

1. The general solution of $(D^2 + m^2) Y = 0$ is :

- (A) $Y = (C_1 + C_2 x) e^{mx}$
 (B) $Y = (C_1 + C_2 x) e^{-mx}$
 (C) $Y = C_1 e^{mx} + C_2 e^{-mx}$
 (D) $Y = C_1 \cos mx + C_2 \sin mx$

2. $Y = x^3$ is a part of complementary function of differential equation :

$$\frac{d^2y}{dx^2} + P \frac{dy}{dx} + QY = 0, \text{ if:}$$

- (A) $2 + 2Px + Qx^2 = 0$
 (B) $6 + 3Px + Qx^2 = 0$
 (C) $P + Qx = 0$
 (D) $1 - P + Q = 0$

3. The general solution of $(D - 1)^2 (D^2 - 2)^2 y = 0$, where D stands for $\frac{d}{dx}$, is :

- (A) $(C_1 + C_2 x) e^x + d_1 \cosh(x + d_2)$
 (B) $(C_1 + C_2 x) e^x + C_3 \cosh(\sqrt{2}x + C_4) + C_5 x \cdot \cosh(\sqrt{2}x + C_6)$
 (C) $C_1 e^x + C_2 e^{\sqrt{2}x} + C_3 e^{-\sqrt{2}x}$
 (D) $(C_1 + C_2 x) e^x + (C_3 + C_4 x) \cosh(\sqrt{x} + C_5) + C_6$

1. $(D^2 + m^2) Y = 0$ का व्यापक है :

- (A) $Y = (C_1 + C_2 x) e^{mx}$
 (B) $Y = (C_1 + C_2 x) e^{-mx}$
 (C) $Y = C_1 e^{mx} + C_2 e^{-mx}$
 (D) $Y = C_1 \cos mx + C_2 \sin mx$

2. $Y = x^3$ अवकल समीकरण $\frac{d^2y}{dx^2} + P \frac{dy}{dx} + QY = 0$, के पूरक फलन का एक भाग होगा, यदि :

- (A) $2 + 2Px + Qx^2 = 0$
 (B) $6 + 3Px + Qx^2 = 0$
 (C) $P + Qx = 0$
 (D) $1 - P + Q = 0$

3. $(D - 1)^2 (D^2 - 2)^2 y = 0$ जहाँ

$D \equiv \frac{d}{dx}$, का व्यापक हल है :

- (A) $(C_1 + C_2 x) e^x + d_1 \cosh(x + d_2)$
 (B) $(C_1 + C_2 x) e^x + C_3 \cosh(\sqrt{2}x + C_4) + C_5 x \cdot \cosh(\sqrt{2}x + C_6)$
 (C) $C_1 e^x + C_2 e^{\sqrt{2}x} + C_3 e^{-\sqrt{2}x}$
 (D) $(C_1 + C_2 x) e^x + (C_3 + C_4 x) \cosh(\sqrt{x} + C_5) + C_6$

4. Let $y = y(x)$ be a solution of $\frac{d^2y}{dx^2} - y = 0$ with condition $y(0) = 1$ and $\lim_{x \rightarrow 1\infty} y(x) = 0$. Then $y(x)$ is :
- (A) e^{-2x}
 (B) e^{-x}
 (C) $\frac{1}{1+x^2}$
 (D) $e^x + e^{-x}$
5. A particular integral of $\frac{d^2y}{dx^2} + a^2y = e^x, a \in IR$, is :
- (A) $\frac{e^x}{1+a^2}$
 (B) $\frac{e^x}{1+a^2} - \cos ax$
 (C) $\frac{e^x}{1+a^2} - \sin ax$
 (D) All of these
6. A particular integral of $\frac{d^2y}{dx^2} + a^2y = \cos ax$ is :
- (A) $\frac{-x}{2a} \cos ax$
 (B) $\frac{x}{2a} \sin ax + \frac{1}{4a^2} \cos ax$
 (C) $\frac{x}{2a} \cos ax$
 (D) $\frac{x}{2a} \cos ax + \frac{1}{4a^2} \cos ax$
4. मान लीजिए $\frac{d^2y}{dx^2} - y = 0$ का एक हल $y = y(x)$ है, जहाँ $y(0) = 1$ और $\lim_{x \rightarrow 1\infty} y(x) = 0$, तब $y(x)$ है :
- (A) e^{-2x}
 (B) e^{-x}
 (C) $\frac{1}{1+x^2}$
 (D) $e^x + e^{-x}$
5. $\frac{d^2y}{dx^2} + a^2y = e^x, a \in IR$ का एक विशिष्ट समाकल है :
- (A) $\frac{e^x}{1+a^2}$
 (B) $\frac{e^x}{1+a^2} - \cos ax$
 (C) $\frac{e^x}{1+a^2} - \sin ax$
 (D) इनमें से सभी
6. $\frac{d^2y}{dx^2} + a^2y = \cos ax$ का एक विशिष्ट समाकल है :
- (A) $\frac{-x}{2a} \cos ax$
 (B) $\frac{x}{2a} \sin ax + \frac{1}{4a^2} \cos ax$
 (C) $\frac{x}{2a} \cos ax$
 (D) $\frac{x}{2a} \cos ax + \frac{1}{4a^2} \cos ax$

7. $y = e^{-x}$ is a solution of $\frac{d^2y}{dx^2} + P \frac{dy}{dx} + Qy = 0$, if:
- (A) $1 + P + Q = 0$
 (B) $P + Qx = 0$
 (C) $2 + 2Px + Qx^2 = 0$
 (D) None of these
8. $y = x^2$ is a solution of $\frac{d^2y}{dx^2} + P \frac{dy}{dx} + Qy = 0$, if:
- (A) $1 - P + Q = 0$
 (B) $1 + P + Q = 0$
 (C) $P + Qx = 0$
 (D) $2 + 2Px + Qx^2 = 0$
9. Give that $y(x) = x$ is a solution of $(x^2 + 1) \frac{d^2y}{dx^2} - 2x \frac{dy}{dx} + 2y = 0$. Then another linearly independent solution to x is:
- (A) $(x - \frac{1}{x})$
 (B) $(x + \frac{1}{x})$
 (C) $x^2 - 1$
 (D) $x^2 + 1$
7. $\frac{d^2y}{dx^2} + P \frac{dy}{dx} + Qy = 0$ का हल $y = e^{-x}$ है, यदि:
- (A) $1 + P + Q = 0$
 (B) $P + Qx = 0$
 (C) $2 + 2Px + Qx^2 = 0$
 (D) इनमें से कोई नहीं
8. $\frac{d^2y}{dx^2} + P \frac{dy}{dx} + Qy = 0$ का हल $y = x^2$ है, यदि:
- (A) $1 - P + Q = 0$
 (B) $1 + P + Q = 0$
 (C) $P + Qx = 0$
 (D) $2 + 2Px + Qx^2 = 0$
9. दिया गया है कि $y(x) = x$, $(x^2 + 1) \frac{d^2y}{dx^2} - 2x \frac{dy}{dx} + 2y = 0$ का एक हल है। तब x का एक और रैखिक रूप से स्वतंत्र हल है:
- (A) $(x - \frac{1}{x})$
 (B) $(x + \frac{1}{x})$
 (C) $x^2 - 1$
 (D) $x^2 + 1$

