and demand for goods and services are balanced by:
   A) government spending.
   B) taxes.
   C) fiscal policy.
   D) the interest rate.

84. The equation $\overline{Y} = C(\overline{Y} - \overline{T}) + I(r) + \overline{G}$ may be solved for the equilibrium level of:
   A) income.
   B) consumption.
   C) government purchases.
   D) the interest rate.

85. The demand for the economy's output:
   A) is always equal to the supply, regardless of the interest rate.
   B) may be computed provided that we know disposable income.
   C) is equal to consumption, investment, and government purchases.
   D) is determined by government purchases and taxes.

86. In the classical model with fixed income, if the demand for goods and services is less than the supply, the interest rate will:
   A) increase.
   B) decrease.
   C) remain unchanged.
   D) either increase or decrease, depending on whether consumption is greater or less than investment.

87. In the classical model with fixed income, if the demand for goods and services is greater than the supply, the interest rate will:
   A) increase.
   B) decrease.
   C) remain unchanged.
   D) either increase or decrease, depending on whether consumption is greater or less than investment.

88. In the classical model with fixed income, if the interest rate is too low, then investment is too _____ and the demand for output _____ the supply.
   A) high; exceeds
   B) high; falls short of
   C) low; exceeds
   D) low; falls short of

89. In the classical model with fixed income, if the interest rate is too high, then investment is too _____ and the demand for output _____ the supply.
   A) high; exceeds
   B) high; falls short of
   C) low; exceeds
   D) low; falls short of

90. National saving refers to:
   A) disposable income minus consumption.
   B) taxes minus government spending.
   C) income minus consumption minus government spending.
   D) income minus investment.

91. Public saving is:
   A) always positive.
   B) always negative.
   C) always zero.
   D) either positive, negative, or zero.

92. In a closed economy, $Y - C - G$ equals:
   A) national saving.
   B) private saving.
   C) public saving.
   D) financial saving.

93. In a closed economy, private saving equals:
   A) $Y - C - G$.
   B) $Y - T - C$.
   C) $Y - I - C$.
   D) $Y - T$.

94. The factor that makes national saving equal investment, in equilibrium, is:
   A) the interest rate.
   B) private saving.
   C) public saving.
   D) fiscal policy.

95. Private saving is:
    A) income minus consumption minus government spending.
    B) disposable income minus consumption.
    C) disposable income minus government spending.
    D) taxes minus government spending.

96. Public saving is:
    A) income minus consumption minus government spending.
    B) disposable income minus consumption.
    C) disposable income minus government spending.
    D) government revenue minus government spending.

97. National saving is:
    A) private saving.
    B) public saving.
    C) private saving plus public saving.
    D) private saving minus public saving.

98. If disposable income is 4,000, consumption is 3,500, government spending is 1,000, and taxes minus transfers are 800, national saving is equal to:
    A) 300.
    B) 500.
    C) 700.
    D) 1,000.

99. If income is 4,800, consumption is 3,500, government spending is 1,000, and taxes minus transfers are 800, private saving is:
    A) 300.
    B) 500.
    C) 1,000.
    D) 1,300.

100. If income is 4,800, consumption is 3,500, government spending is 1,000, and taxes minus transfers are 800, public saving is:
    A) –200.
    B) 200.
    C) 500.
    D) 1,800.

101. In equilibrium, total investment equals:
    A)   private saving.
    B)   public saving.
    C)   national saving.
    D)   household saving.

102. The demand for loanable funds is equivalent to:
    A)   national saving.
    B)   private saving.
    C)   public saving.
    D)   investment.

103. The supply of loanable funds is equivalent to:
    A)   national saving.
    B)   private saving.
    C)   public saving.
    D)   investment.

104. The supply and demand for loanable funds determines the:
    A)   real wage.
    B)   real rental price of capital.
    C)   real interest rate.
    D)   nominal interest rate.

105. If saving exceeds investment demand, and consumption is not a function of the interest rate:
    A)   the demand for loans exceeds the supply of loans.
    B)   the interest rate will fall.
    C)   the interest rate will rise.
    D)   saving will fall.

106. In the classical model with fixed income, if households want to save more than firms want to invest, then:
    A)   the interest rate rises.
    B)   the interest rate falls.
    C)   output increases.
    D)   output falls.

107. When the demand for loanable funds exceeds the supply of loanable funds, households want to save _____ than firms want to invest and the interest rate _____.
    A) more; rises
    B) more; falls
    C) less; rises
    D) less; falls

108. Assume that equilibrium GDP (Y) is 5,000. Consumption (C). is given by the equation $C = 500 + 0.6Y$. No government exists. In this case, equilibrium investment is:
    A) 1,500.
    B) 2,000.
    C) 2,500.
    D) 3,000.

109. Assume that equilibrium GDP (Y) is 5,000. Consumption (C) is given by the equation $C = 500 + 0.6(Y - T)$. Taxes (T) are equal to 1,000. Government spending is 600. In this case, equilibrium investment is:
    A) 600.
    B) 1,100.
    C) 1,500.
    D) 2,200.

110. Assume that equilibrium GDP (Y) is 5,000. Consumption (C) is given by the equation $C = 500 + 0.6Y$. Investment (I) is given by the equation $I = 2,000 - 100r$, where r is the real interest rate in percent. No government exists. In this case, the equilibrium real interest rate is:
    A) 2 percent.
    B) 5 percent.
    C) 10 percent.
    D) 20 percent.

111. Assume that equilibrium GDP (Y) is 5,000. Consumption (C) is given by the equation $C = 500 + 0.6(Y - T)$. Taxes (T) are equal to 600. Government spending is equal to 1,000. Investment is given by the equation $I = 2,160 - 100r$, where r is the real interest rate in percent. In this case, the equilibrium real interest rate is:
    A) 5 percent.
   B) 8 percent.
    C) 10 percent.
    D) 13 percent.

112. According to the model developed in Chapter 3, when government spending increases without a change in taxes:
    A) consumption increases.
    B) consumption decreases.
    C) investment increases.
    D) investment decreases.

