**Topics: Basic Definitions and Solution of Differential Equations (First Order First Degree)**

1. **Definitions: Differential equation, ODE, PDE, Order and degree of a differential equation, Linear and non-linear differential equation.**
2. **Solve the given equations,**

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**Topics: Equation of First Order and Higher Degree**

1. **Solve **
2. **Solve **
3. **Solve **

**Topics: Linear Differential Equations with Constant Coefficients**

1. **Solve **
2. **Solve the following differential equations.**

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1. **Solve **
2. **Solve **
3. **Solve the differential equation **

**Topics: The Laplace Transform**

1. **Find the Laplace transform of t2cosat.**
2. **Prove the following, **
3. **Find the Laplace transform of **
4. **Using Laplace transform prove that **
5. **Prove that.**
6. **Find the Laplace transform of the function **
7. **Evaluate.**
8. **Evaluate by use of convolution theorem.**
9. **Solve the differential equation  by using Laplace transform.**
10. **Solve the differential equation  by using Laplace transform.**

**Topics: The Fourier Transform**

1. **Define Fourier series. Write down Drichlet’s conditions of Fourier series.**
2. **Obtain the Fourier series for in the interval 0<x<2π.**
3. **Find the Fourier series expansions of the function in the interval **
4. **Find the Fourier series expansion of the function. Hence evaluate the sum **
5. **If f(x) is given by  then expand f(x) in the Fourier series.**
6. **Show that.**
7. **Prove that.**
8. **Find the (a) finite Fourier Sine transform (b) finite Fourier Cosine transform of the function F(x)= 2x, 0<x<4.**
9. **Establish the relation between Fourier and Laplace transforms.**
10. **Use finite Fourier transform to solve**

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