10. Let y_p be a particular solution of $(D - a)^n \phi(D)y = e^{ax}$, where $D \equiv \frac{d}{dx}$ and $\phi(a) \neq 0$. Then y_p is

- (A) $\frac{x^n e^{ax}}{\phi(a)}$
 (B) $\frac{x^n e^{ax}}{n! \phi(a)}$
 (C) $\frac{x^n e^{ax}}{n! \phi^{(n)}(a)}$
 (D) $\frac{x^n e^{ax}}{\phi^{(n)}(a)}$

11. $\frac{d^2y}{dx^2} + y = x$ has linearly independent solutions, which are total in number :

- (A) 0
 (B) 1
 (C) 2
 (D) 3

12. The normal form of equation $\frac{d^2y}{dx^2} + \frac{2}{x} \frac{dy}{dx} + x^2y = 0$ is $\frac{d^2v}{dx^2} + Q, v = R/u$, where u is :

- (A) x
 (B) $-x$
 (C) $\frac{1}{x}$
 (D) $-\frac{1}{x}$

10. मान लीजिए y_p , समीकरण $(D - a)^n \phi(D)y = e^{ax}$ का एक विशिष्ट हल है, जहाँ $D \equiv \frac{d}{dx}$ और $\phi(a) \neq 0$, तब y_p है :

- (A) $\frac{x^n e^{ax}}{\phi(a)}$
 (B) $\frac{x^n e^{ax}}{n! \phi(a)}$
 (C) $\frac{x^n e^{ax}}{n! \phi^{(n)}(a)}$
 (D) $\frac{x^n e^{ax}}{\phi^{(n)}(a)}$

11. $\frac{d^2y}{dx^2} + y = x$ के रैखिक स्वतंत्र हल हैं, जो संख्या में कुल हैं :

- (A) 0
 (B) 1
 (C) 2
 (D) 3

12. समीकरण $\frac{d^2y}{dx^2} + \frac{2}{x} \frac{dy}{dx} + x^2y = 0$ का सामान्य रूप $\frac{d^2v}{dx^2} + Q, v = R/u$ है, जहाँ u है :

- (A) x
 (B) $-x$
 (C) $\frac{1}{x}$
 (D) $-\frac{1}{x}$

13. For a linear differential equation
 $A \frac{d^2y}{dx^2} + B \frac{dy}{dx} + Cy = X$, $A \neq 0$,
 If $A + B + C = 0$, then part of
 C.F. of the solution is :

- (A) $y = x$
 (B) $y = x^2$
 (C) $y = e^x$
 (D) $y = e^{-x}$

14. Particular integral of the
 differential equation $\frac{d^2y}{dx^2} - 4y =$
 $e^x + \sin 2x$ is :

- (A) $\frac{-e^x}{3} - \frac{\sin 2x}{8}$
 (B) $\frac{e^x}{3} + \frac{\sin 2x}{8}$
 (C) $\frac{-e^x}{3} + \frac{\sin 2x}{8}$
 (D) $\frac{e^x}{3} - \frac{\sin 2x}{8}$

15. Which of the following is a
 linear differential equation with
 constant coefficients ?

- (A) $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + 2y = 0$
 (B) $x^2 y \frac{d^2y}{dx^2} + 3 \frac{dy}{dx} + 2y = 0$
 (C) $2 \frac{d^2y}{dx^2} + 5 \frac{dy}{dx} + y = 10$
 (D) $(x^2 + 1) \frac{d^2y}{dx^2} + 3x \frac{dy}{dx} +$
 $5y = 0$

13. रैखिक अवकल समीकरण $A \frac{d^2y}{dx^2} +$
 $B \frac{dy}{dx} + Cy = X$, $A \neq 0$ के लिए यदि
 $A + B + C = 0$, तब हल के C.F. का
 एक भाग है :

- (A) $y = x$
 (B) $y = x^2$
 (C) $y = e^x$
 (D) $y = e^{-x}$

14. अवकल समीकरण $\frac{d^2y}{dx^2} - 4y = e^x +$
 $\sin 2x$ का विशिष्ट समाकल है :

- (A) $\frac{-e^x}{3} - \frac{\sin 2x}{8}$
 (B) $\frac{e^x}{3} + \frac{\sin 2x}{8}$
 (C) $\frac{-e^x}{3} + \frac{\sin 2x}{8}$
 (D) $\frac{e^x}{3} - \frac{\sin 2x}{8}$

15. निम्नलिखित में से कौन सा स्थिर गुणांक के
 साथ एक रैखिक अवकल समीकरण है ?

- (A) $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + 2y = 0$
 (B) $x^2 y \frac{d^2y}{dx^2} + 3 \frac{dy}{dx} + 2y = 0$
 (C) $2 \frac{d^2y}{dx^2} + 5 \frac{dy}{dx} + y = 10$
 (D) $(x^2 + 1) \frac{d^2y}{dx^2} + 3x \frac{dy}{dx} +$
 $5y = 0$

16. Consider the following initial value problem $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = x$, $y(0) = \frac{5}{36}$, $y'(0) = \frac{1}{6}$

Then the value of $y(1)$ is :

- (A) $\frac{10}{36}$
 (B) $\frac{11}{36}$
 (C) $\frac{15}{36}$
 (D) $\frac{5}{36}$

17. Particular integral of the differential equation $(D^2 - 2D + 5)y = e^{2x} \sin x$, where $D = \frac{d}{dx}$, is:

- (A) $-\frac{1}{10} e^{2x} [\cos x - 2\sin x]$
 (B) $\frac{1}{10} e^{2x} [\cos x - 2\sin x]$
 (C) $\frac{1}{10} e^{3x} [\cos x - 2\sin x]$
 (D) $\frac{1}{10} e^{3x} [\cos x + 2\sin x]$

