Differential Equations with Boundary-Value Problems International Metric Edition 10th edition Zill Test Bank

SKU: 9798214031958-TEST-BANK

Name:_____ Class:_____ Date:_____

Section 1.1 - Definitions and Terminology

1. The differential equation $y'' + 2y' + 3y = 0$ is
Select the correct answer.

a. first order linear
b. second order linear
c. third order linear
d. first order nonlinear
e. second order nonlinear

ANSWER: b

2. The differential equation $y'' + 2yy' + 3y = 0$ is
Select the correct answer.

a. first order linear
b. second order linear
c. third order linear
d. first order nonlinear
e. second order nonlinear

ANSWER: e

3. The differential equation $y' + 3y = \sin x$ is
Select the correct answer.

a. first order linear
b. second order linear
c. third order linear
d. first order nonlinear
e. second order nonlinear

ANSWER: a

4. The differential equation $y'' + 2y' + 3y = \sin y$ is
Select the correct answer.

a. first order linear
b. second order linear
c. third order linear
d. first order nonlinear
e. second order nonlinear

ANSWER: e

5. The differential equation $y''' + 2y'' + 3xy' - 4e^x y = \sin x$ is
Select the correct answer.

Copyright Cengage Learning. Powered by Cognero.

Differential Equations with Boundary-Value Problems International Metric Edition 10th edition Zill Test Bank

Section 1.1 - Definitions and Terminology

a. first order linear
b. second order linear
c. third order linear
d. first order nonlinear
e. second order nonlinear

ANSWER: c

6. The values of *m* for which $y = e^{mx}$ is a solution of $y'' - 5y' + 6y = 0$ are
Select the correct answer.

a. 2 and 4
b. -2 and -3
c. 3 and 4
d. 2 and 3
e. 1 and 5

ANSWER: d

7. The values of *m* for which $y = x^m$ is a solution of $x^2y'' - 5xy' + 8y = 0$ are
Select the correct answer.

a. 2 and 4
b. -2 and -4
c. 3 and 5
d. 2 and 3
e. 1 and 5

ANSWER: a

8. The values of *c* for which $y = c$ is a constant solution of $y' = y^2 + 3y - 4$ are
Select the correct answer.

a. 1 and 4
b. -2 and -3
c. 1 and -4
d. -1 and 3
e. 1 and 3

ANSWER: c

9. The values of *m* for which $y = e^{mx}$ is a solution of $y'' - 4y' - 5y = 0$ are
Select the correct answer.

a. 1 and 4
b. -1 and 4

Copyright Cengage Learning. Powered by Cognero.

Differential Equations with Boundary-Value Problems International Metric Edition 10th edition Zill Test Bank

Section 1.1 - Definitions and Terminology

c. 2 and 3
d. -2 and -3
e. -1 and 5

ANSWER: e

10. In the LRC circuit problem in the text, C stands for
Select the correct answer.

a. capacitance
b. resistance
c. current
d. inductance
e. charge on the capacitor

ANSWER: a

11. In the LRC circuit problem in the text, the units of inductance, L, are
Select the correct answer.

a. ohms
b. farads
c. amperes
d. henrys
e. coulombs

ANSWER: d

12. In the falling body problem, the units of acceleration might be
Select the correct answer.

a. meters per second
b. feet per second
c. meters per second per second
d. kilograms per meter
e. kilograms per meter per second

ANSWER: c

13. The differential equation $y''' + 2y'' + 3y' + 7y = 0$ is
Select the correct answer.

a. first order linear
b. second order linear
c. third order linear
d. first order nonlinear
e. second order nonlinear

Copyright Cengage Learning. Powered by Cognero.

Differential Equations with Boundary-Value Problems International Metric Edition 10th edition Zill Test Bank

Section 1.1 - Definitions and Terminology

ANSWER: c

14. The differential equation $y'' + 2yy' + 3y = 0$ is
Select the correct answer.

a. first order linear
b. second order linear
c. third order linear
d. first order nonlinear
e. second order nonlinear

ANSWER: e

15. The differential equation $y' + 3y = \sin x$ is
Select the correct answer.

a. first order linear
b. second order linear
c. third order linear
d. first order nonlinear
e. second order nonlinear

ANSWER: a

16. The differential equation $y'' + 2y' + 3y = \sin y$ is
Select the correct answer.

a. first order linear
b. second order linear
c. third order linear
d. first order nonlinear
e. second order nonlinear

ANSWER: e

17. The differential equation $y''' + 2y'' + 3xy' - 4e^x y = \sin x$ is
Select the correct answer.

a. first order linear
b. second order linear
c. third order linear
d. first order nonlinear
e. second order nonlinear

ANSWER: c

Copyright Cengage Learning. Powered by Cognero.

