

# Mahakal Institute of Technology, Ujjain

Department of Mathematics

## PYQ's Unit -II

Q.N.	Question	Marks	RBT Level	CO
Q.1.	Solve $\frac{d^2 y}{dx^2} - \cot x \frac{dy}{dx} (1 - \cot x)y = e^x \sin x$	5	L3, L4	CO2
Q.2.	Solve $x^2 (d^2 y / dx^2) + x dy/dx - y = 0$ given that $x + 1/x$ is one integral.	5	L3, L4	CO2
Q.3	solve $(1 - x^2) d^2 y / dx^2 + x dy / dx - y = x(1 - x^2)^{3/2}$	5	L3, L4	CO2
Q.4.	Solve the differential equation by removal of first derivative method (By reducing it to normal form), $\frac{d^2 y}{dx^2} - 2 \tan x \frac{dy}{dx} + 5y = \sec x . e^x$	5	L3, L4	CO2
Q.5.	Solve $(d^2 y / dx^2) + 2x dy/dx + (x^2 + 1)y = x^3 + 3x$ by changing it in normal form.	5	L3, L4	CO2
Q.6	Solve by method of variation of parameters, $\frac{d^2 y}{dx^2} + 9y = \tan 3x$ or $(D^2 + 9)y = \tan 3x$	5	L3, L4	CO2
Q.7	Solve by method of variation of parameters, $\frac{d^2 y}{dx^2} + y = \tan x$			
Q.8	Solve by method of variation of parameters, $\frac{d^2 y}{dx^2} + 4y = \tan 2x$	Q.6	Q.6	Q.6
Q.9	Solve by method of variation of parameters, $\frac{d^2 y}{dx^2} + a^2 y = \tan ax$			

Q.11	Solve $\frac{d^2 y}{dx^2} - y = 0$ in series.	5	L3, L5	CO2
Q.12	Solve $(1-x^2)\frac{d^2 y}{dx^2} + 2x\frac{dy}{dx} + y = 0$ in series. Solve by power series method, $(1+x^2)\frac{d^2 y}{dx^2} + x\frac{dy}{dx} - y = 0$ or Solve in series the equation $(1+x^2)\frac{d^2 y}{dx^2} + x\frac{dy}{dx} - y = 0$ about the point $x = 0$ .	5	L3, L5	CO2
Q13.	Solve by using Frobenius method, $x(1-x)\frac{d^2 y}{dx^2} + 2(1-2x)\frac{dy}{dx} - 2y = 0$	5	L3, L5	CO2
Q14.	Show that (i) $J_{1/2}(x) = \sqrt{\frac{2}{\pi x}} \sin x$ (ii) $J_n(-x) = (-1)^n J_n(x)$ when $n$ is a positive or negative integer.	5	L3, L5	CO2