113. According to the model developed in Chapter 3, when taxes decrease without a change in government spending:
    A) consumption and investment both increase.
    B) consumption and investment both decrease.
    C) consumption increases and investment decreases.
    D) consumption decreases and investment increases.

114. According to the model developed in Chapter 3, when government spending increases and taxes increase by an equal amount:
    A) consumption and investment both increase.
    B) consumption and investment both decrease.
    C) consumption increases and investment decreases.
    D) consumption decreases and investment increases.

115. According to the model developed in Chapter 3, when government spending increases but taxes are not raised, interest rates:
    A) increase.
    B) are unchanged.
    C) decrease.
    D) can vary.

116. According to the model developed in Chapter 3, when taxes are increased but government spending is unchanged, interest rates:
    A) increase.
    B) are unchanged.
    C) decrease.
    D) can vary wildly.

117. In a closed economy with fixed output, when government spending increases:
    A) private saving decreases.
    B) private saving increases.
    C) public saving decreases.
    D) public saving increases.

118. In the neoclassical model with fixed income, if there is a decrease in government spending with no change in taxes, then public saving _____ and private saving _____.
    A) increases; increases.
    B) increases; does not change
    C) decreases; increases
    D) decreases; does not change

119. Crowding out occurs when an increase in government spending _____ the interest rate and investment _____.
    A) increases; increases
    B) increases; decreases
    C) decreases; increases
    D) decreases; decreases

120. The reduction in investment brought about by the increase in the interest rate caused by increased government spending is called:
    A) a budget deficit.
    B) fiscal policy.
    C) the identification problem.
    D) crowding out.

121. In the United Kingdom between 1730 and 1920, during wartime, government spending tended to increase:
    A) but the interest rate did not increase.
    B) and the interest rate also increased.
    C) but the interest rate decreased.
    D) and the interest rate remained constant.

122. In the classical model with fixed income, an increase in the real interest rate could be the result of a(n):
    A) increase in government spending.
    B) decrease in government spending.
    C) decrease in desired investment.
    D) increase in taxes.

123. In the classical model with fixed income a decrease in the real interest rate could be the result of a(n):
   A)   increase in government spending.
   B)   increase in desired investment.
   C)   increase in taxes.
   D)   decrease in taxes.

124. In the classical model with fixed income, a reduction in the government budget deficit will lead to a:
   A)   higher real interest rate.
   B)   lower real interest rate.
   C)   higher level of output.
   D)   lower level of output.

125. When government spending increases and taxes are increased by an equal amount, interest rates:
   A)   increase.
   B)   remain the same.
   C)   decrease.
   D)   can vary wildly.

126. In the neoclassical model with fixed income, if there is a decrease in taxes with no change in government spending, then public saving _____ and private saving _____.
   A)   increases; increases
   B)   increases; decreases
   C)   decreases; increases
   D)   decreases; does not change

Use the following to answer questions 127-130:

Exhibit: Saving, Investment, and the Interest Rate 1
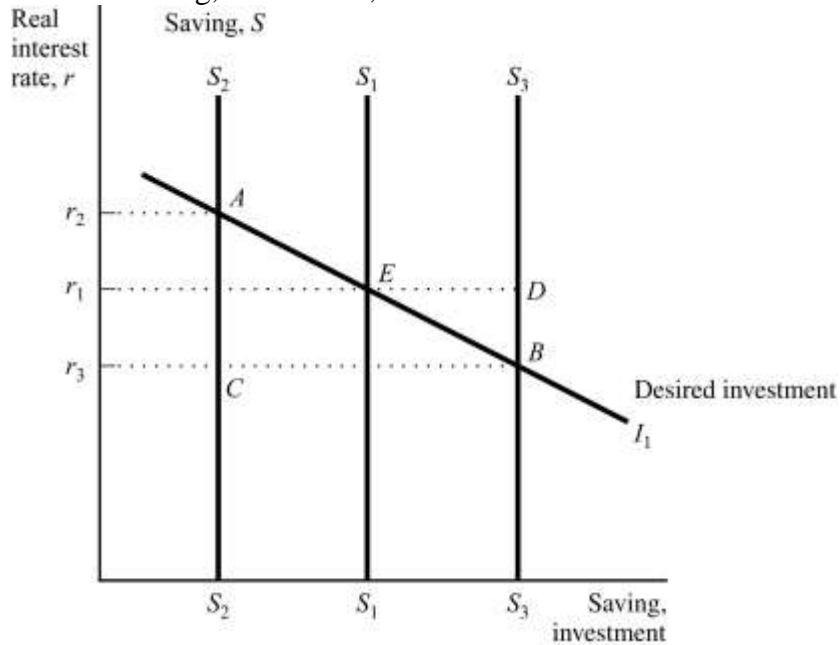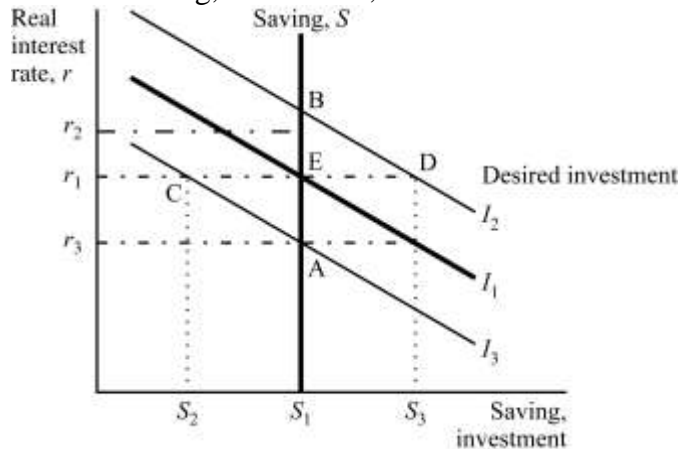

127. (Exhibit: Saving, Investment, and the Interest Rate 1) The economy begins in equilibrium at Point E, representing the real interest rate, r_1, at which saving, S_1, equals desired investment, I_1. What will be the new equilibrium combination of real interest rate, saving, and investment if the government cuts spending, holding other factors constant?
A) Point A
B) Point B
C) Point C
D) Point D

