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

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

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

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

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

7. 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.

8. 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.

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

(a) \( y = x \ln(Cx) \)
(b) \( y = x \ln(\ln x + C) \)
(c) \( y = x \ln(\ln x) + Cx \)
(d) \( y = x \ln x + Cx \)
(e) None of the above.
10. The solution of the initial-value problem \( 2y \frac{dy}{dx} = 2xy^2 + 2x - y^2 - 1, \ y(0) = 1 \) is:

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

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

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

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

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

13. The general solution of \( x^2y' + 2y = 2e^{1/x} \sqrt{y} \) 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.
14. The solution of the initial-value problem \( xy' + y = x^4y^4 \), \( y(1) = 1/2 \) is:

(a) \( y^{-3} = x^3 (5 - 4x) \)
(b) \( y = \frac{1}{x (11 - 3x)^3} \)
(c) \( y^3 = \frac{1}{x (11 - 3x)} \)
(d) \( y = \frac{1}{x (11 - 3x)^{1/3}} \)
(e) None of the above.