

**RK UNIVERSITY**  
**School of Engineering**

**Subject Name: Differential Equation**

**Subject code: APS301**

**Branch : All**

1. Solve the initial value problem  $y'' - 4y' + 8 = 0$   
for  $y(0) = 1$  and  $y'(0) = 2$
2. Find the general solution to  $y''' - y'' + y' - y = 0$ .
3. Solve :  $y'' + y' - 12y = \sin(3t)$
4. Solve the given differential equation by undetermined coefficients.

$$y'' - 8y' + 16y = 24x + 2$$

5. Find the general solution for  $y'' - 3y' - 4y = -25 \cos(2t)$ .
6. Solve for a particular solution of the differential equation using the method of undetermined coefficients.

$$y'' - 2y' + 5y = 4e^{3t}$$

7. Solve the given differential equation by undetermined coefficients.

$$y'' - 8y' + 16y = 24x + 2$$

8. Solve :  $y'' - 2y' + 1 = (x+1)e^{2x}$
9. Find the laplace transforms of

i.  $\frac{\sin t}{t}$

ii.  $\frac{1 - \cos 2t}{t}$

iii.  $\frac{\cos 2t - \cos 3t}{t}$

iv.  $\frac{\sin wt}{t}$

**10.** Find the inverse Laplace transforms of

i.  $\frac{s}{(s^2-1)^2}$

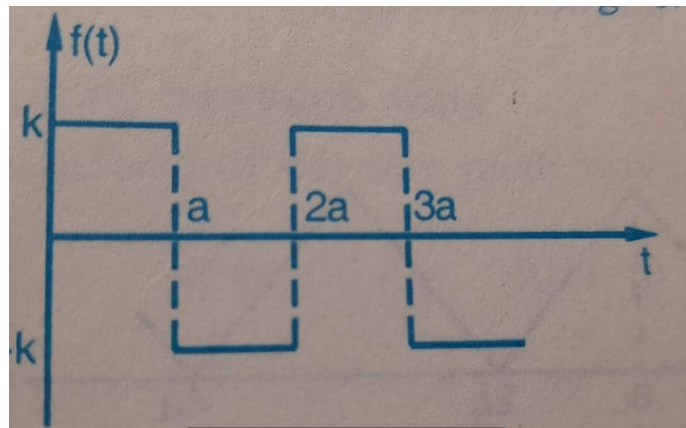
ii.  $\frac{s}{s^4 + s^2 + 1}$

iii.  $\frac{s}{s^4 + 4a^4}$

**11.** Find the laplace transform of the square wave function of period  $2a$  defined as

$$\begin{aligned} f(t) &= k \quad \text{if } 0 \leq t < a \\ &= -k \quad \text{if } a < t < 2a \end{aligned}$$

The graph of the square wave is shown in Fig.



**12.** Use transform method to solve

$$y'' + 3y' + 2y = e^t, \quad y(0) = 1, \quad y'(0) = 0.$$

**13.** Find the Laplace transform of

i.  $t u(t - a)$

ii.  $t^2 u(t - 3)$