128. (Exhibit: Saving, Investment, and the Interest Rate 1) The economy begins in equilibrium at Point E, representing the real interest rate, r_1, at which saving, S_1, equals desired investment, I_1. What will be the new equilibrium combination of real interest rate, saving, and investment if the government cuts taxes, holding other factors constant?
A) Point A
B) Point B
C) Point C
D) Point D

129. (Exhibit: Saving, Investment, and the Interest Rate 1) The economy begins in equilibrium at Point E, representing the real interest rate, r_1, at which saving, S_1, equals desired investment, I_1. What will be the new equilibrium combination of real interest rate, saving, and investment if the government increases spending, holding other factors constant?
   A) Point A
   B) Point B
   C) Point C
   D) Point D

130. (Exhibit: Saving, Investment, and the Interest Rate 1) The economy begins in equilibrium at Point E, representing the real interest rate, r_1, at which saving, S_1, equals desired investment, I_1. What will be the new equilibrium combination of real interest rate, saving, and investment if the government raises taxes, holding other factors constant?
   A) Point A
   B) Point B
   C) Point C
   D) Point D

131. Use the model developed in Chapter 3 and assume that consumption does not depend on the interest rate. In this case, when there is a technological advance that leads to an increase in investment demand:
   A) investment increases and the interest rate rises.
   B) investment is unchanged and the interest rate rises.
   C) investment and the interest rate are both unchanged.
   D) investment increases and the interest rate falls.

132. Use the model developed in Chapter 3 and assume that consumption does not depend on the interest rate. In this case, when the government lowers taxes on business investment, thus increasing desired investment, but does not change government spending or change any taxes that affect disposable income, then the quantity of investment:
   A) increases and the interest rate rises.
   B) is unchanged and the interest rate rises.
   C) and the interest rate are both unchanged.
   D) decreases and the interest rate rises.

133. Use the model developed in Chapter 3, but assume that consumption decreases, other things being equal, when the interest rate rises. If there is a technological advance that leads to an increase in investment demand:
    A)   investment increases and the interest rate rises.
    B)   investment is unchanged and the interest rate rises.
    C)   investment and the interest rate are both unchanged.
    D)   investment decreases and the interest rate rises.

134. When there is a fixed supply of loanable funds, an increase in investment demand results in a(n):
    A)   higher interest rate.
    B)   lower interest rate.
    C)   increase in investment.
    D)   decrease in investment.

135. When saving (the supply of loanable funds) increases as the interest rate increases, an increase in investment demand results in a _____ interest rate and _____ in the quantity of investment.
    A)   higher; no change
    B)   higher; an increase
    C)   lower; no change
    D)   lower; an increase

136. Suppose that GDP (Y) is 5,000. Consumption (C) is given by the equation $C = 500 + 0.5(Y - T)$. Investment (I) is given by the equation $I = 2,000 - 100r$, where r is the real interest rate in percent. Government spending (G) is 1,000 and taxes (T) is also 1,000. When a technological innovation changes the investment function to $I = 3,000 - 100r$:
    A) I rises by 1,000 and r rises by 10 percentage points.
    B) I rises by 1,000 and r is unchanged.
    C) I is unchanged and r rises by 10 percentage points.
    D) I is unchanged and r rises by 15 percentage points.

Use the following to answer questions 137-138:

Exhibit: Saving, Investment, and the Interest Rate 2

137. (Exhibit: Saving, Investment, and the Interest Rate 2) The economy begins in equilibrium at Point E, representing the real interest rate, r_1, at which saving, S_1, equals desired investment, I_1. What will be the new equilibrium combination of real interest rate, saving, and investment if there is a technological innovation that increases the demand for investment goods?
   A)   Point A
   B)   Point B
   C)   Point C
   D)   Point D

138. (Exhibit: Saving, Investment, and the Interest Rate 2) The economy begins in equilibrium at Point E, representing the real interest rate, r_1, at which saving, S_1, equals desired investment, I_1. What will be the new equilibrium combination of real interest rate, saving, and investment if there is a tax law change that makes investment projects less profitable and decreases the demand for investment goods (but does not change the amount of taxes collected in the economy)?
   A)   Point A
   B)   Point B
   C)   Point C
   D)   Point D

139. If increased immigration raises the labor force, the neoclassical theory of distribution predicts:
A) the real wage will rise and the real rental price of capital will fall.
B) both the real wage and the real rental price of capital will fall.
C) both the real wage and the real rental price of capital will rise.
D) the real wage will fall and the real rental price of capital will rise.

140. If an earthquake destroys some of the capital stock, the neoclassical theory of distribution predicts:
A) the real wage will rise and the real rental price of capital will fall.
B) both the real wage and the real rental price of capital will fall.
C) both the real wage and the real rental price of capital will rise.
D) the real wage will fall and the real rental price of capital will rise.

141. If a neutral technological advance improves the production function, the neoclassical theory of distribution predicts:
A) the real wage will rise and the real rental price of capital will fall.
B) both the real wage and the real rental price of capital will fall.
C) both the real wage and the real rental price of capital will rise.
D) the real wage will fall and the real rental price of capital will rise.

142. An example of decreasing returns to scale is when capital and labor inputs:
A) both increase 10 percent and output increases 5 percent.
B) both increase 10 percent and output increases 10 percent.
C) both increase 5 percent and output increases 10 percent.
D) do not change and output increases 5 percent.

143. An example of increasing returns to scale is when capital and labor inputs:
A) both increase 10 percent and output increases 5 percent.
B) both increase 10 percent and output increases 10 percent.
C) both increase 5 percent and output increases 10 percent.
D) do not change and output decreases 5 percent.

144. If the productivity of farmers has risen substantially over time because of technological progress, and workers can move freely between being farmers and barbers, the neoclassical theory of distribution predicts that the real wage(s) of:
   A)   both barbers and farmers should have remained constant over time.
   B)   both barbers and farmers should have risen over time.
   C)   farmers should have risen while the real wage of barbers should have remained constant.
   D)   barbers should have risen while the real wage of farmers should have remained constant.