18. Particular integral of the differential equation $\frac{d^2y}{dx^2} + a^2y = \cos(ax)$, $a \neq 0$, is :

- (A) $\frac{x}{2a} \sin(ax)$
 (B) $\frac{-x}{2a} \sin(ax)$
 (C) $\frac{x^2}{2a} \sin(ax)$
 (D) $\frac{x}{2a^3} \cos(ax)$

16. निम्नलिखित प्रारम्भिक मूल समस्या पर विचार कीजिए $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = x$, $y(0) = \frac{5}{36}$, $y'(0) = \frac{1}{6}$ तो $y(1)$ का मान है :

- (A) $\frac{10}{36}$
 (B) $\frac{11}{36}$
 (C) $\frac{15}{36}$
 (D) $\frac{5}{36}$

17. अवकल समीकरण $(D^2 - 2D + 5)y = e^{2x} \sin x$ जहाँ $D = \frac{d}{dx}$, का विशिष्ट समाकल है :

- (A) $-\frac{1}{10} e^{2x} [\cos x - 2\sin x]$
 (B) $\frac{1}{10} e^{2x} [\cos x - 2\sin x]$
 (C) $\frac{1}{10} e^{3x} [\cos x - 2\sin x]$
 (D) $\frac{1}{10} e^{3x} [\cos x + 2\sin x]$

18. अवकल समीकरण $\frac{d^2y}{dx^2} + a^2y = \cos(ax)$, $a \neq 0$ का विशिष्ट समाकल है :

- (A) $\frac{x}{2a} \sin(ax)$
 (B) $\frac{-x}{2a} \sin(ax)$
 (C) $\frac{x^2}{2a} \sin(ax)$
 (D) $\frac{x}{2a^3} \cos(ax)$

19. $y = e^{ax}$ is a solution of the differential equation
 $y'' + Py' + Qy = 0$ if:
 (A) $a^2 + aP + Q = 0$
 (B) $a^2 - aP + Q = 0$
 (C) $a^2 + aP - Q = 0$
 (D) $a^2 - aP - Q = 0$
20. Let $y = C_1u + C_2v + Au + Bv$ be solution obtained by using method of variation of parameters for the differential equation $y'' + Py' + Qy = X$, Where P, Q, X are function of x , and $X \neq 0$. Then particular integral y_p is:
 (A) $Au + Bv$
 (B) $Au - Bv$
 (C) $u + v$
 (D) $u - v$
21. Let $y(x) = C_1u + C_2v + A_1u + B_1v$ is the solution of the differential equation $\frac{d^2y}{dx^2} + y = \operatorname{cosec} x$ when we solve it by the method of variation of parameter. Then the values of u, v, A_1, B_1 are:
 (A) $\cos x, \sin x, -x^2, \log \sin x$
 (B) $\cos x, \sin x, -x, \log \sin x$
 (C) $\cos^2 x, \sin x, x, \log \sin x$
 (D) $\cos x, \sin x, x, -\log \sin x$
 Where C_1, C_2 are arbitrary constants.
19. अवकल समीकरण $y'' + Py' + Qy = 0$ का एक हल $y = e^{ax}$ है, यदि:
 (A) $a^2 + aP + Q = 0$
 (B) $a^2 - aP + Q = 0$
 (C) $a^2 + aP - Q = 0$
 (D) $a^2 - aP - Q = 0$
20. मान लीजिए $y = C_1u + C_2v + Au + Bv$ समीकरण $y'' + Py' + Qy = X$ जहाँ P, Q, X x के फलन हैं, और $X \neq 0$, का हल पैरामीटर की भिन्नता विधि से प्राप्त हल है तब विशिष्ट समाकल y_p है
 (A) $Au + Bv$
 (B) $Au - Bv$
 (C) $u + v$
 (D) $u - v$
21. मान लीजिये कि $y(x) = C_1u + C_2v + A_1u + B_1v$ अवकल समीकरण $\frac{d^2y}{dx^2} + y = \operatorname{cosec} x$ का हल है जब इसे हम पैरामीटर की भिन्नता की विधि से हल करते हैं। तो u, v, A_1, B_1 के मान हैं:
 (A) $\cos x, \sin x, -x^2, \log \sin x$
 (B) $\cos x, \sin x, -x, \log \sin x$
 (C) $\cos^2 x, \sin x, x, \log \sin x$
 (D) $\cos x, \sin x, x, -\log \sin x$
 जहाँ C_1, C_2 स्वेच्छ नियतांक हैं।

22. If $y = x^m$ be the solution of the differential equation $\frac{d^2y}{dx^2} +$

$$P \frac{dy}{dx} + Qy = 0 \text{ then :}$$

- (A) $m + Pmx + Qx^2 = 0$
 (B) $m^2 + Pmx + Qx^2 = 0$
 (C) $m(m - 1) + Pmx + Qx^2 = 0$
 (D) $m + Pm(m - 1)x + Qx = 0$

Where P, Q are the functions of the variable x .

23. If $y = e^{mx}$ is a solution of the differential equation $\frac{d^2y}{dx^2} +$

$$P \frac{dy}{dx} + Qy = 0 \text{ then :}$$

- (A) $m^2 + Pm + Q = 0$
 (B) $m^2 - Pm + Q^2 = 0$
 (C) $m + Pm^2 + Q = 0$
 (D) $m^3 + Pm + Q = 0$

Where P, Q are the functions of the variable x .

22. यदि $y = x^m$ अवकल समीकरण $\frac{d^2y}{dx^2} +$

$$P \frac{dy}{dx} + Qy = 0 \text{ का हल है, तो :}$$

- (A) $m + Pmx + Qx^2 = 0$
 (B) $m^2 + Pmx + Qx^2 = 0$
 (C) $m(m - 1) + Pmx + Qx^2 = 0$
 (D) $m + Pm(m - 1)x + Qx = 0$

जहाँ P, Q चर x के फलन हैं।

23. यदि $y = e^{mx}$ अवकल समीकरण $\frac{d^2y}{dx^2} +$

$$P \frac{dy}{dx} + Qy = 0 \text{ का एक हल है तो :}$$

- (A) $m^2 + Pm + Q = 0$
 (B) $m^2 - Pm + Q^2 = 0$
 (C) $m + Pm^2 + Q = 0$
 (D) $m^3 + Pm + Q = 0$

जहाँ P, Q चर x के फलन हैं।

24. If by putting $y = uv$ the differential equation $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = R$ is transformed into the normal form $\frac{d^2v}{dx^2} + Iv = \frac{R}{u}$, then the values of I and u are :

- (A) $Q - \frac{P^2}{4} - \frac{1}{2} \frac{dP}{dx}, e^{-\frac{1}{2} \int P dx}$
 (B) $Q + \frac{P^2}{4} - \frac{1}{2} \frac{dP}{dx}, e^{\frac{1}{2} \int P dx}$
 (C) $Q - \frac{P^2}{4} + \frac{1}{2} \frac{dP}{dx}, e^{\int P dx}$
 (D) $Q^2 - \frac{P^2}{4} - \frac{1}{2} \frac{dP}{dx}, e^{\int P dx}$

Where P, Q, R, u and v are some functions of x .

