Practical - 1

Ques.1) Solve yu_y - xu_x=1

```
In[ ]:= DSolve[y * D[u[x, y], y] - x * D[u[x, y], x] == 1, u[x, y], {x, y}]
Out[ ]= {{u[x, y] → -Log[x] + C[1][x y]}}
```

Ques.2) Solve u_x - yu_y=0

```
In[ ]:= DSolve[D[u[x, y], x] - y * D[u[x, y], y] == 0, u[x, y], {x, y}]
Out[ ]= {{u[x, y] → C[1][e^x y]}}
```

Ques.3) Solve (1+x^2) u_x - u_y=0

```
In[ ]:= DSolve[(1 + x^2) * D[u[x, y], y] - D[u[x, y], y] == 0, u[x, y], {x, y}]
Out[ ]= {{u[x, y] → C[1][x]}}
```

Ques.4) Solve y^2u_x - xyu_y=x(u-2y)

```
In[ ]:= DSolve[y^2 * D[u[x, y], x] - x * y * D[u[x, y], y] == x (u[x, y] - 2 y), u[x, y], {x, y}]
```

$$\text{Out[ ]= } \left\{\left\{u[x, y] \to \frac{-x^2 \sqrt{-y^2} + \sqrt{y^2}\ C_1\left[\frac{1}{2}\left(x^2+y^2\right)\right]}{\sqrt{-y^2}\ \sqrt{y^2}}\right\}, \left\{u[x, y] \to \frac{x^2 \sqrt{-y^2} + \sqrt{y^2}\ C_1\left[\frac{1}{2}\left(x^2+y^2\right)\right]}{\sqrt{-y^2}\ \sqrt{y^2}}\right\}\right\}$$

```
In[ ]:= Clear All
Out[ ]= All Clear
```

Ques.5) Solve xu_x - yu_y=u

```
In[ ]:= DSolve[x * D[u[x, y], x] + y * D[u[x, y], y] == u[x, y], u[x, y], {x, y}]
```

$$\text{Out[ ]= } \left\{\left\{u[x, y] \to x\, C_1\left[\frac{y}{x}\right]\right\}\right\}$$

Ques.6) Solve xu_x - yu_y=u

```
In[ ]:= Clear All
Out[ ]= All Clear
```