145. The government raises lump-sum taxes on income by $100 billion, and the neoclassical economy adjusts so that output does not change. If the marginal propensity to consume is 0.6, private saving:
   A)   rises by $40 billion.
   B)   rises by $60 billion.
   C)   falls by $60 billion.
   D)   falls by $40 billion.

146. The government raises lump-sum taxes on income by $100 billion, and the neoclassical economy adjusts so that output does not change. If the marginal propensity to consume is 0.6, public saving:
   A)   rises by $100 billion.
   B)   rises by $60 billion.
   C)   falls by $60 billion.
   D)   falls by $100 billion.

147. The government raises lump-sum taxes on income by $100 billion, and the neoclassical economy adjusts so that output does not change. If the marginal propensity to consume is 0.6, national saving:
   A)   rises by $100 billion.
   B)   rises by $60 billion.
   C)   falls by $60 billion.
   D)   falls by $100 billion.

148. The government raises lump-sum taxes on income by $100 billion, and the neoclassical economy adjusts so that output does not change. If the marginal propensity to consume is 0.6, investment:
   A)   rises by $100 billion.
   B)   rises by $60 billion.
   C)   falls by $60 billion.
   D)   falls by $100 billion.

149. Assume that an increase in consumer confidence raises consumers' expectations of future income and thus the amount they want to consume today for any given income. This shift, in a neoclassical economy, will:
A) lower investment and raise the interest rate.
B) raise investment and lower the interest rate.
C) lower both investment and the interest rate.
D) raise both investment and the interest rate.

150. In a neoclassical economy, assume that the government lowers both government spending and taxes by the same amount. By doing so:
A) investment falls and the interest rate rises.
B) investment rises and the interest rate falls.
C) investment and the interest rate both fall.
D) investment and the interest rate both rise.

151. In a neoclassical economy, assume that the government lowers both government spending and taxes by $100 billion. If the marginal propensity to consume is 0.6, investment will:
A) rise $100 billion.
B) rise $60 billion.
C) rise $40 billion.
D) not change.

152. In a neoclassical economy, if consumption increases as the interest rate decreases, then a $10 billion rise in government spending would:
A) still crowd out exactly $10 billion of investment.
B) crowd out between zero and $10 billion of investment.
C) not crowd out any investment.
D) crowd out more than $10 billion of investment.

153. Assume that the production function is Cobb–Douglas with parameter $\alpha = 0.3$. If factors are paid their marginal products, capital and labor, respectively, receive the shares of income:
A) 0.3 and 0.3.
B) 0.7 and 0.7.
C) 0.3 and 0.7.
D) 0.7 and 0.3.

154. Assume that the production function is Cobb–Douglas with parameter $\alpha = 0.3$. In the neoclassical model, if the labor force increases by 10 percent, then output:
    A) increases by about 10 percent.
    B) increases by about 7 percent.
    C) increases by about 3 percent.
    D) does not increase since the new workers are unemployed.

155. In an economy with flexible prices, competitive factor markets and fixed supplies of the factors of production, graphically illustrate the impact of a change in immigration policy in a country that permits a huge influx of foreign workers into the labor market, ceteris paribus. Be sure to label: i. the axes; ii. the curves; iii. the initial equilibrium values; iv. the direction the curve's shift; and v. the terminal equilibrium values. Explain in words how the equilibrium values of labor, the real wage, saving, investment, and the real interest rate change.

156. In an economy with flexible prices, competitive factor markets, and fixed supplies of the factors of production, graphically illustrate the impact of an advance in technology that greatly improves the productivity of capital, ceteris paribus. Be sure to label: i. the axes; ii. the curves; iii. the initial equilibrium values; iv. the direction the curves shift; and v. the terminal equilibrium values. Explain in words how the equilibrium values change.

157. In an economy with flexible prices, competitive factor markets, and fixed supplies of the factors of production, graphically illustrate the impact of a deadly virus that kills a large part of the labor force, but leaves the other factors of production untouched, ceteris paribus. Be sure to label: i. the axes; ii. the curves; iii. the initial equilibrium values; iv. the direction the curves shift; and v. the terminal equilibrium values. Explain in words how the equilibrium values change.

158. Assume that the production function is given by $Y = AK^{0.5}L^{0.5}$, where Y is GDP, K is capital stock, and L is labor. The parameter A is equal to 10. Assume also that capital is 100, labor is 400, and both capital and labor are paid for their marginal products.
    a. What is Y?
    b. What is the real wage of labor?
    c. What is the real rental price of capital (the amount of output paid per unit of capital)?

159. Assume that GDP (Y) is 6,000. Consumption (C). is given by the equation $C = 600 +$ $0.6(Y - T)$. Investment (I) is given by the equation $I = 2,000 - 100r$, where r is the real rate of interest in percent. Taxes (T) are 500 and government spending (G) is also 500.
    a. What are the equilibrium values of C, I, and r?
    b. What are the values of private saving, public saving, and national saving?
    c. If government spending rises to 1,000, what are the new equilibrium values of C, I, a[...]
    d. What are the new equilibrium values of private saving, public saving, and national sa[...]

160. Assume that GDP (Y) is 5,000. Consumption (C). is given by the equation $C = 1,000 +$ $0.3(Y - T)$. Investment (I) is given by the equation $I = 1,500 - 50r$, where r is the real interest rate in percent. Taxes (T) are 1,000 and government spending (G) is 1,500.
    a. What are the equilibrium values of C, I, and r?
    b. What are the values of private saving, public saving, and national saving?
    c. Now assume there is a technological innovation that makes business want to invest m[...] raises the investment equation to $I = 2,000 - 50r$. What are the new equilibrium value[...] I, and r?
    d. What are the new values of private saving, public saving, and national saving?

161. Assume that GDP (Y) is 5,000. Consumption (C). is given by the equation $C = 1,200 +$ $0.3(Y - T) - 50r$, where r is the real interest rate. Investment (I) is given by the equation $I = 1,500 - 50r$. Taxes (T) are 1,000 and government spending (G) is 1,500.
    a. What are the equilibrium values of C, I, and r?
    b. What are the values of private saving, public saving, and national saving?
    c. Now assume there is a technological innovation that makes business want to invest m[...] raises the investment equation to $I = 2,000 - 50r$. What are the new equilibrium value[...] I, and r?
    d. What are the new values of private saving, public saving, and national saving?