25. Cauchy Euler form of the differential equation $(5 + 2x)^2 \frac{d^2y}{dx^2} - 6(5 + 2x) \frac{dy}{dx} + 8y = 0$ is :

- (A) $t^2 \frac{d^2y}{dt^2} + 3t \frac{dy}{dt} + 2y = 0,$
 $t = 5 + 2x$
 (B) $t^2 \frac{d^2y}{dt^2} - 3t \frac{dy}{dt} + 2y = 0,$
 $t = 5 + 2x$
 (C) $t^2 \frac{d^2y}{dt^2} - 4t \frac{dy}{dt} + 3y = 0,$
 $t = 5 + 2x$
 (D) $t^2 \frac{d^2y}{dt^2} - 6t \frac{dy}{dt} + 8y = 0,$
 $t = 5 + 2x$

24. यदि $y = uv$ रखने पर, अवकल समीकरण $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = R$ सामान्य रूप $\frac{d^2v}{dx^2} + Iv = \frac{R}{u}$ में परिवर्तित हो जाता तो I एवं u के मान हैं :

- (A) $Q - \frac{P^2}{4} - \frac{1}{2} \frac{dP}{dx}, e^{-\frac{1}{2} \int P dx}$
 (B) $Q + \frac{P^2}{4} - \frac{1}{2} \frac{dP}{dx}, e^{\frac{1}{2} \int P dx}$
 (C) $Q - \frac{P^2}{4} + \frac{1}{2} \frac{dP}{dx}, e^{\int P dx}$
 (D) $Q^2 - \frac{P^2}{4} - \frac{1}{2} \frac{dP}{dx}, e^{\int P dx}$

जहाँ P, Q, R, u एवं v चर x के कुछ फलन हैं।

25. अवकल समीकरण $(5 + 2x)^2 \frac{d^2y}{dx^2} - 6(5 + 2x) \frac{dy}{dx} + 8y = 0$ का कॉची आयलर रूप है :

- (A) $t^2 \frac{d^2y}{dt^2} + 3t \frac{dy}{dt} + 2y = 0,$
 $t = 5 + 2x$
 (B) $t^2 \frac{d^2y}{dt^2} - 3t \frac{dy}{dt} + 2y = 0,$
 $t = 5 + 2x$
 (C) $t^2 \frac{d^2y}{dt^2} - 4t \frac{dy}{dt} + 3y = 0,$
 $t = 5 + 2x$
 (D) $t^2 \frac{d^2y}{dt^2} - 6t \frac{dy}{dt} + 8y = 0,$
 $t = 5 + 2x$

26. Which of following is Cauchy Euler equation ?

(A) $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + 2y = 0$

(B) $x^2 \frac{d^2y}{dx^2} + \frac{dy}{dx} + y = 0$

(C) $x^4 \frac{d^3y}{dx^3} + x^2 \frac{d^2y}{dx^2} + \frac{dy}{dx} + y = 10$

(D) $(x + 1)^3 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = 20$

27. Particular integral of the differential equation $\frac{d^2y}{dx^2} - 3 \frac{dy}{dx} + 2y = e^{5x}$ is :

(A) $\frac{1}{12} e^{50x}$

(B) $\frac{1}{12} e^{5x}$

(C) $\frac{1}{120} e^{5x}$

(D) $\frac{1}{14} e^{-5x}$

28. The general solution of the differential equation $\frac{d^2y}{dx^2} -$

$13 \frac{dy}{dx} + 12y = 0$ is :

(A) $y(x) = C_1 e^{12x} + C_2 e^x$

(B) $y(x) = C_1 e^{-12x} + C_2 e^x$

(C) $y(x) = C_1 e^{12x} + C_2 e^{-x}$

(D) $y(x) = C_1 e^{-x} + C_2 e^x$

Where C_1, C_2 are arbitrary constants.

26. निम्नलिखित में से कौन कॉची आयलर समीकरण है ?

(A) $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + 2y = 0$

(B) $x^2 \frac{d^2y}{dx^2} + \frac{dy}{dx} + y = 0$

(C) $x^4 \frac{d^3y}{dx^3} + x^2 \frac{d^2y}{dx^2} + \frac{dy}{dx} + y = 10$

(D) $(x + 1)^3 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = 20$

27. अवकल समीकरण $\frac{d^2y}{dx^2} - 3 \frac{dy}{dx} + 2y = e^{5x}$ का विशिष्ट समाकल है :

(A) $\frac{1}{12} e^{50x}$

(B) $\frac{1}{12} e^{5x}$

(C) $\frac{1}{120} e^{5x}$

(D) $\frac{1}{14} e^{-5x}$

28. अवकल समीकरण $\frac{d^2y}{dx^2} - 13 \frac{dy}{dx} + 12y = 0$ का सामान्य हल है :

(A) $y(x) = C_1 e^{12x} + C_2 e^x$

(B) $y(x) = C_1 e^{-12x} + C_2 e^x$

(C) $y(x) = C_1 e^{12x} + C_2 e^{-x}$

(D) $y(x) = C_1 e^{-x} + C_2 e^x$

जहाँ C_1, C_2 स्वेच्छ नियतांक हैं।

29. Which of the following is a homogeneous linear differential equation with constant coefficients ?

(A) $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = 10$

(B) $x \frac{d^2y}{dx^2} + \frac{dy}{dx} + 2y = 20$

(C) $\frac{d^2y}{dx^2} + 5 \frac{dy}{dx} + 10y = 0$

(D) $x \frac{d^3y}{dx^3} + 2 \frac{dy}{dx} + xy = 0$

30. If the independent variable is changed from x to z in the differential equation $\frac{d^2y}{dx^2} +$

$\cot x \frac{dy}{dx} + 4y \operatorname{cosec}^2 x = 0$

where z is a function of x , then the transformed differential equation is :

(A) $\frac{d^2y}{dz^2} - y = 0$

(B) $\frac{d^2y}{dz^2} + y = 0$

(C) $\frac{d^2y}{dz^2} + y = 2$

(D) $\frac{d^2y}{dz^2} + 3y = 0$

29. निम्नलिखित में से कौन सा स्थिर गुणांकों के साथ एक सजातीय रैखिक अवकल समीकरण है ?

