

PRINTABLE VERSION

Quiz 6

You scored 40 out of 100

Question 1

Your answer is **INCORRECT**.

An object is in simple harmonic motion. Find an equation for the motion given that the period is $\frac{\pi}{4}$ and at time $t = 0$, $y = 1$, and $y' = 8$. What is the equation of motion?

- a) $y(t) = \sqrt{2} \sin\left(8t + \frac{1}{4}\pi\right)$
- b) $y(t) = \sqrt{2} \sin\left(\frac{1}{8}t + \frac{1}{4}\pi\right)$
- c) $y(t) = \sin\left(8t + \frac{1}{2}\pi\right)$
- d) $y(t) = \sin\left(8t + \frac{1}{4}\pi\right)$
- e) $y(t) = \sqrt{2} \sin\left(\frac{1}{4}t + \frac{1}{6}\pi\right)$
- f) None of the above.

Question 2

Your answer is **INCORRECT**.

An object is in simple harmonic motion. Find an equation for the motion given that the frequency is $\frac{6}{\pi}$ and at time $t = 0$, $y = 1$, and $y' = 0$. What is the equation of motion?

- a) $y(t) = \sqrt{2} \sin\left(12t + \frac{1}{4}\pi\right)$
- b) $y(t) = \sin\left(\frac{1}{12}t + \frac{1}{4}\pi\right)$
- c) $y(t) = \sqrt{2} \sin\left(\frac{1}{12}t + \frac{1}{2}\pi\right)$
- d) $y(t) = \sqrt{2} \sin(12t)$

- e) $y(t) = \sin(12t)$
- f) None of the above.

Question 3

Your answer is **INCORRECT**.

Find the general solution of

$$y''' - 2y'' - 9y' + 18y = 0$$

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

- a) $y = C_1 e^{-2x} + C_2 e^{-3x} + C_3 e^{-3x}$
- b) $y = C_1 e^{2x} + C_2 e^{3x} + C_3 x e^{3x}$
- c) $y = C_1 e^{2x} + C_2 e^{3x} + C_3 e^{3x}$
- d) $y = C_1 e^{-2x} + C_2 e^{-3x} + C_3 e^{3x}$
- e) $y = C_1 e^{2x} + C_2 e^{3x} + C_3 e^{-3x}$
- f) None of the above.

Question 4

Your answer is **INCORRECT**.

Find the general solution of

$$y''' - 4y'' - 16y' + 64y = 0$$

given that $r_1 = -4$ is a root of the characteristic equation.

- a) $y = C_1 e^{4x} + C_2 e^{-4x} + C_3 x e^{-4x}$
- b) $y = C_1 e^{4x} + C_2 x e^{4x} + C_3 e^{-4x}$
- c) $y = C_1 e^{4x} + C_2 x e^{4x} + C_3 e^{4x}$
- d) $y = C_1 e^{-4x} + C_2 x e^{-4x} + C_3 e^{4x}$
- e) $y = C_1 e^{4x} + C_2 e^{-4x} + C_3 e^{-4x}$

f) None of the above.

Question 5

Your answer is CORRECT.

Find the general solution of

$$y^{(4)} - 4y''' + 12y'' + 4y' - 13y = 0$$

given that $r_1 = 2 + 3i$ is a root of the characteristic equation.

a) $y = C_1 e^x + C_2 x e^x + C_3 e^{2x} \cos(3x) + C_4 e^{2x} \sin(3x)$

b) $y = C_1 e^{-x} + C_2 x e^{-x} + C_3 e^{3x} \cos(2x) + C_4 e^{3x} \sin(2x)$

c) $y = C_1 e^x + C_2 e^{-x} + C_3 e^{2x} \cos(3x) + C_4 e^{3x} \sin(2x)$

d) $y = C_1 e^x + C_2 e^{-x} + C_3 e^{2x} \cos(3x) + C_4 e^{2x} \sin(3x)$

e) $y = C_1 e^x + C_2 e^{-x} + C_3 e^{3x} \cos(2x) + C_4 e^{3x} \sin(2x)$

f) None of the above.

