

PRINTABLE VERSION

Quiz 6

You scored 70 out of 100

Question 1

Your answer is CORRECT.

An object is in simple harmonic motion. Find an equation for the motion given that the period is $\frac{2\pi}{3}$ and at time $t = 0$, $y = 1$, and $y' = 3$. What is the equation of motion?

- a) $y(t) = \sqrt{2} \sin\left(\frac{1}{3}t + \frac{1}{4}\pi\right)$
- b) $y(t) = \sqrt{2} \sin\left(3t + \frac{1}{4}\pi\right)$
- c) $y(t) = \sin\left(3t + \frac{1}{2}\pi\right)$
- d) $y(t) = \sin\left(3t + \frac{2}{3}\pi\right)$
- e) $y(t) = \sqrt{2} \sin\left(\frac{2}{3}t + \frac{1}{6}\pi\right)$
- f) None of the above.

Question 2

Your answer is CORRECT.

An object is in simple harmonic motion. Find an equation for the motion given that the frequency is $\frac{5}{\pi}$ and at time $t = 0$, $y = 0$, and $y' = -10$. What is the equation of motion?

- a) $y(t) = \sin(10t + \pi)$
- b) $y(t) = \sin\left(\frac{1}{10}t + \frac{1}{4}\pi\right)$
- c) $y(t) = \sqrt{2} \sin\left(10t + \frac{1}{4}\pi\right)$
- d) $y(t) = \sqrt{2} \sin\left(10t + \frac{1}{2}\pi\right)$

e) $y(t) = \sin\left(10t + \frac{1}{2}\pi\right)$

f) None of the above.

Question 3

Your answer is **INCORRECT**.

Find the general solution of

$$y''' - 9y'' + 26y' - 24y = 0$$

given that $r_1 = 2$ is a root of the characteristic equation.

a) $y = C_1 e^{2x} + C_2 e^{4x} + C_3 e^{3x}$

b) $y = C_1 e^{-2x} + C_2 e^{-4x} + C_3 e^{-3x}$

c) $y = C_1 e^{-2x} + C_2 e^{-4x} + C_3 e^{3x}$

d) $y = C_1 e^{2x} + C_2 e^{4x} + C_3 e^{-3x}$

e) $y = C_1 e^{2x} + C_2 e^{4x} + C_3 x e^{4x}$

f) None of the above.

Question 4

Your answer is **CORRECT**.

Find the general solution of

$$y''' + 5y'' + 8y' + 4y = 0$$

given that $r_1 = -1$ is a root of the characteristic equation.

a) $y = C_1 x e^{-2x} + C_2 x e^{2x} + C_3 e^{-x}$

b) $y = C_1 e^{-2x} + C_2 e^{2x} + C_3 e^{-x}$

c) $y = C_1 e^{-2x} + C_2 x e^{-2x} + C_3 e^x$

d) $y = C_1 e^{2x} + C_2 x e^{2x} + C_3 e^x$

e) $y = C_1 e^{-2x} + C_2 e^{-x} + C_3 x e^{-x}$

f) None of the above.

Question 5

Your answer is CORRECT.

Find the general solution of

$$y^{(4)} - 2y''' + 4y'' + 2y' - 5y = 0$$

given that $r_1 = 1 + 2i$ is a root of the characteristic equation.

a) $y = C_1 e^x + C_2 e^{-x} + C_3 e^{2x} \cos(x) + C_4 e^{2x} \sin(x)$

b) $y = C_1 e^x + C_2 e^{-x} + C_3 e^x \cos(2x) + C_4 e^x \sin(2x)$

c) $y = C_1 e^x + C_2 e^{-x} + C_3 e^x \cos(2x) + C_4 e^{2x} \sin(x)$

d) $y = C_1 e^{-x} + C_2 x e^{-x} + C_3 e^{2x} \cos(x) + C_4 e^{2x} \sin(x)$

e) $y = C_1 e^x + C_2 x e^x + C_3 e^x \cos(2x) + C_4 e^x \sin(2x)$

f) None of the above.

Question 6

Your answer is CORRECT.

Find the solution of the initial value problem:

$$y^{(4)} - 4y''' + 4y'' = 0$$

$$[y(0) = 3, y'(0) = 4, y''(0) = 0, y'''(0) = 0]$$

a) $y = 3 - 4x$

b) $y = 3 + 4x$

c) $y = 4e^{2x} + 3xe^{2x}$

d) $y = 3e^{2x} + 4xe^{2x}$

e) $y = 4 + 3x$

f) None of the above.

Question 7

Your answer is CORRECT.

Find the solution of the initial value problem:

$$y''' - y'' + 25y' - 25y = 0$$

$$[y(0) = 0, y'(0) = 0, y''(0) = -2]$$

a) $y = -13e^x + 13\cos(5x) + 65\sin(5x)$

b) $y = 13e^x + 13\cos(5x) - 65\sin(5x)$

c) $y = \frac{1}{13}e^x - \frac{1}{13}\cos(5x) + \frac{1}{65}\sin(5x)$

d) $y = -\frac{1}{13}e^x - \frac{1}{13}\cos(5x) - \frac{1}{65}\sin(5x)$

e) $y = -\frac{1}{13}e^x + \frac{1}{13}\cos(5x) + \frac{1}{65}\sin(5x)$

f) None of the above.