(A) $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = 10$

(B) $x \frac{d^2y}{dx^2} + \frac{dy}{dx} + 2y = 20$

(C) $\frac{d^2y}{dx^2} + 5 \frac{dy}{dx} + 10y = 0$

(D) $x \frac{d^3y}{dx^3} + 2 \frac{dy}{dx} + xy = 0$

30. यदि अवकल समीकरण $\frac{d^2y}{dx^2} + \cot x \frac{dy}{dx} +$

$4y \operatorname{cosec}^2 x = 0$ में स्वतंत्र चर x से z

में परिवर्तित किया जाता है, जहाँ z , x का फलन है, तो परिवर्तित अवकल समीकरण है :

(A) $\frac{d^2y}{dz^2} - y = 0$

(B) $\frac{d^2y}{dz^2} + y = 0$

(C) $\frac{d^2y}{dz^2} + y = 2$

(D) $\frac{d^2y}{dz^2} + 3y = 0$

31. Consider the differential equation

$$\frac{d^2y}{dx^2} + P \frac{dy}{dx} + Qy = R \dots (i)$$

Where P, Q, R are the functions of x . If the independent variable in (i) is changed from x to z where z is a function of x , then the equation (i) is transformed into the equation

$$\frac{d^2y}{dz^2} + P_1 \frac{dy}{dz} + Q_1 y = R_1 \dots (ii)$$

Then the values of P_1, Q_1, R_1 in (ii) are :

(A) $\frac{\frac{d^2z}{dx^2} + P \left(\frac{dz}{dx}\right)}{\left(\frac{dz}{dx}\right)^2}, \frac{Q}{\left(\frac{dz}{dx}\right)^2}, \frac{R}{\left(\frac{dz}{dx}\right)^2}$

(B) $\frac{\frac{d^2z}{dx^2} - P \left(\frac{dz}{dx}\right)}{\left(\frac{dz}{dx}\right)^2}, \frac{Q}{\left(\frac{dz}{dx}\right)^2}, \frac{R}{\left(\frac{dz}{dx}\right)^2}$

(C) $\frac{d^2z}{dx^2} - \frac{dz}{dx}, Q \left(\frac{dz}{dx}\right), R \left(\frac{dz}{dx}\right)$

(D) $\frac{dz}{dx} + P, Q \left(\frac{dz}{dx}\right)^2, R \left(\frac{dz}{dx}\right)^2$

32. Normal form of the differential

$$\text{equation } \frac{d^2y}{dx^2} + 2x \frac{dy}{dx} + (x^2 + 5)$$

$y = xe^{-\frac{x^2}{2}}$ is :

(A) $\frac{d^2v}{dx^2} + 4v = x$

(B) $\frac{d^2v}{dx^2} + 8v = x$

(C) $\frac{d^2v}{dx^2} - 4v = x^2$

(D) $\frac{d^2v}{dx^2} - 12v = x$

Where $y = uv$ be the solution of given differential equation and u, v and the functions of x .

31. अवकल समीकरण $\frac{d^2y}{dx^2} + P \frac{dy}{dx} + Qy =$

$$R \dots (i) \text{ पर विचार कीजिए, जहाँ}$$

P, Q, R x के फलन है। यदि (i) में स्वतंत्र चर x से z में परिवर्तित किया जाता है, जहाँ z, x का फलन है, तो समीकरण (i)

$$\text{समीकरण } \frac{d^2y}{dz^2} + P_1 \frac{dy}{dz} + Q_1 y =$$

$R_1 \dots (ii)$ में परिवर्तित हो जाता है। तो

(ii) में P_1, Q_1, R_1 के मान हैं :

(A) $\frac{\frac{d^2z}{dx^2} + P \left(\frac{dz}{dx}\right)}{\left(\frac{dz}{dx}\right)^2}, \frac{Q}{\left(\frac{dz}{dx}\right)^2}, \frac{R}{\left(\frac{dz}{dx}\right)^2}$

(B) $\frac{\frac{d^2z}{dx^2} - P \left(\frac{dz}{dx}\right)}{\left(\frac{dz}{dx}\right)^2}, \frac{Q}{\left(\frac{dz}{dx}\right)^2}, \frac{R}{\left(\frac{dz}{dx}\right)^2}$

(C) $\frac{d^2z}{dx^2} - \frac{dz}{dx}, Q \left(\frac{dz}{dx}\right), R \left(\frac{dz}{dx}\right)$

(D) $\frac{dz}{dx} + P, Q \left(\frac{dz}{dx}\right)^2, R \left(\frac{dz}{dx}\right)^2$

32. अवकल समीकरण $\frac{d^2y}{dx^2} + 2x \frac{dy}{dx} + (x^2 +$

$5) y = xe^{-\frac{x^2}{2}}$ का सामान्य रूप है :

(A) $\frac{d^2v}{dx^2} + 4v = x$

(B) $\frac{d^2v}{dx^2} + 8v = x$

(C) $\frac{d^2v}{dx^2} - 4v = x^2$

(D) $\frac{d^2v}{dx^2} - 12v = x$

जहाँ $y = uv$ दिये गये अवकल समीकरण का हल है एवं u, v x के फलन हैं।

33. Let $y(x) = C_1 \cos(ax) + C_2 \sin(ax) + A_1 \cos(ax) + B_1 \sin(ax)$ be the solution of the differential equation $\frac{d^2y}{dx^2} + a^2y = \sec(ax)$ when we solve it by the method of variation of parameter. Then the values of A_1 & B_1 are :

- (A) $\frac{1}{a^2} \log \cos(ax), \frac{x}{a}$
 (B) $\frac{2}{a^2} \log \cos(ax), \frac{x}{a}$
 (C) $\frac{1}{a^2} \log \sin(ax), \frac{x^2}{a^2}$
 (D) $\frac{1}{a^2} \log \sin(ax), \frac{x}{a}$

Where C_1, C_2 are the arbitrary constant.

