1. $2xy^2 y' = 2x^2 y - 5x^3$ is
   (a) a linear equation.
   (b) a separable equation.
   (c) a Bernoulli equation.
   (d) a homogeneous equation.
   (e) none of the above.

2. $xy' = 3x^3 y - 3x^2 y^3$ is
   (a) a Bernoulli equation.
   (b) a linear equation.
   (c) a separable equation.
   (d) a homogeneous equation.
   (e) none of the above.

3. $y' = x^2 [\sin(2y) - 2xy]$ is
   (a) a separable equation.
   (b) a linear equation.
   (c) a Bernoulli equation.
   (d) a homogeneous equation.
   (e) none of the above.

4. $3y' + 2x^2 y^4 - 3x^{-1} y = 0$ is
   (a) a linear equation.
   (b) a separable equation.
   (c) a Bernoulli equation.
   (d) a homogeneous equation.
   (e) none of the above.

5. $x^2 y' = 2xy - 5xe^x$ is
   (a) a linear equation.
   (b) a separable equation.
   (c) a Bernoulli equation.
   (d) a homogeneous equation.
   (e) none of the above.
6. $2xyy' = 2y^2 + x^2 \sin(y/x)$ is

(a) a linear equation.
(b) a homogeneous equation.
(c) a separable equation.
(d) a Bernoulli equation.
(e) none of the above.

7. The general solution of $y' = 6xy^{1/3} - \frac{3y}{x}$ is:

(a) $y^2 = \left(\frac{x^4 + C}{x^2}\right)^3$
(b) $y = \left(\frac{x^2 + C}{x}\right)^2$
(c) $y = \left(x + \frac{C}{x}\right)^{3/2}$
(d) $y^{2/3} = C(1 + x^2)$
(e) None of the above.

8. The general solution of $xy' = 4x^2e^{2x} + y$ is:

(a) $y = 2e^{2x} + C$
(b) $y = 2xe^{2x} + Cx$
(c) $y = 4xe^{2x} + Cx$
(d) $y = 2xe^{-2x} + Cx^2$
(e) None of the above.

9. The general solution of $\frac{dy}{dx} = \frac{x^3 + y^3}{xy^2}$ is:

(a) $y^2 = x^2 \ln Cx^2$
(b) $y^3 = x \ln Cx^3$
(c) $y^2 = x^2 \ln x^3 + Cx^2$
(d) $y^3 = x^3 \ln Cx^3$
(e) None of the above.

10. The general solution of $y' = \frac{y + \sqrt{x^2 - y^2}}{x}$ is

(a) $y = x \sin(\ln x) + Cx$
(b) $y = x \sin(\ln x) + C$
\(\text{(c) } y = Cx \sin(\ln x)\)
\(\text{\textcolor{red}{(d) } y = x \sin(\ln x + C)}\)
\(\text{(e) None of the above.}\)

11. The general solution of \(xe^{y/x} \frac{dy}{dx} = x + ye^{y/x}\) is:

\(\text{(a) } y = x \ln(Cx)\)
\(\text{\textcolor{red}{(b) } y = x \ln(\ln x + C)}\)
\(\text{(c) } y = x \ln(\ln x) + Cx\)
\(\text{(d) } y = x \ln x + Cx\)
\(\text{(e) None of the above.}\)

12. The solution of the initial-value problem \(2y \frac{dy}{dx} = 2xy^2 + 2x - y^2 - 1, \ y(0) = 1\) is:

\(\text{\textcolor{red}{(a) } y^2 = 2e^{x^2 - x} - 1}\)
\(\text{(b) } y^2 = e^{x^2 - x} - 2\)
\(\text{(c) } y^2 = 2e^{x-1} - 1\)
\(\text{(d) } y^2 + 1 = e^{x^2 - x}\)
\(\text{(e) None of the above.}\)

13. The general solution of \(x^2 y' + 2xy - y^3 = 0\) is:

\(\text{(a) } y^2 = \frac{4x}{Cx^2 + 1}\)
\(\text{(b) } y^2 = \frac{2 + Cx^5}{3x}\)
\(\text{\textcolor{red}{(c) } y^2 = \frac{5x}{2 + Cx^5}}\)
\(\text{(d) } y^2 = \frac{2 + Cx^4}{5x}\)
\(\text{(e) None of the above.}\)

14. The general solution of \(y' = \frac{x^3 + x^2y + 3y^3}{x^3 + 3xy^2}\) is:

\(\text{(a) } y^3 + x^2y = \ln x^3 + Cx^3\)
\(\text{\textcolor{red}{(b) } y^3 + x^2y = x^3 \ln x + Cx^3}\)
\(\text{(c) } y^3 + x^2y = \ln x + C\)
\(\text{(d) } y^3 + x^3 = x^3 \ln x + C\)
\(\text{(e) None of the above.}\)
15. The general solution of $x^2 y' + 2y = 2e^{1/x} \sqrt{y}$ is:

(a) $y^{1/2} = \frac{1}{x} e^{1/x} + Cx$

(b) $y^{1/2} = e^{1/x} \left( \frac{C - x}{x} \right)$

(c) $y^{1/2} = e^{1/x} \left( \frac{Cx - 1}{x} \right)$

(d) $y^{1/2} = xe^{1/x}(Cx + 1)$

(e) None of the above.