Question 8

Your answer is CORRECT.

Find the homogeneous equation with constant coefficients that has the given general solution

$$y = C_1 e^{-4x} + C_2 x e^{-4x} + C_3 e^x \cos(5x) + C_4 e^x \sin(5x)$$

a) $y''' + 10y'' + 58y' + 240y + 416 = 0$

b) $y^{(4)} + 4y''' + y'' - 5y' + y = 0$

c) $y^{(4)} + 6y''' + 26y'' + 176y' + 416y = 0$

d) $y^{(4)} - 6y''' - 24y'' + 224y' - 384y = 0$

e) $y^{(4)} - 10y''' + 58y'' - 240y' + 416y = 0$

f) None of the above.

Question 9

Your answer is **CORRECT**.

Find the homogeneous equation with constant coefficients of least order that has the following as a solution

$$y = 2e^{-x} - 3\sin(4x) + 2x$$

- a) $y^{(5)} + 16y^{(4)} + 16y''' + 4y'' = 0$
- b) $y^{(5)} + y^{(4)} + 16y''' + 16y'' = 0$
- c) $y^{(5)} + y^{(4)} - 16y''' - 16y'' = 0$
- d) $y^{(5)} - y^{(4)} - 16y''' + 16y'' = 0$
- e) $y^{(5)} + 16y^{(4)} - 16y''' + 4y'' = 0$
- f) None of the above.

Question 10

Your answer is **INCORRECT**.

Find the general solution of the nonhomogeneous equation

$$y''' - 4y'' + y' - 4y = e^x + 3$$

- a) $y = C_1 e^x + C_2 \cos(x) + C_3 \sin(x) - \frac{3}{2} - \frac{1}{3} e^x$
- b) $y = C_1 e^x + C_2 \cos(4x) - C_3 \sin(4x) - \frac{9}{4} - \frac{1}{2} e^x$
- c) $y = C_1 e^{-4x} + C_2 \cos(x) + C_3 \sin(x) + \frac{3}{4} + \frac{1}{6} e^x$
- d) $y = C_1 e^{-x} + C_2 \cos(x) + C_3 \sin(x) + \frac{3}{4} + \frac{1}{6} e^x$
- e) $y = C_1 e^{-4x} + C_2 \cos(x) + C_3 \sin(x) - \frac{3}{4} - \frac{1}{6} e^x$
- f) None of the above.

Question 11

Your answer is **INCORRECT**.

Find the general solution of the nonhomogeneous equation

$$y^{(4)} + 2y'' + y = \cos(3x) + 3$$

- a) $y = C_1 \cos(x) + C_2 \sin(x) + C_3 e^x \cos(x) + C_4 e^x \sin(x) - 3 + \frac{1}{64} \sin(3x)$
- b) $y = C_1 \cos(x) + C_2 e^x + C_3 x \cos(x) + C_4 x \sin(x) - 3 - \frac{1}{64} \cos(3x)$
- c) $y = C_1 \cos(x) + C_2 \sin(x) + C_3 e^x \cos(x) + C_4 e^x \sin(x) + 3 + \frac{1}{64} \cos(3x)$
- d) $y = C_1 e^x + C_2 x e^x + C_3 \cos(x) + C_4 \sin(x) + 3 + \frac{1}{64} \sin(3x)$
- e) $y = C_1 e^x + C_2 x e^x + C_3 \cos(x) + C_4 \sin(x) - 3 - \frac{1}{64} \cos(3x)$
- f) None of the above.

Question 12

Your answer is **CORRECT**.

Give the form of a particular solution of

$$y^{(4)} - y = 2e^{-x} + 3e^{3x} + \cos(x) + 1$$

- a) $z = Ax e^x + B e^{3x} + C \cos(x) + D \sin(x) + E$
- b) $z = Ax e^x + B e^{3x} + Cx \cos(x) + Dx \sin(x) + E$
- c) $z = Ax e^{-x} + B e^{3x} + Cx \cos(x) + Dx \sin(x) + E$
- d) $z = Ax e^{-x} + B e^{3x} + C \cos(x) + D \sin(x)$
- e) $z = A e^{-x} + B e^{3x} + Cx \cos(x) + Dx \sin(x) + E$
- f) None of the above.

Question 13

Your answer is **INCORRECT**.

Give the form of a particular solution of

$$y^{(4)} + 2y''' + 10y'' + 18y' + 9y = 5e^{-x} + \cos(x) + 4$$

given that $r_1 = 3i$ is a root of the characteristic equation.

- a) $z = A e^{-x} + Bx \cos(3x) + Cx \sin(3x) + D$
- b) $z = Ax e^{-x} + B \cos(x) + C \sin(x) + D$
- c) $z = Ax^2 e^{-x} + B \cos(x) + C \sin(x) + D$
- d) $z = A e^{-x} + B \cos(x) + C \sin(x) + D$
- e) $z = Ax^2 e^{-x} + Bx \cos(3x) + Cx \sin(3x) + D$
- f) None of the above.