34. The particular integral of $\frac{d^4y}{dx^4} +$

$y = x^4$ is :

- (A) $x^4 - 24$
 (B) $x^4 - 1$
 (C) $x^4 - 4$
 (D) 24

33. मान लीजिये कि $y(x) = C_1 \cos(ax) + C_2 \sin(ax) + A_1 \cos(ax) + B_1 \sin(ax)$, अवकल समीकरण $\frac{d^2y}{dx^2} + a^2y = \sec(ax)$ का हल है जब इसे हम पैरामीटर की भिन्नता की विधि से हल करते हैं। तो A_1 एवं B_1 के मान हैं।

- (A) $\frac{1}{a^2} \log \cos(ax), \frac{x}{a}$
 (B) $\frac{2}{a^2} \log \cos(ax), \frac{x}{a}$
 (C) $\frac{1}{a^2} \log \sin(ax), \frac{x^2}{a^2}$
 (D) $\frac{1}{a^2} \log \sin(ax), \frac{x}{a}$

जहाँ C_1, C_2 स्वेच्छ नियतांक है।

34. $\frac{d^4y}{dx^4} + y = x^4$ का विशेष समाकल है :

- (A) $x^4 - 24$
 (B) $x^4 - 1$
 (C) $x^4 - 4$
 (D) 24

35. If $x = x(t)$, $y = y(t)$ be the solution of the linear system $\frac{dx}{dt} = 6x + 4y$, $\frac{dy}{dt} = 10x + 6y$.

Then $x(t)$ satisfies :

- (A) $(D^2 - 12D - 4)x = 0$
 (B) $(D^2 - 12D + 4)x = 0$
 (C) $(2D^2 + 12D - 4)x = 0$
 (D) $(D^3 + 12D^2 - 8)x = 0$

Where $D = \frac{d}{dt}$.

36. Two independent integrals u, v of the simultaneous differential equations $dx = dy = dz$ are :

- (A) $x + y, y + z$
 (B) $x - y, y - z$
 (C) $x^2 + y^2, y^2 + z^2$
 (D) $x^3 + y^3, y^3 + z^3$

37. Two independent solutions of the simultaneous differential equations $\frac{dx}{1} = \frac{dy}{-2} = \frac{dz}{3x^2 \sin(y+2x)}$ are :

- (A) $2x + y = C_1, x^3 \sin(2x + y) - z = C_2$
 (B) $2x - y = C_1, x^3 \sin(2x - y) + z = C_2$
 (C) $x + y = C_1, \sin x - z = C_2$
 (D) $x - y = C_1, \sin x - \sin z = C_2$

Where C_1, C_2 are the arbitrary constants

35. यदि $x = x(t)$, $y = y(t)$ रैखीय प्रणाली $\frac{dx}{dt} = 6x + 4y$, $\frac{dy}{dt} = 10x + 6y$ के हल हैं। तो $x(t)$ सन्तुष्ट करता है

- (A) $(D^2 - 12D - 4)x = 0$
 (B) $(D^2 - 12D + 4)x = 0$
 (C) $(2D^2 + 12D - 4)x = 0$
 (D) $(D^3 + 12D^2 - 8)x = 0$

जहाँ $D = \frac{d}{dt}$.

36. समकालिक अवकल समीकरणों $dx = dy = dz$ के दो u, v स्वतंत्र समाकल हैं :

- (A) $x + y, y + z$
 (B) $x - y, y - z$
 (C) $x^2 + y^2, y^2 + z^2$
 (D) $x^3 + y^3, y^3 + z^3$

37. समकालिक अवकल समीकरणों $\frac{dx}{1} = \frac{dy}{-2} = \frac{dz}{3x^2 \sin(y+2x)}$ के दो स्वतंत्र हल हैं :

- (A) $2x + y = C_1, x^3 \sin(2x + y) - z = C_2$
 (B) $2x - y = C_1, x^3 \sin(2x - y) + z = C_2$
 (C) $x + y = C_1, \sin x - z = C_2$
 (D) $x - y = C_1, \sin x - \sin z = C_2$

जहाँ C_1, C_2 स्वेच्छ नियतांक हैं।

38. Two independent solutions of the differential equations $\frac{dx}{1+y} =$

$\frac{dy}{1+x} = \frac{dz}{z}$ are :

- (A) $(1+x)^2 + (1+y)^3 = C_1, x+y+z = C_2$
 (B) $(1+x)^2 - (1+y)^2 = C_1, \frac{z+x+y}{z} = C_2$
 (C) $(1+x)^2 - (y^2 + y)^2 = C_1, \frac{z+x+y}{z} = C_2$
 (D) $(1+x)^2 - (1+y)^2 = C_1, \frac{2+x+y}{z} = C_2$

Where C_1, C_2 are the arbitrary constants.

39. Let $x = x(t), y = y(t)$ be the solutions of the equations $\frac{dx}{dt} = -\omega y, \frac{dy}{dt} = \omega x$ then :

- (A) $x(t) = A \cos(\omega t) + B \sin(\omega t), y(t) = A \sin(\omega t) - B \cos(\omega t)$
 (B) $x(t) = A \cos^2(\omega t) + B \sin(\omega t), y(t) = A \sin^2(\omega t) + B \cos(\omega t)$
 (C) $x(t) = A \cos(\omega t) + B \sin^2(\omega t), y(t) = A \sin^2(\omega t) + B \cos^2(\omega t)$
 (D) None of these

38. अवकल समीकरणों $\frac{dx}{1+y} = \frac{dy}{1+x} = \frac{dz}{z}$ के दो स्वतंत्र हल है :

- (A) $(1+x)^2 + (1+y)^3 = C_1, x+y+z = C_2$
 (B) $(1+x)^2 - (1+y)^2 = C_1, \frac{z+x+y}{z} = C_2$
 (C) $(1+x)^2 - (y^2 + y)^2 = C_1, \frac{z+x+y}{z} = C_2$
 (D) $(1+x)^2 - (1+y)^2 = C_1, \frac{2+x+y}{z} = C_2$

जहाँ C_1, C_2 स्वेच्छ नियतांक है।

39. मान लीजिये कि $x = x(t), y = y(t)$ समीकरणों $\frac{dx}{dt} = -\omega y, \frac{dy}{dt} = \omega x$ के हल हैं। तो :

- (A) $x(t) = A \cos(\omega t) + B \sin(\omega t), y(t) = A \sin(\omega t) - B \cos(\omega t)$
 (B) $x(t) = A \cos^2(\omega t) + B \sin(\omega t), y(t) = A \sin^2(\omega t) + B \cos(\omega t)$
 (C) $x(t) = A \cos(\omega t) + B \sin^2(\omega t), y(t) = A \sin^2(\omega t) + B \cos^2(\omega t)$
 (D) इनमें से कोई नहीं

40. Consider the following statements

(i) Let $u_i, i = 1, 2, \dots, n$ be n functions of n independent variables x_1, x_2, \dots, x_n . Then $\sum_{i=1}^n u_i dx_i = 0$ is called partial differential equation.

