

* Important Questions on Variation of Parameters:

1. $(D^2+1)y = \sec x$
2. $(D^2+1)y = \operatorname{cosec} x$
3. $(D^2+4)y = \tan 2x$
4. $(D^2+1)y = \sec x \cdot \tan x$
5. $(D^2-4D+4)y = e^{2x} \sec^2 x$
6. $(D^2-6D+9)y = e^{3x} x^2$
7. $(D^2-1)y = \frac{2}{1+e^x}$

* Cauchy's L.D.E. :

1. $x^2 \frac{d^2y}{dx^2} - 3x \frac{dy}{dx} + 5y = x^2 \sin(\log x)$
2. $x^2 \frac{d^2y}{dx^2} - 4x \frac{dy}{dx} + 6y = x^5$
3. $x^3 \frac{d^3y}{dx^3} + x^2 \frac{d^2y}{dx^2} - 2y = x^2 + x^{-3}$
4. $x^2 \frac{d^2y}{dx^2} - 3x \frac{dy}{dx} + 5y = x^2 \log x$
5. $x^3 \frac{d^2y}{dx^2} + 3x^2 \frac{dy}{dx} + xy = \sin(\log x)$

* Legendre's L.D.E. :

1. $(2x+3)^2 \frac{d^2y}{dx^2} - 2(2x+3) \frac{dy}{dx} - 12y = 6x$

2. $(x+2)^2 \frac{d^2y}{dx^2} + 3(x+2) \frac{dy}{dx} + y = 4 \sin(\log x+2)$

3. $(1+x)^2 \frac{d^2y}{dx^2} + (1+x) \frac{dy}{dx} + y = 4 \cos(\log 1+x)$

4. $(2x+1)^2 \frac{d^2y}{dx^2} - 2(2x+1) \frac{dy}{dx} - 12y = 6x$

5. $(1+x)^2 \frac{d^2y}{dx^2} + (1+x) \frac{dy}{dx} + y = 2 \sin(\log 1+x)$

* Simultaneous Equations:

1. $\frac{dx}{dt} + 2x - 3y = t$; $\frac{dy}{dt} - 3x + 2y = e^{2t}$

2. $\frac{du}{dx} + v = \sin x$; $\frac{dv}{dx} + u = \cos x$

3. $\frac{dx}{dt} + 5x - 2y = t$; $\frac{dy}{dt} + 2x + y = 0$

4. $(D-2)x + (D-1)y = e^t$; $(D+3)x + y = 0$

* Symmetrical Equations:

$$1. \frac{dx}{y^2} = \frac{dy}{-xy} = \frac{dz}{x(z-2y)}$$

$$2. \frac{dx}{2x} = \frac{dy}{-y} = \frac{dz}{4xy^2-2z}$$

$$3. \frac{dx}{y-z} = \frac{dy}{z-x} = \frac{dz}{x-y}$$

$$4. \frac{dx}{3z-4y} = \frac{dy}{4x-2z} = \frac{dz}{4y-3x}$$

$$5. \frac{dx}{y+zx} = \frac{dy}{-x-yz} = \frac{dz}{x^2-y^2}$$

$$6. \frac{dx}{x^2-y^2-z^2} = \frac{dy}{2xy} = \frac{dz}{2xz}$$

$$7. \frac{dx}{y} = \frac{dy}{-x} = \frac{dz}{x(e^{x^2+y^2})}$$

$$8. \frac{dx}{y} = \frac{dy}{-x} = \frac{dz}{2x-3y}$$

* Four