Question 14

Your answer is CORRECT.

Give the Laplace transform of

$$f(x) = \cosh(2x)$$

- a) $F(s) = \frac{s^2}{s^2 - 4}$
- b) $F(s) = \frac{2}{s^2 - 4}$
- c) $F(s) = \frac{1}{s^2 - 4}$
- d) $F(s) = \frac{2s}{s^2 - 4}$
- e) $F(s) = \frac{s}{s^2 - 4}$
- f) None of the above.

Question 15

Your answer is CORRECT.

Give the Laplace transform for

$$f(x) = 2 + 5x + x^2$$

- a) $F(s) = -\frac{1}{s^2} - \frac{5}{s^3} - \frac{2}{s^4}$
- b) $F(s) = \frac{2}{s^2} + \frac{5}{s^3} + \frac{2}{s^4}$
- c) $F(s) = \frac{3}{s} + \frac{5}{s^2} + \frac{2}{s^3}$
- d) $F(s) = \frac{2}{s} + \frac{5}{s^2} + \frac{2}{s^3}$
- e) $F(s) = -\frac{1}{s} - \frac{5}{s^2} - \frac{2}{s^3}$
- f) None of the above.

Question 16

Your answer is **INCORRECT**.

Give the Laplace transform for

$$f(x) = 3e^{-x} + 5\sin(2x)$$

- a) $F(s) = -\frac{15}{s+1} - \frac{50}{s^2+4}$
- b) $F(s) = -\frac{2}{s+1} - \frac{10}{s^2+4}$
- c) $F(s) = \frac{3}{s(s+1)} + \frac{10}{s(s^2+4)}$
- d) $F(s) = \frac{3}{2(s+1)} + \frac{5}{s^2+4}$
- e) $F(s) = -\frac{3}{5(s+1)} - \frac{2}{s^2+4}$
- f) None of the above.

Question 17

Your answer is **CORRECT**.

Give the Laplace transform for

$$f(x) = 4 - 3e^{2x} - 2\cos(4x)$$

- a) $F(s) = -\frac{3}{s} + \frac{3}{s-2} + \frac{2s}{s^2+16}$
- b) $F(s) = \frac{4}{s} - \frac{3}{s-2} - \frac{2s}{s^2+16}$
- c) $F(s) = \frac{4}{s^2} - \frac{3}{s(s-2)} - \frac{2}{s^2+16}$
- d) $F(s) = \frac{5}{s} - \frac{3}{s-2} - \frac{2s}{s^2+16}$
- e) $F(s) = -\frac{3}{s^2} + \frac{3}{s(s-2)} + \frac{2}{s^2+16}$
- f) None of the above.

Question 18

Your answer is **INCORRECT**.

Give the Laplace transform for

$$f(x) = 5xe^{-2x} + 4e^{2x}\cos(5x)$$

- a) $F(s) = \frac{5}{s+2} + \frac{20}{(s-2)^2+25}$
- b) $F(s) = \frac{10}{(s+2)^2} + \frac{4(s-2)}{(s-2)^2+25}$
- c) $F(s) = \frac{5}{(s+2)^2} + \frac{20}{(s-2)^2+25}$
- d) $F(s) = \frac{5}{(s+2)^2} + \frac{4(s-2)}{(s-2)^2+5}$
- e) $F(s) = \frac{5}{s+2} + \frac{4(s-2)}{(s-2)^2+25}$
- f) None of the above.

Question 19

Your answer is **CORRECT**.

Give the Laplace transform for

$$f(x) = 4x^5 - 2e^{2x} \sin(3x)$$

- a) $F(s) = \frac{4}{s^6} + \frac{6}{(s-2)^2 + 9}$
- b) $F(s) = \frac{480}{s^5} - \frac{6}{(s-2)^2 + 9}$
- c) $F(s) = \frac{480}{s^6} + \frac{6}{(s-2)^2 + 9}$
- d) $F(s) = \frac{4}{s-5} - \frac{2(s-2)}{(s-2)^2 + 9}$
- e) $F(s) = \frac{480}{s^6} - \frac{6}{(s-2)^2 + 9}$
- f) None of the above.

Question 20

Your answer is **CORRECT**.

Give the Laplace transform for

$$f(x) = 5 - 2x - 3x^4 e^{5x}$$

- a) $F(s) = \frac{5}{s} - \frac{2}{s^2} - \frac{72}{(s-5)^4}$
- b) $F(s) = \frac{5}{s} + \frac{2}{s^2} - \frac{72}{(s+5)^5}$
- c) $F(s) = \frac{5}{s} - \frac{2}{s^2} - \frac{72}{(s-5)^5}$
- d) $F(s) = \frac{5}{s} - \frac{2}{s^2} - \frac{72}{(s+5)^5}$
- e) $F(s) = \frac{5}{s^2} - \frac{2}{s^3} - \frac{72}{(s-5)^5}$
- f) None of the above.