(ii) Let $u_i, i = 1, 2, \dots, n$ be n functions of n independent variables x_1, x_2, \dots, x_n . Then $\sum_{i=1}^n u_i dx_i = 0$ is called total differential equation. Then :

- (A) Only (i) is true
 (B) Only (ii) is true
 (C) Both (i) and (ii) are true
 (D) Both (i) and (ii) are false

41. Necessary condition for the integrability of the differential equation $Pdx + Qdy + Rdz = 0$, where P, Q, R are the functions of x, y, z is :

(A) $P \left(\frac{\partial Q}{\partial z} - \frac{\partial R}{\partial y} \right) + Q \left(\frac{\partial R}{\partial x} - \frac{\partial P}{\partial z} \right) + R \left(\frac{\partial P}{\partial y} - \frac{\partial Q}{\partial x} \right) = 0$

(B) $P \left(\frac{\partial Q}{\partial z} - \frac{\partial R}{\partial y} \right) + Q \left(\frac{\partial R}{\partial x} - \frac{\partial P}{\partial z} \right) + R \left(\frac{\partial P}{\partial y} - \frac{\partial Q}{\partial x} \right) = 1$

(C) $P \left(\frac{\partial Q}{\partial z} + \frac{\partial R}{\partial y} \right) + Q \left(\frac{\partial R}{\partial x} + \frac{\partial P}{\partial z} \right) + R \left(\frac{\partial P}{\partial y} - \frac{\partial Q}{\partial x} \right) = 0$

(D) $Q \left(\frac{\partial Q}{\partial x} + \frac{\partial P}{\partial y} \right) + R \left(\frac{\partial P}{\partial x} - \frac{\partial Q}{\partial z} \right) + = 0$

40. निम्नलिखित कथनों पर विचार कीजिए

(i) मान लीजिये कि $u_i, i = 1, 2, \dots, n$ n स्वतंत्र चरों x_1, x_2, \dots, x_n के n फलन हैं। तो $\sum_{i=1}^n u_i dx_i = 0$ को पैटियन अवकल समीकरण कहा जाता है।

(ii) मान लीजिये कि $u_i, i = 1, 2, \dots, n$ n स्वतंत्र चरों x_1, x_2, \dots, x_n के n फलन हैं। तो $\sum_{i=1}^n u_i dx_i = 0$ को टोटल अवकल समीकरण कहा जाता है। तो :

- (A) केवल (i) सत्य है
 (B) केवल (ii) सत्य है
 (C) (i) एवं (ii) दोनों सत्य है
 (D) (i) एवं (ii) दोनों असत्य है

41. अवकल समीकरण $Pdx + Qdy + Rdz = 0$ जहाँ P, Q, R x, y, z के फलन हैं, के की समाकलनीयता की आवश्यक शर्त है :

(A) $P \left(\frac{\partial Q}{\partial z} - \frac{\partial R}{\partial y} \right) + Q \left(\frac{\partial R}{\partial x} - \frac{\partial P}{\partial z} \right) + R \left(\frac{\partial P}{\partial y} - \frac{\partial Q}{\partial x} \right) = 0$

(B) $P \left(\frac{\partial Q}{\partial z} - \frac{\partial R}{\partial y} \right) + Q \left(\frac{\partial R}{\partial x} - \frac{\partial P}{\partial z} \right) + R \left(\frac{\partial P}{\partial y} - \frac{\partial Q}{\partial x} \right) = 1$

(C) $P \left(\frac{\partial Q}{\partial z} + \frac{\partial R}{\partial y} \right) + Q \left(\frac{\partial R}{\partial x} + \frac{\partial P}{\partial z} \right) + R \left(\frac{\partial P}{\partial y} - \frac{\partial Q}{\partial x} \right) = 0$

(D) $Q \left(\frac{\partial Q}{\partial x} + \frac{\partial P}{\partial y} \right) + R \left(\frac{\partial P}{\partial x} - \frac{\partial Q}{\partial z} \right) + = 0$

42. The differential equation $Pdx + Qdy + Rdz = 0$, where P, Q, R are the functions of x, y, z is said to be exact if :

- (A) $\frac{\partial P}{\partial y} = \frac{\partial Q}{\partial x}, \frac{\partial Q}{\partial z} \neq \frac{\partial R}{\partial y}, \frac{\partial R}{\partial x} = \frac{\partial P}{\partial z}$
- (B) $\frac{\partial P}{\partial y} = \frac{\partial Q}{\partial x}, \frac{\partial Q}{\partial z} = \frac{\partial R}{\partial y}, \frac{\partial R}{\partial x} = \frac{\partial P}{\partial z}$
- (C) $\frac{\partial P}{\partial y} = \frac{\partial P}{\partial z}, \frac{\partial Q}{\partial x} = \frac{\partial Q}{\partial z} = \frac{\partial R}{\partial z}$
- (D) $\frac{\partial P}{\partial y} = \frac{\partial Q}{\partial x}, \frac{\partial P}{\partial z} = \frac{\partial P}{\partial y}, \frac{\partial Q}{\partial z} = \frac{\partial R}{\partial x}$

43. Which of the following equations is a homogeneous equation ?

- (A) $(x^2 + y^2)dx + (y^2 + z^2)dy + (z^2 + x^2)dz = 0$
- (B) $(x^2 + y^2 + 1)dx + (y^2 + z^2 + 1)dy + (z^2 + x^2 + 1)dz = 0$
- (C) $(x + y + 2)dx + (y + z + 3)dy + (z + x + 4)dz = 0$
- (D) $(x + 1)dx + (x + y + z + 2)dy + (x^2 + 1)dz = 0$

42. अवकल समीकरण $Pdx + Qdy + Rdz = 0$ जहाँ P, Q, R x, y, z के फलन हैं, को एक्जैक्ट कहा जाता है यदि :

- (A) $\frac{\partial P}{\partial y} = \frac{\partial Q}{\partial x}, \frac{\partial Q}{\partial z} \neq \frac{\partial R}{\partial y}, \frac{\partial R}{\partial x} = \frac{\partial P}{\partial z}$
- (B) $\frac{\partial P}{\partial y} = \frac{\partial Q}{\partial x}, \frac{\partial Q}{\partial z} = \frac{\partial R}{\partial y}, \frac{\partial R}{\partial x} = \frac{\partial P}{\partial z}$
- (C) $\frac{\partial P}{\partial y} = \frac{\partial P}{\partial z}, \frac{\partial Q}{\partial x} = \frac{\partial Q}{\partial z} = \frac{\partial R}{\partial z}$
- (D) $\frac{\partial P}{\partial y} = \frac{\partial Q}{\partial x}, \frac{\partial P}{\partial z} = \frac{\partial P}{\partial y}, \frac{\partial Q}{\partial z} = \frac{\partial R}{\partial x}$

43. निम्नलिखित समीकरणों में से कौन सा सजातीय समीकरण है ?

