

**DIRECTIONS:**

- **STAPLE** this page to the front of your homework (don't forget your name!).
- Show all work, clearly and in order **You will lose points if you work is not in order.**
- When required, **do not forget the units!**
- Circle your final answers. **You will lose points if you do not circle your answers.**

Question	Points	Score
1	2	
2	2	
3	6	
Total	10	

**Problem 1:** (2 points) Verify the following

$$\mathcal{L}\{\cos t\} = \frac{s}{s^2 + 1}.$$

**Problem 2:** (2 points) Find the inverse Laplace Transform of

$$F(s) = \frac{3s}{s^2 - s - 6}.$$

**Problem 3:** (6 points) Use the Laplace Transform to solve the following initial value problem(s)

(a) (2 points)  $y'' - y' - 6y = \cos t$ ,  $y(0) = 1$ ,  $y'(0) = -1$ .

(b) (2 points)  $y'' + 4y = \sin(t) - u_{2\pi}(t) \sin(t - 2\pi)$ ,  $y(0) = 0$ ,  $y'(0) = 0$ .

(c) (2 points)  $y'' + 4y = \delta(t - \pi) - \delta(t - 2\pi)$ ,  $y(0) = 0$ ,  $y'(0) = 0$ .