Question 6

Your answer is CORRECT.

Find the solution of the initial value problem:

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

$$[y(0) = 1, y'(0) = -4, y''(0) = 0, y'''(0) = 0]$$

a) $y = -4 + x$

b) $y = 1 - 4x$

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

d) $y = 1 + 4x$

e) $y = e^{-2x} - 4xe^{-2x}$

f) None of the above.

Question 7

Your answer is CORRECT.

Find the solution of the initial value problem:

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

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

- a) $y = \frac{5}{2} e^x - \frac{5}{2} \cos(3x) - \frac{15}{2} \sin(3x)$
- b) $y = \frac{2}{5} e^x + \frac{2}{5} \cos(3x) + \frac{2}{15} \sin(3x)$
- c) $y = -\frac{5}{2} e^x - \frac{5}{2} \cos(3x) + \frac{15}{2} \sin(3x)$
- d) $y = \frac{2}{5} e^x - \frac{2}{5} \cos(3x) - \frac{2}{15} \sin(3x)$
- e) $y = -\frac{2}{5} e^x + \frac{2}{5} \cos(3x) - \frac{2}{15} \sin(3x)$
- f) None of the above.

Question 8

Your answer is CORRECT.

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

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

- a) $y^{(4)} - 6y''' + 14y'' - 16y' + 8y = 0$
- b) $y^{(4)} - 2y''' - 4y'' + 8y' = 0$
- c) $y^{(4)} + 2y''' + y'' - y' + y = 0$
- d) $y^{(4)} + 2y''' - 2y'' + 8y = 0$
- e) $y''' + 6y'' + 14y' + 16y + 8 = 0$
- 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

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

- a) $y^{(5)} + 9y^{(4)} - 9y''' + 3y'' = 0$
- b) $y^{(5)} + y^{(4)} - 9y''' - 9y'' = 0$
- c) $y^{(5)} + y^{(4)} + 9y''' + 9y'' = 0$
- d) $y^{(5)} - y^{(4)} - 9y''' + 9y'' = 0$
- e) $y^{(5)} + 9y^{(4)} + 9y''' + 3y'' = 0$
- f) None of the above.

Question 10

Your answer is **INCORRECT**.

Find the general solution of the nonhomogeneous equation

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

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

Question 11

Your answer is **INCORRECT**.

Find the general solution of the nonhomogeneous equation

$$y^{(4)} + 18y'' + 81y = \cos(2x) + 2$$

- a) $y = C_1 e^{3x} + C_2 x e^{3x} + C_3 \cos(3x) + C_4 \sin(3x) - \frac{2}{81} - \frac{1}{25} \cos(2x)$
- b) $y = C_1 \cos(3x) + C_2 \sin(3x) + C_3 e^x \cos(3x) + C_4 e^x \sin(3x) + \frac{2}{81} + \frac{1}{25} \cos(2x)$
- c) $y = C_1 \cos(3x) + C_2 e^{3x} + C_3 x \cos(3x) + C_4 x \sin(3x) - \frac{2}{81} - \frac{1}{25} \cos(2x)$
- d) $y = C_1 \cos(3x) + C_2 \sin(3x) + C_3 e^{3x} \cos(3x) + C_4 e^{3x} \sin(3x) - \frac{2}{81} + \frac{1}{25} \sin(2x)$
- e) $y = C_1 e^{3x} + C_2 x e^{3x} + C_3 \cos(3x) + C_4 \sin(3x) + \frac{2}{81} + \frac{1}{25} \sin(2x)$
- f) None of the above.

Question 12

Your answer is **INCORRECT**.

