NORTH SOUTH UNIVERSITY

Committed to the Highest Standards of Academic Excellence
School of Engineering & Physical Sciences
Department of Mathematics & Physics

MAT 350 (Engineering Mathematics) - Section: 06
HW-1 Semester: Summer2022
Deadline: 12/06/2022

Questions-

Determine the order and the linearity of the following ODE:

1. $x\frac{d^3y}{dx^3} - (\frac{dy}{dx})^4 + y = 0$
2. $udv - (v + uv - ue^u)du = 0\,; \quad in\ v : in\ u$
3. $\frac{d^2R}{dt^2} = -\frac{k}{R^2}$
4. $(sin\theta)y''' - (cos\theta)y' = 2$

Solve the following differential equation by separation of variables:

5. $x\frac{dy}{dx} = 4y$
6. $ylnx\,\frac{dy}{dx} = (\frac{y+1}{x})^2$
7. $\frac{dP}{dt} = P - P^2$

Find an explicit solution of the following IVPs:

8. $\frac{dy}{dt} + 2y = 1, y(0) = \frac{5}{2}$
9. $\sqrt{1-y^2}dx - \sqrt{1-x^2}dy = 0, y(0) = \frac{\sqrt{3}}{2}$
10. Radiocarbon dating. What should be the ${}^{14}_{6}C$ content (in percent of y_0) of a fossilized tree that is claimed to be 3000 years old?

Note: Students are requested to submit the hard copy of the solution in class.