162. a. Suppose a government moves to reduce a budget deficit. Using the long-run model of the economy developed in Chapter 3, graphically illustrate the impact of reducing a government's budget deficit by reducing government purchases. Be sure to label: i. the axes; ii. the curves; iii. the initial equilibrium values; iv. the direction curves shift; and v. the terminal equilibrium values.
    b. State in words what happens to: i. the real interest rate; ii. national saving; iii. investment; iv. consumption; and v. output.

163. a. Suppose a government moves to reduce a budget deficit. Using the long-run model of the economy developed in Chapter 3, graphically illustrate the impact of reducing a government's budget deficit by increasing (lump-sum) taxes on household income. Be sure to label: i. the axes; ii. the curves; iii. the initial equilibrium values; iv. the direction curves shift; and v. the terminal equilibrium values.
    b. State in words what happens to: i. the real interest rate; ii. national saving; iii. investment; iv. consumption; and v. output.

164. a. Suppose a government education program succeeds in getting households to save more (you may interpret this as a downward shift in the consumption function). Using the long-run model of the economy developed in Chapter 3, graphically illustrate the impact of the higher saving rate by households. Be sure to label: i. the axes; ii. the curves; iii. the initial equilibrium values; iv. the direction curves shift; and v. the terminal equilibrium values.
    b. State in words what happens to: i. the real interest rate; ii. national saving; iii. investment; iv. consumption; and v. output.

165. a. Suppose there is a technological breakthrough that increases the productivity of all capital and, consequently, increases the demand for investment. Using the long-run model of the economy developed in Chapter 3, graphically illustrate the impact of the increased investment demand. Be sure to label: i. the axes; ii. the curves; iii. the initial equilibrium values; iv. the direction curves shift; and v. the terminal equilibrium values.
    b. State in words what happens to: i. the real interest rate; ii. national saving; iii. investment; iv. consumption; and v. output.

166. a. Suppose a government decides to reduce spending and (lump-sum) income taxes by the same amount. Using the long-run model of the economy developed in Chapter 3, graphically illustrate the impact of the equal reductions in spending and taxes. Be sure to label: i. the axes; ii. the curves; iii. the initial equilibrium values; iv. the direction curves shift; and v. the terminal equilibrium values.
    b. State in words what happens to: i. the real interest rate; ii. national saving; iii. investment; iv. consumption; and v. output.

167. Consider two competitive economies that have the same quantities of labor ($L = 400$) and capital ($K = 400$), and the same technology ($A = 100$). The economies of the countries are described by the following Cobb–Douglas production functions:
    North Economy: $Y = A\ L^{.3}K^{.7}$
    South Economy: $Y = A\ L^{.7}K^{.3}$
    a. Which economy has the larger total production? Explain.
    b. In which economy is the marginal product of labor larger? Explain.
    c. In which economy is the real wage larger? Explain.
    d. In which economy is labor's share of income larger? Explain.

168. Assume that a competitive economy can be described by a constant returns to scale (Cobb–Douglas) production function and all factors of production are fully employed. Holding other factors constant, including the quantity of capital and technology, carefully explain how a one-time, 10-percent increase in the quantity of labor (perhaps the result of a special immigration policy) will change each of the following:
   a. the level of output produced;
   b. the real wage of labor;
   c. the real rental price of capital;
   d. labor's share of total income.

169. Assume that a competitive economy can be described by a constant returns to scale (Cobb–Douglas) production function and all factors of production are fully employed. Holding other factors constant, including the quantity of labor and technology, carefully explain how a one-time, 50-percent decrease in the quantity of capital (perhaps the result of war damage) will change each of the following:
   a. the level of output produced;
   b. the real wage of labor;
   c. the real rental price of capital;
   d. capital's share of total income.

170. Consider a competitive economy in which factor prices adjust to keep the factors of production fully employed and the interest rate adjusts to keep the supply and demand for goods and services in equilibrium. The economy can be described by the following set of equations:

$$L = \overline{L}, \ K = \overline{K}, \ G = \overline{G}, \ T = \overline{T},$$
$$Y = A K^{\alpha} L^{(1-\alpha)}$$
$$Y = C + I + G$$
$$C = C(Y - T)$$
$$I = I(r)$$

Suggest at least two policies that a government could use to increase the equilibrium quantity of investment in the economy, and carefully explain how these policies produce this result.

171. Consider a competitive economy in which factor prices adjust to keep the factors of production fully employed, and the interest rate adjusts to keep the supply and demand for goods and services in equilibrium. The economy can be described by the following set of equations:

$$L = \bar{L}, \ K = \bar{K}, \ G = \bar{G}, \ T = \bar{T},$$
$$Y = AK^{\alpha}L^{(1-\alpha)}$$
$$Y = C + I + G$$
$$C = C(Y - T)$$
$$I = I(r)$$

How does an increase in government spending, holding other factors constant, affect the level of:
a. public saving?
b. private saving?
c. national saving?
d. the equilibrium interest rate?
e. the equilibrium quantity of investment?

172. Price flexibility plays a key role in the classical model by ensuring that the markets reach equilibrium.
a. Explain which price adjusts to bring equilibrium in the labor market. Describe how th adjusts when demand exceeds supply in this market.
b. Explain which price adjusts to bring equilibrium in the loanable funds market. Descri the price adjusts when supply exceeds demand in this market.

173. Consider a production function for an economy:
$$Y = 20(L^{.5}K^{.4}N^{.1})$$
where L is labor, K is capital, and N is land. In this economy the factors of production are in fixed supply with $L = 100$, $K = 100$, and $N = 100$.
a. What is the level of output in this country?
b. Does this production function exhibit constant returns to scale. Demonstrate by exam
c. If the economy is competitive so that factors of production are paid the value of their marginal products, what is the share of total income will go to land?

