Student Name: _____	**Reg. No:** _____
Course Title: Differential Equations	**Course Code:**
Course Instructor: Fatima Asif	**Exam Type: Assignment # 4**

Q.1) Compute Transforms Directly

- t^2
- e^{-5t}
- $\sinh 3t$

Use Properties and Basic Transforms to find Laplace Transform of the following:

- $\sin(5t+2)$
- $e^{-t}\sin 2t$
- $t\sin t$

Find Inverse Laplace Transform

- $\dfrac{s-2}{s^2+3}$
- $\dfrac{3}{s(s^2+4)}$

Solve the initial value problems

- $y"+2y'+5y=0,\ y(0)=1,\ y'(0)=1$
- $y"+9y=\sin 3t,\ y(0)=1,\ y'(0)=0$

Q.2) Can the following IVP be solved using Laplace Transform? Explain your answer.

$$2y''' + 3y'' - 3y' - 2y = e^{-t} \ ; \quad y(0) = 0 \ ; \quad y'(0) = 0 \ ; \ y''(1) = 2$$

If ***yes***, then solve it. If ***no***, then fix the problem and solve it.

Q.3) Solve the following differential equation using power series.

- $y'' - xy = sinx$
- $y'' - xy = x^2 \quad ; \ y(0) = 1 \ , y'(0) = 0$