Multiple choice questions - Differential equations

Year: University Year 1 · 10

Question 1 The order of $y'' + 3y' = x$ is

- ◯ **A.** 1
- ◯ **B.** 2
- ◯ **C.** 3
- ◯ **D.** 0

Question 2 General solution of $y' = 2y$

- ◯ **A.** $y = Ce^{2x}$
- ◯ **B.** $y = 2x + C$
- ◯ **C.** $y = Ce^{x/2}$
- ◯ **D.** $y = C\sin 2x$

Question 3 Roots $m = \pm 3i$ give

- ◯ **A.** $Ae^{3x} + Be^{-3x}$
- ◯ **B.** $A\cos 3x + B\sin 3x$
- ◯ **C.** $(A + Bx)e^{3x}$
- ◯ **D.** $e^{3x}\cos x$

Question 4 Integrating factor of $y' + 3y = x$

- ◯ **A.** e^{3x}
- ◯ **B.** e^{-3x}
- ◯ **C.** $3x$
- ◯ **D.** x^3

Question 5 A repeated root m gives

- ◯ **A.** Ae^{mx}
- ◯ **B.** $(A + Bx)e^{mx}$
- ◯ **C.** $A\cos mx$
- ◯ **D.** $Ae^{mx} + Be^{-mx}$

Question 6 The number of arbitrary constants in the general solution of a second-order DE is

- ◯ **A.** 0
- ◯ **B.** 1

- ◯ **C.** 2
- ◯ **D.** 3

Question 7 $y' = y^2$ is

- ◯ **A.** linear
- ◯ **B.** separable
- ◯ **C.** second order
- ◯ **D.** exact only

Question 8 Newton's law of cooling gives T approaching

- ◯ **A.** 0
- ◯ **B.** the ambient temperature
- ◯ **C.** infinity
- ◯ **D.** the initial temperature

Question 9 For $y'' + y = 0$ the solutions are

- ◯ **A.** exponentials
- ◯ **B.** sines and cosines
- ◯ **C.** polynomials
- ◯ **D.** logarithms

Question 10 Total solution of a non-homogeneous DE is

- ◯ **A.** y_c only
- ◯ **B.** y_p only
- ◯ **C.** $y_c + y_p$
- ◯ **D.** $y_c\, y_p$

Answer grid - Differential equations

Year: University Year 1

Question	Answer	Explanation
1	**B**	Highest derivative y''.
2	**A**	Exponential growth.
3	**B**	Purely imaginary.
4	**A**	$e^{\int 3dx}$.
5	**B**	Extra factor of x.
6	**C**	Equal to the order.
7	**B**	$\int y^{-2}dy = \int dx$.
8	**B**	$T \to T_s$.
9	**B**	$m = \pm i$.
10	**C**	Superposition.