Differential Equations with Boundary-Value Problems International Metric Edition 10th edition Zill Test Bank

Name:_____ Class:_____ Date:_____

Section 1.1 - Definitions and Terminology

18. The values of *m* for which $y = e^{mx}$ is a solution of $y'' - 9y' + 20y = 0$ are
Select the correct answer.

a. 4 and -5
b. -4 and -5
c. 3 and 6
d. 4 and 5
e. 3 and 5

ANSWER: d

19. The values of *m* for which $y = x^m$ is a solution of $x^2y'' - 7xy' + 12y = 0$ are
Select the correct answer.

a. -3 and 4
b. -2 and -6
c. 3 and 4
d. 2 and 6
e. 3 and -4

ANSWER: a

20. The values of *c* for which $y = c$ is a constant solution of $y' = y^2 + 5y - 6$ are
Select the correct answer.

a. 1 and 6
b. -1 and 6
c. 1 and -6
d. -2 and 3
e. 2 and 3

ANSWER: c

21. The values of *m* for which $y = e^{mx}$ is a solution of $y'' - 6y' - 7y = 0$ are
Select the correct answer.

a. 1 and 7
b. -1 and 6
c. 1 and 6
d. 1 and -6
e. -1 and 7

ANSWER: e

22. In the LRC circuit problem in the text, *R* stands for
Select the correct answer.

Copyright Cengage Learning. Powered by Cognero.

Differential Equations with Boundary-Value Problems International Metric Edition 10th edition Zill Test Bank

Section 1.1 - Definitions and Terminology

a. capacitance
b. resistance
c. current
d. inductance
e. charge on the capacitor

ANSWER: b

23. In the *LRC* circuit problem in the text, the units for C, are
Select the correct answer.

a. ohms
b. farads
c. amperes
d. henrys
e. coulombs

ANSWER: b

24. In the falling body problem, the units of acceleration might be
Select the correct answer.

a. centimeters per second
b. feet per second
c. feet per second per second
d. kilograms per centimeter
e. kilograms per centimeter per second

ANSWER: c

Copyright Cengage Learning. Powered by Cognero.

Differential Equations with Boundary-Value Problems International Metric Edition 10th edition Zill Test Bank

Name:_____ Class:_____ Date:_____

Section 1.2 - Initial-Value Problems

1. The solution of the initial value problem $y' = 3y, y(0) = 2$ is $y = ce^{3x}$, where $c =$
(Select the correct answer.)

a. 2
b. -2
c. 3
d. -3
e. 1

ANSWER: a

2. The solution of the initial value problem $y' = 2y + x, y(1) = \frac{1}{4}$ is $y = -\frac{x}{2} - \frac{1}{4} + ce^{2x}$, where $c =$
Select the correct answer.

a. 2
b. e^{-2}
c. e^{-1}
d. $\frac{e^{-2}}{2}$
e. 1

ANSWER: b

3. The initial value problem $y' = \sqrt{y^2 - 9}, y(x_0) = y_0$ has a unique solution guaranteed by Theorem 1.1 if
Select the correct answer.

a. $y_0 = 3$
b. $y_0 = -3$
c. $y_0 = 5$
d. $y_0 = 0$
e. $y_0 = 1$

ANSWER: c

4. The solution of the initial value problem $y' = 5y, y(1) = 3$ is $y = ce^{5x}$, where $c =$
(Select the correct answer.)

a. $3e^{-5}$
b. 3
c. $3e^{5}$

Copyright Cengage Learning. Powered by Cognero.

Differential Equations with Boundary-Value Problems International Metric Edition 10th edition Zill Test Bank

Section 1.2 - Initial-Value Problems

d. $-3e^5$

e. -3

ANSWER: a

5. The solution of the initial value problem $y' = 2y + x, \quad y(-1) = \frac{1}{2}$ is $y = -\frac{x}{2} - \frac{1}{4} + ce^{2x}$, where $c =$ (Select the correct answer.)

a. 2

b. $\frac{e^2}{4}$

c. e^2

d. $\frac{e^2}{2}$

e. 1

ANSWER: b

6. The initial value problem $y' = \sqrt{y^2 - 16}, \quad y(x_0) = y_0$ has a unique solution guaranteed by Theorem 1.1 if Select the correct answer.

a. $y_0 = 4$

b. $y_0 = -4$

c. $y_0 = 0$

d. $y_0 = 8$

e. $y_0 = 1$

ANSWER: d

Copyright Cengage Learning. Powered by Cognero.

Differential Equations with Boundary-Value Problems International Metric Edition 10th edition Zill Test Bank

Name:_____ Class:_____ Date:_____

Section 1.3 - Differential Equations as Mathematical Models

1. The population of a town increases at a rate proportional to its population. Its initial population is 1000. The correct initial value problem for the population, $P(t)$, as a function of time, t, is
Select the correct answer.

a. $\frac{dP}{dt} = kP,\ P(0) = 1000$

b. $\frac{dP}{dt} = kP^2,\ P(0) = 100$

c. $\frac{dP}{dt} = kP,\ P(0) = 100$

d. $\frac{dP}{dt} = kP(1-P),\ P(0) = 100$

e. $\frac{dP}{dt} = kP^2,\ P(0) = 1000$

ANSWER: a

2. The temperature of a cup of coffee obeys Newton's law of cooling. The initial temperature of the coffee is $150°F$ and one minute later, it is $135°F$. The ambient temperature of the room is $70°F$. If $T(t)$ represents the temperature of the coffee at time t, the correct differential equation for the temperature with side conditions is
Select the correct answer.