174. The economy of   Miniland has an income of $400, consumption is $200,   government expenditure is $200, and the tax earnings of government is $150.

a. Calculate private saving.

b. Calculate public saving.

c. Calculate national saving.

175. The closed economy of Moneyland has total income of $5000, consumption function is $C = 2000 – 30r$, investment function $I = 1500 – 20r$, government spending is $2000, r is nominal interest rate. Inflation is 6 percent. Find the real rate of interest.

176. The production of an economy is explained by a function: $Y = 20 \, (L^5 K^5)$ where L is labor and K is capital with $L = 400$ and $K = 400$. Does this economy support constant returns to scale?

177. After studying the circular flow of dollars in the economy, explain with an example how saving done by households goes back into the circular flow. In reality, does all saving go back as an investment?

178. Suppose people in an economy reduce their saving. What will be the effect on real interest rate and investment?

179. The total output of the closed economy Moneyland is 10,000. Consumption is explained by the function $C = 3,800 + 0.7T – 150r$, where r is the real interest rate. Investment (I) is given by the equation, $I = 1,500 + 50r$. Taxes (T) are 1,000 and government spending (G) is 3,500. What are the values of consumption, investment, and real interest rate?

180. What effect does advancement in technology have upon the equilibrium between real rental price and capital (assuming supply of capital is fixed)?

181. The government of an economy has increased its spending and taxes by the same amount. What is the effect on investment?

182. What is the effect of an increase in interest rate on keeping government spending constant on consumption and investment?

Answer Key

1. D
2. C
3. B
4. A
5. D
6. B
7. C
8. A
9. C
10. B
11. C
12. C
13. A
14. D
15. D
16. B
17. A
18. B
19. C
20. B
21. D
22. B
23. B
24. B
25. B
26. B
27. B
28. D
29. C
30. B
31. D
32. C
33. D
34. D
35. D
36. D
37. D
38. A
39. A
40. B
41. B
42. B
43. A
44. C

45. A
46. C
47. A
48. C
49. C
50. C
51. C
52. A
53. C
54. B
55. A
56. B
57. C
58. C
59. C
60. B
61. A
62. B
63. C
64. A
65. C
66. B
67. A
68. D
69. B
70. B
71. D
72. A
73. D
74. C
75. D
76. A
77. C
78. B
79. A
80. B
81. A
82. D
83. D
84. D
85. C
86. B
87. A
88. A
89. D
90. C

91. D
92. A
93. B
94. A
95. B
96. D
97. C
98. A
99. B
100. A
101. C
102. D
103. A
104. C
105. B
106. B
107. C
108. A
109. C
110. B
111. D
112. D
113. C
114. B
115. A
116. C
117. C
118. B
119. B
120. D
121. B
122. A
123. C
124. B
125. A
126. C
127. B
128. A
129. A
130. B
131. B
132. D
133. A
134. A
135. B
136. C

137. B
138. A
139. D
140. D
141. C
142. A
143. C
144. B
145. D
146. A
147. B
148. B
149. A
150. B
151. C
152. B
153. C
154. B
155.
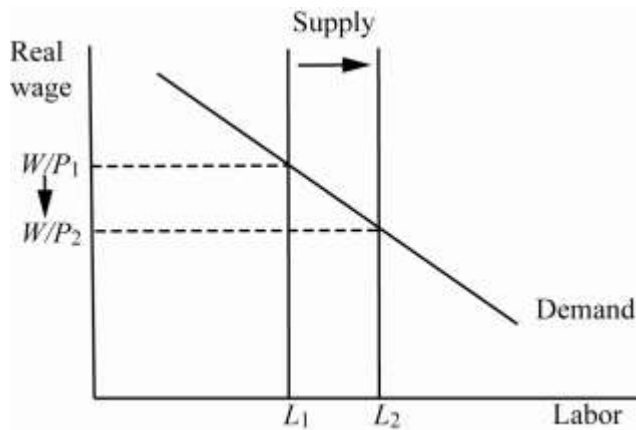
The supply of labor force increases, which forces the real wage lower and increases the quantity of labor employed, since there is no unemployment in this model. Output (Y) increases as labor increases, national saving ($Y - C - G$) increases, which makes the equilibrium rate of interest fall to bring national saving and investment into equilibrium.

156.
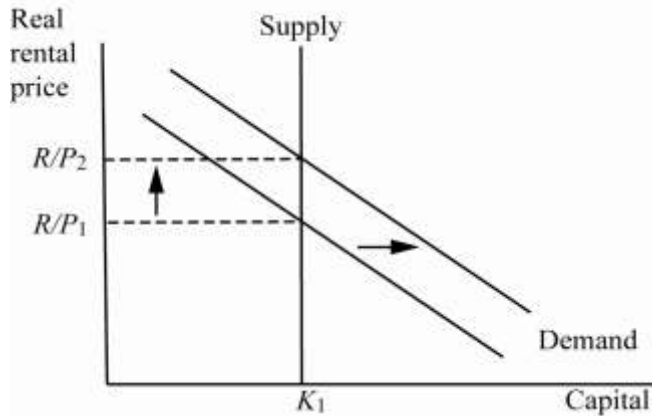
The demand for capital increases, which increases the real rental price of capital, but the quantity of capital employed is unchanged at the level of the fixed supply.

157.
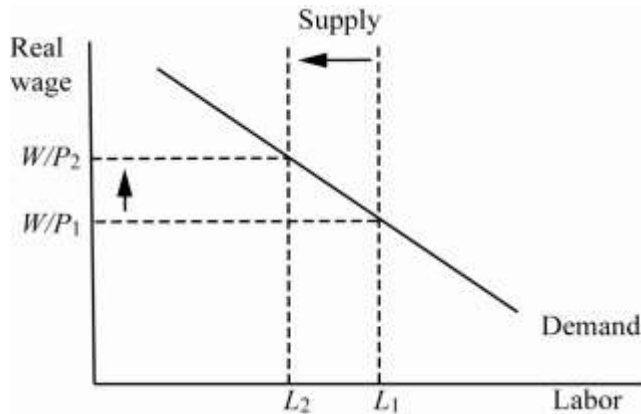
The supply of labor decreases, which increases the real wage. All of the reduced labor force is employed.

