



Dashboard > Courses > School Of Engineering & Applied Sciences > B.Tech. > B.Tech. Cohort 2020-2024 > Semester-II Cohort 2020-24
> EMAT102L-Even2021 > 3 July - 9 July > Quiz 1_Differential Equations

Started on Monday, 5 July 2021, 6:00 PM

State Finished

Completed on Monday, 5 July 2021, 6:30 PM

Time taken 29 mins 7 secs

Grade 8.0 out of 10.0 (80%)



Question 1

Correct

Mark 2.0 out of

2.0

Consider the following differential equation:

$$2xydx + (x^2 - 1)dy = 0.$$

Identify the correct statement:

Select one:

- ☐ The differential equation is exact and the general solution is $ax^2y + bx^3y^2 = C$, where C is an arbitrary constant and a, b are some specific constants that satisfy the relation $a + b = 2$.
- ☐ The differential equation is not exact and y^2 is an integrating factor.
- ☐ The differential equation is not exact and y^3 is an integrating factor.
- ☒ The differential equation is exact and the general solution is $x^ay - y^b = C$, where C is an arbitrary constant and a, b are some specific constants that satisfy the relation $a + b = 3$.



The correct answer is: The differential equation is exact and the general solution is $x^ay - y^b = C$, where C is an arbitrary constant and a, b are some specific constants that satisfy the relation $a + b = 3$.



Question 2

Incorrect

Mark 0.0 out of

2.0

Let $R : |x - 0| \leq 2, |y - 0| \leq 3$ be a rectangle. Consider the IVP

$$\frac{dy}{dx} = xy^2, y(0) = 0.$$

Which of the following statement is correct about this IVP?

Select one:

- ☒ This IVP has no solution. ✖
- ☐ This IVP has a unique solution on the interval $|x| \leq \frac{1}{8}$.
- ☐ This IVP has two solutions on the interval $|x| \leq \frac{1}{6}$.
- ☐ This IVP has infinitely many solutions on the interval $|x| \leq \frac{1}{6}$.

The correct answer is: This IVP has a unique solution on the interval $|x| \leq \frac{1}{8}$.

Question 3

Correct

Mark 2.0 out of

2.0

Consider the following differential equation:

$$x^3 \frac{d^3 y}{dx^3} + x \frac{d^2 y}{dx^2} + e^y = 0.$$

Let O and D denote the order and degree respectively of this differential equation. Identify the correct statement:

Select one:

- ☐ $O^2 + D^2 = 10$ and the equation is linear.
- ☐ $O + D = 5$ and the equation is non-linear.
- ☐ $O - D = 1$ and the equation is linear.
- ☒ $O - D = 2$ and the equation is non-linear.



The correct answer is: $O - D = 2$ and the equation is non-linear.



Question 4

Correct

Mark 2.0 out of

2.0

Find the Lipschitz constant for the following function

$$f(x, y) = x|\sin y| \text{ on domain } D = \{(x, y) : |x| \leq 1, -\infty < y < \infty\}$$

Select one:

- ☐ 4
- ☐ 3
- ☒ 1 ✓
- ☐ 2

The correct answer is: 1

Question 5

Correct

Mark 2.0 out of

2.0

Consider the IVP $\frac{dy}{dx} = y^2, y(0) = 1$.

The iterate $y_2(x)$ obtained by using Picard's method of successive approximations on this IVP is given by $a + bx + cx^2 + fx^3$, where a, b, c, f are some specific constants such that $a + b + c + 3f$ equals:

Select one:

- ☐ 1
- ☐ 3
- ☐ 6
- ☒ 4 ✓

The correct answer is: 4