a. $\frac{dT}{dt} = k(T-135)$

b. $\frac{dT}{dt} = k(T-150)$

c. $\frac{dT}{dt} = k(T-70)$

d. $\frac{dT}{dt} = T(T-150)$

e. $\frac{dT}{dt} = T(T-70)$

ANSWER: c

3. In the previous problem, after a long period of time, the temperature of the coffee approaches
Select the correct answer.

a. $120°F$

b. $100°F$

c. $70°F$

d. $65°F$

e. $0°F$

Copyright Cengage Learning. Powered by Cognero.

Differential Equations with Boundary-Value Problems International Metric Edition 10th edition Zill Test Bank

Section 1.3 - Differential Equations as Mathematical Models

ANSWER: c

4. A large mixing tank initially contains 100 gallons of water in which 30 pounds of salt have been dissolved. Another brine solution is pumped into the tank at the rate of 4 gallons per minute, and the resulting mixture is pumped out at the same rate. The concentration of the incoming brine solution is 2 pounds of salt per gallon. If $A(t)$ represents the amount of salt in the tank at time t, the correct differential equation for A is
Select the correct answer.

a. $\frac{dA}{dt} = 8 - .02A$

b. $\frac{dA}{dt} = 8 - .04A$

c. $\frac{dA}{dt} = 4 - .04A$

d. $\frac{dA}{dt} = 2 - .04A$

e. $\frac{dA}{dt} = 4 - .08A$

ANSWER: b

5. In the previous problem, over a long period of time, the total amount of salt in the tank will approach
Select the correct answer.

a. 30 pounds
b. 50 pounds
c. 100 pounds
d. 200 pounds
e. 300 pounds

ANSWER: d

6. The population of a town increases at a rate proportional to its population. Its initial population is 5000. The correct initial value problem for the population, $P(t)$, as a function of time, t, is
Select the correct answer.

a. $\frac{dP}{dt} = kP,\ P(0) = 5000$

b. $\frac{dP}{dt} = kP^2,\ P(0) = 500$

c. $\frac{dP}{dt} = kP,\ P(0) = 500$

d. $\frac{dP}{dt} = kP(1 - P),\ P(0) = 5000$

Copyright Cengage Learning. Powered by Cognero.

Differential Equations with Boundary-Value Problems International Metric Edition 10th edition Zill Test Bank

Section 1.3 - Differential Equations as Mathematical Models

e. $\frac{dP}{dt} = kP^2, P(0) = 5000$

ANSWER: a

7. The temperature of a cup of coffee obeys Newton's law of cooling. The initial temperature of the coffee is $140°F$ and one minute later, it is $125°F$. The ambient temperature of the room is $65°F$. If $T(t)$ represents the temperature of the coffee at time *t*, the correct differential equation for the temperature is
Select the correct answer.

a. $\frac{dT}{dt} = k(T - 125)$

b. $\frac{dT}{dt} = k(T - 140)$

c. $\frac{dT}{dt} = k(T - 65)$

d. $\frac{dT}{dt} = T(T - 140)$

e. $\frac{dT}{dt} = T(T - 65)$

ANSWER: c

8. In the previous problem, after a long period of time, the temperature of the coffee approaches
Select the correct answer.

a. $125°F$

b. $100°F$

c. $65°F$

d. $50°F$

e. $0°F$

ANSWER: c

9. A large mixing tank initially contains 1000 gallons of water in which 40 pounds of salt have been dissolved. Another brine solution is pumped into the tank at the rate of 5 gallons per minute, and the resulting mixture is pumped out at the same rate. The concentration of the incoming brine solution is 3 pounds of salt per gallon. If *A(t)* represents the amount of salt in the tank at time *t*, the correct differential equation for *A* is
Select the correct answer.

a. $\frac{dA}{dt} = 3 - .005A$

b. $\frac{dA}{dt} = 5 - .05A$

Copyright Cengage Learning. Powered by Cognero.

Differential Equations with Boundary-Value Problems International Metric Edition 10th edition Zill Test Bank

Section 1.3 - Differential Equations as Mathematical Models

c. $\frac{dA}{dt} = 15 - .005A$

d. $\frac{dA}{dt} = 3 - .05A$

e. $\frac{dA}{dt} = 15 + .05A$

ANSWER: c

10. In the previous problem, over a long period of time, the total amount of salt in the tank will approach Select the correct answer.

a. 300 pounds
b. 500 pounds
c. 1000 pounds
d. 3000 pounds
e. 5000 pounds

ANSWER: d

Copyright Cengage Learning. Powered by Cognero.

Differential Equations with Boundary-Value Problems International Metric Edition 10th edition Zill Test Bank