158. a. 2,000
   b. 2.5
   c. 10
159. a. 3,900; 1,600; 4 percent
   b. 1,600; 0; 1,600
   c. 3,900; 1,100; 9 percent
   d. 1,600; –500; 1,100
160. a. 2,200; 1,300; 4 percent
   b. 1,800; –500; 1,300
   c. 2,200; 1,300; 14 percent
   d. 1,800; –500; 1,300
161. a. 2,200; 1,300; 4 percent
   b. 1,800; –500; 1,300
   c. 1,950; 1,550; 9 percent
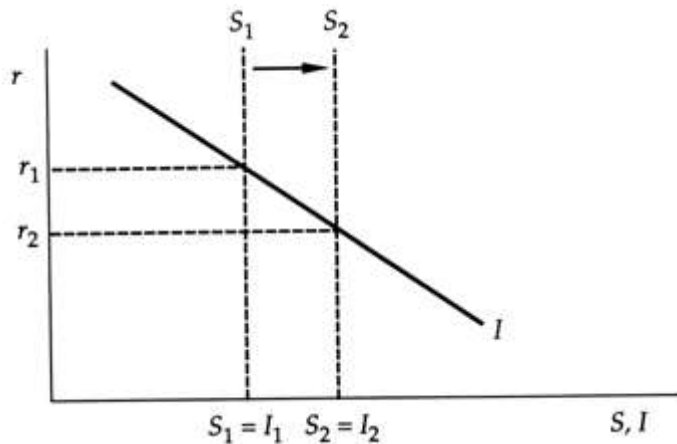   d. 2,050; –500; 1,550
162. a.
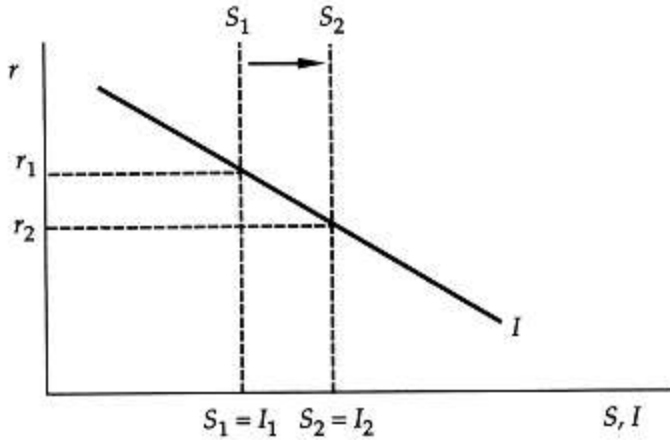
b. i. real interest rate decreases
    ii. national saving increases
    iii. investment increases
    iv. consumption is unchanged
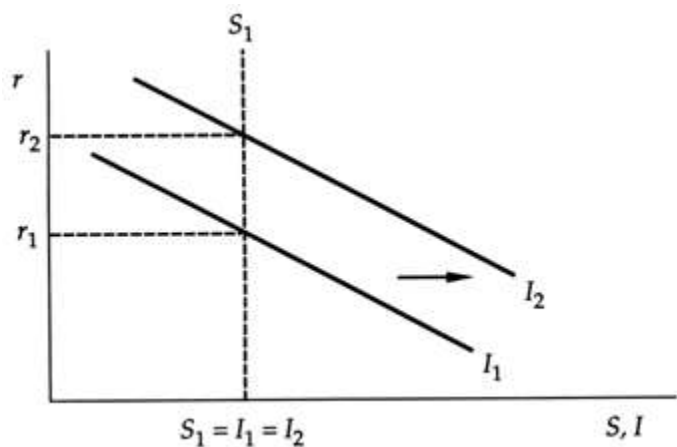   v. output is unchanged, fixed because it is determined by the factors of production

163. a.
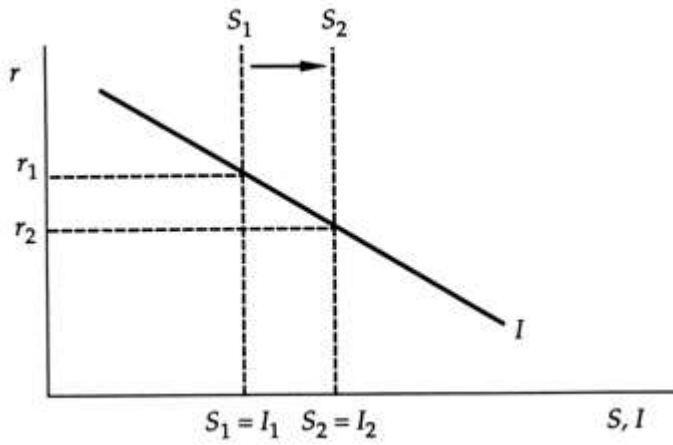
b. i. real interest rate decreases
    ii. national saving increases
    iii. investment increases
    iv. consumption decreases
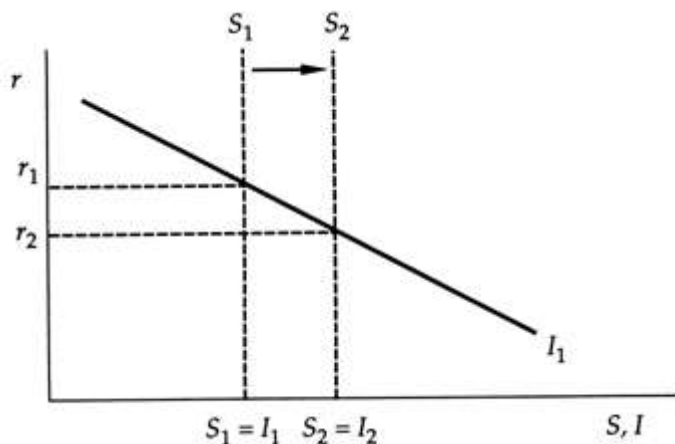   v. output is unchanged, fixed because it is determined by the factors of production

164. a.