Give the form of a particular solution of

$$y^{(4)} - 256y = 2e^{-4x} + 3e^x + \cos(4x) - 2$$

- a) $z = Ae^{-4x} + Be^x + Cx \cos(4x) + Dx \sin(4x) + E$
- b) $z = Ax e^{-4x} + Be^x + C \cos(4x) + D \sin(4x)$
- c) $z = Ax e^{4x} + Be^x + Cx \cos(4x) + Dx \sin(4x) + E$
- d) $z = Ax e^{-4x} + Be^x + Cx \cos(4x) + Dx \sin(4x) + E$
- e) $z = Ax e^{4x} + Be^x + C \cos(4x) + D \sin(4x) + E$
- 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) $z = A e^{-x} + B x \cos(3x) + C x \sin(3x) + D$
- b) $z = A x e^{-x} + B \cos(x) + C \sin(x) + D$
- c) $z = A x^2 e^{-x} + B \cos(x) + C \sin(x) + D$
- d) $z = A e^{-x} + B \cos(x) + C \sin(x) + D$
- e) $z = A x^2 e^{-x} + B x \cos(3x) + C x \sin(3x) + D$
- f) None of the above.

Question 14

Your answer is **INCORRECT**.

Give the Laplace transform of

$$f(x) = \cosh(3x)$$

- a) $F(s) = \frac{1}{s^2 - 9}$
- b) $F(s) = \frac{3}{s^2 - 9}$
- c) $F(s) = \frac{s}{s^2 - 9}$
- d) $F(s) = \frac{s^2}{s^2 - 9}$
- e) $F(s) = \frac{3s}{s^2 - 9}$
- f) None of the above.

Question 15

Your answer is **INCORRECT**.

Give the Laplace transform for

$$f(x) = 2 + 4x + x^2$$

- a) $F(s) = \frac{2}{s} + \frac{4}{s^2} + \frac{2}{s^3}$

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

Question 16

Your answer is **INCORRECT**.

Give the Laplace transform for

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

- a) $F(s) = \frac{3}{2(s+1)} - \frac{8}{s^2+16}$
- b) $F(s) = -\frac{2}{s+1} + \frac{16}{s^2+16}$
- c) $F(s) = \frac{3}{s(s+1)} - \frac{16}{s(s^2+16)}$
- d) $F(s) = \frac{3}{4(s+1)} - \frac{4}{s^2+16}$
- e) $F(s) = \frac{3}{s+1} - \frac{16}{s^2+16}$
- f) None of the above.

Question 17

Your answer is **CORRECT**.

Give the Laplace transform for

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

- a) $F(s) = \frac{2}{s} - \frac{4}{s-3} - \frac{2s}{s^2+25}$
- b) $F(s) = -\frac{1}{s} + \frac{4}{s-3} + \frac{2s}{s^2+25}$
- c) $F(s) = \frac{2}{s^2} - \frac{4}{s(s-3)} - \frac{2}{s^2+25}$
- d) $F(s) = \frac{3}{s} - \frac{4}{s-3} - \frac{2s}{s^2+25}$
- e) $F(s) = -\frac{1}{s^2} + \frac{4}{s(s-3)} + \frac{2}{s^2+25}$
- f) None of the above.

Question 18

Your answer is **INCORRECT**.

Give the Laplace transform for

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

- 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

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

- a) $F(s) = \frac{2}{s^4} + \frac{16}{(s+5)^2 + 16}$
- b) $F(s) = \frac{12}{s^3} - \frac{16}{(s+5)^2 + 16}$
- c) $F(s) = \frac{12}{s^4} + \frac{16}{(s+5)^2 + 16}$
- d) $F(s) = \frac{2}{s-3} - \frac{4(s+5)}{(s+5)^2 + 16}$
- e) $F(s) = \frac{12}{s^4} - \frac{16}{(s+5)^2 + 16}$
- f) None of the above.

Question 20

Your answer is **CORRECT**.

Give the Laplace transform for

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

- a) $F(s) = \frac{2}{s} - \frac{5}{s^2} + \frac{96}{(s-3)^5}$
- b) $F(s) = \frac{2}{s} + \frac{5}{s^2} + \frac{96}{(s+3)^5}$
- c) $F(s) = \frac{2}{s} - \frac{5}{s^2} + \frac{96}{(s-3)^4}$
- d) $F(s) = \frac{2}{s} - \frac{5}{s^2} + \frac{96}{(s+3)^5}$
- e) $F(s) = \frac{2}{s^2} - \frac{5}{s^3} + \frac{96}{(s-3)^5}$
- f) None of the above.