- (A) $(x^2 + y^2)dx + (y^2 + z^2)dy + (z^2 + x^2)dz = 0$
- (B) $(x^2 + y^2 + 1)dx + (y^2 + z^2 + 1)dy + (z^2 + x^2 + 1)dz = 0$
- (C) $(x + y + 2)dx + (y + z + 3)dy + (z + x + 4)dz = 0$
- (D) $(x + 1)dx + (x + y + z + 2)dy + (x^2 + 1)dz = 0$

44. Solution of the differential equation $(x - 3y - z)dx + (2y - 3x)dy + (z - x)dz = 0$ is:

- (A) $x^2 + 2y + z - 6xy - 2xz = C$
 (B) $x^2 + 2y^2 + z^2 - 6xy - 2xz = C$
 (C) $x^2 - 2y^2 - z^2 + 6xy - 2xz = C$
 (D) $x^2 + 2y + z^2 - 6x + y^2 = C$

Where C is an arbitrary constant.

45. $xP + yQ + zR = C$ be the solution of the differential equation $Pdx + Qdy + Rdz = 0$, where P, Q, R are the functions of x, y, z & C is an arbitrary constant, if:

- (A) It is exact and homogeneous of degree $n \neq -1$
 (B) It is not exact but homogeneous of degree $n \neq -1$
 (C) It is exact and homogeneous of degree $n \neq -3$
 (D) It is exact and homogeneous of degree $n \neq 2$

44. अवकल समीकरण $(x - 3y - z)dx + (2y - 3x)dy + (z - x)dz = 0$ का हल है :

- (A) $x^2 + 2y + z - 6xy - 2xz = C$
 (B) $x^2 + 2y^2 + z^2 - 6xy - 2xz = C$
 (C) $x^2 - 2y^2 - z^2 + 6xy - 2xz = C$
 (D) $x^2 + 2y + z^2 - 6x + y^2 = C$

जहाँ C एक स्वेच्छ नियतांक है।

45. $xP + yQ + zR = C$ अवकल समीकरण $Pdx + Qdy + Rdz = 0$ का हल है, जहाँ P, Q, R, x, y, z के फलन है, और C एक स्वेच्छ नियतांक है, यदि :

- (A) यह सटीक एवं घात $n \neq -1$ का सजातीय है
 (B) यह सटीक नहीं है लेकिन घात $n \neq -1$ का सजातीय है
 (C) यह सटीक एवं घात $n \neq -3$ का सजातीय है
 (D) यह सटीक एवं घात $n \neq 2$ का सजातीय है

46. The solution of the equations

$$\frac{dx}{yz} = \frac{dy}{zx} = \frac{dz}{xy} \text{ is :}$$

- (A) $x^2 + y^2 = C_1, x - z = C_2$
 (B) $x^2 - y^2 = C_1, x^2 - z^2 = C_2$
 (C) $x^2 + y^2 = C_1, x + z = C_2$
 (D) None of these

47. Solution of the differential equation $zy dx - zx dy - y^2 dz = 0$ is :

- (A) $z = Ce^{(x/y)}$
 (B) $z = Ce^{(x^2/y)}$
 (C) $z = Ce^{(x/y^2)}$
 (D) $z = Ce^{(x/y)^2}$

Where C is an arbitrary constant.

48. The total differential $d\left[\frac{y}{x}\right]$ of $\frac{y}{x}$ is :

- (A) $\frac{xdy - ydx^2}{2x^2}$
 (B) $\frac{xdy + ydx}{x^2}$
 (C) $\frac{xdy - ydx}{x^2}$
 (D) $\frac{x^2dy + y^2dx}{x^4}$

46. समीकरणों $\frac{dx}{yz} = \frac{dy}{zx} = \frac{dz}{xy}$ का हल है :

- (A) $x^2 + y^2 = C_1, x - z = C_2$
 (B) $x^2 - y^2 = C_1, x^2 - z^2 = C_2$
 (C) $x^2 + y^2 = C_1, x + z = C_2$
 (D) इनमें से कोई नहीं

47. अवकल समीकरण $zy dx - zx dy - y^2 dz = 0$ का हल है :

- (A) $z = Ce^{(x/y)}$
 (B) $z = Ce^{(x^2/y)}$
 (C) $z = Ce^{(x/y^2)}$
 (D) $z = Ce^{(x/y)^2}$

जहाँ C एक स्वेच्छ नियतांक है।

48. $\frac{y}{x}$ का सम्पूर्ण अवकल $d\left[\frac{y}{x}\right]$ है :

- (A) $\frac{xdy - ydx^2}{2x^2}$
 (B) $\frac{xdy + ydx}{x^2}$
 (C) $\frac{xdy - ydx}{x^2}$
 (D) $\frac{x^2dy + y^2dx}{x^4}$

49. Total differential $d[\log(xy)]$ of $\log(xy)$ is :

(A) $\frac{xdx + ydy}{xy}$

(B) $\frac{xdx - ydy}{xy}$

(C) $\frac{ydx + xdy}{xy}$

(D) $\frac{ydx + x^2dy}{xy}$

50. $y = e^{5x}$ is a part of complementary function of differential equation : $\frac{d^2y}{dx^2} +$

$P \frac{dy}{dx} + QY = 0$, if :

(A) $P + Qx = 0$

(B) $25 + 5P + 10Q = 0$

(C) $1 + P + Q = 0$

(D) $25 + 5P + Q = 0$

49. $\log(xy)$ का सम्पूर्ण अवकल

$d[\log(xy)]$ है :

(A) $\frac{xdx + ydy}{xy}$

(B) $\frac{xdx - ydy}{xy}$

(C) $\frac{ydx + xdy}{xy}$

(D) $\frac{ydx + x^2dy}{xy}$

50. $y = e^{5x}$ अवकल समीकरण $\frac{d^2y}{dx^2} +$

$P \frac{dy}{dx} + QY = 0$ के पूरक फलन का एक

भाग होगा, यदि :

(A) $P + Qx = 0$

(B) $25 + 5P + 10Q = 0$

(C) $1 + P + Q = 0$

(D) $25 + 5P + Q = 0$