b.   i. real interest rate decreases
ii. national saving increases
iii. investment increases
iv. consumption decreases
v. output is unchanged, fixed because it is determined by the factors of production

165. a.

b.   i. real interest rate increases
ii. national saving is unchanged
iii. amount of investment is unchanged
iv. consumption is unchanged
v. output is unchanged, fixed because it is determined by the factors of production

166. a.

b.   i. real interest rate decreases
     ii. national saving increases
     iii. investment increases
     iv. consumption increases
     v. output is unchanged, fixed because it is determined by the factors of production

167. a.   Output is the same in both economies, given the symmetry of the parameters of the productions function and the equal quantities of labor and capital.
   b.   The *MPL* is larger in the South Economy. The *MPL* depends on the value of $(1 - \alpha)$ and the average productivity of labor (Y/L). Since the average productivity of labor is the same in both countries, differences in the *MPL* depend on the value of $(1 - \alpha)$, which is larger in South Economy (.7) than in North Economy (.3).
   c.   Since factors are paid according to the values of their marginal products, the real wage is larger in South Economy, because the *MPL* is larger in South Economy than in North Economy (from part b).
   d.   Labor's share of income equals $(1 - \alpha)$, which is larger in South Economy (.7) than in North Economy (.3).

168. a.   Output increases by less than 10 percent because of diminishing returns to labor.
   b.   The real wage decreases because the average productivity of labor decreases $(Y/L$ decreases, as Y increases less in proportion than the increase in $L)$, so the *MPL*, which equals $(1 - \alpha)Y/L$, decreases.
   c.   The real rental price of capital increases because the average productivity of capital increases $(Y/K$ increases, as Y increases and K is constant), so the *MPK*, $\alpha Y/K$, increases.
   d.   Labor's share of income is unchanged, since it depends only on the parameter $(1 - \alpha)$ from the production function, which does not change.

169. a.   Output decreases by less than 50 percent because of diminishing returns to capital.
   b.   The real wage decreases because the average productivity of labor decreases $(Y/L$ decreases, as Y decreases and L is constant), so the *MPL*, which equals $(1 - \alpha)Y/L$, decreases.
   c.   The real rental price of capital increases because the average productivity of capital increases $(Y/K$ increases, as Y decreases proportionally less than K decreases), so the *MPK*, $\alpha Y/K$ increases.
   d.   Capital's share of income is unchanged since it depends only on the parameter (α) from the production function, which does not change.

170. The government could cut spending (G), which would increase national saving $(Y - C - G)$, lower the equilibrium interest rate, and produce an increase in the equilibrium

quantity of investment. The government could increase taxes (T), which would increase national saving ($Y - C - G$) by reducing consumption, lower the equilibrium interest rates and produce an increase in the equilibrium quantity of investment.

171. a. Public saving equals $T - G$. An increase in government spending, G, reduces public saving.
    b. Private saving equals $Y - T - C$. An increase in government spending does not affect private saving.
    c. National saving equals $Y - C - G$. An increase in government spending reduces national saving by an amount equal to the increase in government spending.
    d. The equilibrium interest rate increases to bring desired investment into equilibrium with the reduced quantity of national saving.
    e. The equilibrium quantity of investment is reduced via the increase in the interest rate by an amount equal to the increase in government spending.

172. a. The real wage adjusts to make labor demand equal to labor supply. If labor demand is greater than labor supply, the real wage rises, decreasing the quantity of labor demanded until the quantity demanded equals the fixed supply of labor.
    b. The real interest rate adjusts to make the supply of loanable funds equal to the demand for loanable funds. If the supply of loanable funds is greater than the demand for loanable funds the interest rate will decrease, increasing the desired quantity of investment spending, which is the demand for loanable funds, until the demand and supply are equal.

173. a. 2,000
    b. Yes, the production function exhibits constant returns to scale. Doubling each factor of production to 200 will double output to 4,000.
    c. 10 percent

174.　$Y = \$400$

　　$C = \$200$

　　$T = \$150$

　　$G = \$200$

　a. Private saving $= Y - C - T = 400 - 200 - 150 = \$50$

　b. Public Saving $= T - G = 150 - 200 = - \$50$

　c. National Saving $=$ Private saving $+$ public saving $= 50 + -50 = \$0$

175.　$Y = C + I + G$; $5000 = 2000 - 30r + 1500 - 20r + 2000$; $r = 10$ percent

　Real interest rate $= r -$ inflation $= 10 - 6 = 4$ percent

176. When increase in percentage of output equals the increased percentage of all factors of production it is called constant returns to scale. Here output is 8000 units, so if we double the factors of production, i.e., $L = 800$ and $K = 800$, we see that the output becomes 16000 units, double of 8000 units supporting the constant returns to scale.

177. According to the circular flow of dollars diagram, households save their money in financial markets and then financial markets lend this money to markets of goods and service for investment. In reality, not all saving is done in the financial markets, some of the money is kept by people to themselves as cash, which does not get converted to investment.

178. If households develop a tendency of saving less, there will be less money to lend, so the supply of loanable funds will be less. This will increase the real interest rates r, and due to the increase in r investors will find it more costly to take a loan, so investment will decrease.

179. $Y = 10,000$

$C = 3,800 + 0.7T - 150r$

$I = 1,500 + 50r$

$T = 1,000$

$G = 4,500$

$Y = C + I + G$

By plugging in values of Y, C, I, T and G, we get: $r = 5$ percent.

By by plugging in the value of r in C and G we get: $C = 3,750$ and $I = 1,750$.

180. Provided that the supply of capital is fixed, advancement in technology will increase the demand for capital. But as the supply is fixed, the real rental price will increase. So the new equilibrium will be in same supply amount of capital with increased real rental price.

181. With increased taxes, people will have less money to consume and save, so there will be reduction in private saving. With increased government spending, public saving will also be reduced. Reduction in both private saving and public saving will lead to a reduction in national saving, and as national saving is equal to investment, this implies a decrease in investment.

182. With increase in interest rates, firms find taking loans for investments to be more costly, so they will decrease investments. And households   start looking to saving as a better option than consuming, so consumption will decrease