1. If m-1 and m+2 are factors of auxiliary equation of $y'' + y' - 2y = 0$ then general solution is

(a) $Ae^{-x} + Be^{2x}$ (b) $e^{x} + e^{-2x}$ (c) $Ae^{x} + Be^{-2x}$ (d) $e^{-x} + e^{2x}$

2. The Wronskian of the functions f(x)=secx and g(x)=tanx is

(a) 1 (b) -1 (c) secx (d) tanx

3. If e^{-x} and e^{2x} are solutions of $y'' - y' - 6y = 0$ then roots of auxiliary equation are

(a) 1 and -2 (b) -1 and 2 (c) 1 and 2 (d) -1 and -2

4. The general solution of $4y'' - 9y' + 2y = 0$ is

(a) Ae^{2x} (b) $Ae^{2x} + Be^{\frac{x}{4}}$ (c) $(A + Bx)e^{2x}$ (d) $(A + B)e^{2x}$

5. The general solution of $4y'' - 4y' + 17y = 0$ is

(a) $Ae^{\frac{x}{2}} + Be^{\pm 2x}$ (b) $Ae^{2x} + Be^{-2x}$

(c) $e^{2x}\left(A\cos\frac{x}{2} + B\sin\frac{x}{2}\right)$ (d) $e^{\frac{x}{2}}(A\cos 2x + B\sin 2x)$

6. The general solution of $y''' + 4y'' + 5y' + 2y = 0$ is

(a) $Ae^{-2x} + (B + Cx)e^{-x}$ (b) $Ae^{-x} + (B + Cx)e^{-2x}$

(c) $Ae^{-2x} + (B + C)xe^{-x}$ (d) $(A + Bx)e^{-x} + (C + Dx)e^{2x}$

7. If D is a differential operator then value of $\frac{1}{D}(e^{-2x} + Sm2x + 4)$

(a) $-\frac{e^{-2x}}{2} - \frac{Cos2x}{2}$ (b) $-\frac{e^{-2x}}{2} + \frac{Cos2x}{2} + 4x$ (c) $-\frac{e^{-2x}}{2} - \frac{Cos2x}{2} + 4x$ (d) $-\frac{e^{-2x}}{2} - \frac{Cos2x}{2} + 4$

8. Particular Integral of $y'' + 2y' - 3y = e^{2x}$ is

(a) $-\frac{1}{5}e^{2x}$ (b) $\frac{1}{5}e^{2x}$ (c) $\frac{1}{5}$ (d) $-\frac{1}{5}$

9. Particular Integral of $y''+4y=Sin2x$ is

(a) $-\frac{1}{2}\cos 2x$ (b) $\frac{x}{2}\cos 2x$ (c) $-\frac{x}{2}\cos 2x$ (d) $-x\cos 2x$

10. If D is a linear differential operator then $\frac{1}{f(D)}.e^{-\alpha x}=$

(a) $\frac{1}{f(-\alpha^2)}.e^{-\alpha x}$, $f(-\alpha^2)\neq 0$ (b) $\frac{1}{f(D-\alpha)}.e^{-\alpha x}$

(c) $\frac{1}{f(\alpha^2)}.e^{-\alpha x}$, $f(\alpha^2)\neq 0$ (d) $\frac{1}{f(-\alpha)}.e^{-\alpha x}$, $f(-\alpha)\neq 0$

11. In method of undetermined coefficients if complimentary function $y_c = Ae^{-x} + (B + Cx)e^{2x}$ of equation $y''' - 3y'' + 4y = e^{2x}$ then choice of particular integral will be

(a) cxe^{2x} (b) cx^2e^{2x} (c) ce^{2x} (d) $c_1e^{-x} + C_2e^{2x}$

12. In method of undetermined coefficients. If complementary function $y_c = ACos2x + BSin2x$ of equation $y'' + 4y = Sin2x$ then choice of particular integral

(a) $c_1\ xCos2x + c_2Sin2x$ (b) $c_1Cos2x + c_2xSin2x$

(c) $x[c_1Cos2x + c_2Sin2x]$ (d) $c_1Cos2x + c_2Sin2x$

13. General solution of $x^2y'' + xy' - 4y = 0$

(a) $y = Ax + Bx^{-2}$ (b) $y = Ax^2 + Bx^{-2}$ (c) $y = Ax^2 + Bx$ (d) $y = Ax^{-2} + Bx^{-2}$

14. General solution of $x^2y'' + 3xy' + 10y = 0$

(a) $y = x[ACos(3\log x) + BSin(3\log x)]$ (b) $y = x[ACos(\log x) + BSin(\log x)]$

(c) $y = x^{-1}[ACos(\log x) + BSin(\log x)]$ (d) $y = x^{-1}[ACos(3\log x) + BSin(3\log x)]$

15 General solution of system of simultaneous equations

$$y_1' = -2y_1 + y_2$$
$$y_2' = y_1 - 2y_2$$

(a) $y_1 = Ae^{-t} + Be^{3t}, y_2 = Ae^{t} - Be^{3t}$ (b) $y_1 = Ae^{-t} + Be^{3t}, y_2 = Ae^{t} - Be^{3t}$

(c) $y_1 = Ae^{-t} + Be^{-3t}, y_2 = Ae^{t} + Be^{-3t}$ (d) $y_1 = Ae^{-t} + Be^{-3t}, y_2 = Ae^{t} - Be^{-3t}$

16 General solution of system of simultaneous equations

$$y_1' = y_1 + 2y_2 + 6t^2 + 12t + 9$$

$$y_2' = 4y_1 + 3y_2 + 4t^2 + 3t + 6$$

(a) $y_1 = Ae^{t} + Be^{5t} + 2t^2 + \frac{2}{5}t + \frac{27}{25}, y_2 = -Ae^{t} + 2Be^{5t} - 4t^2 - \frac{21}{5}t - \frac{121}{25}$

(b) $y_1 = Ae^{-t} + Be^{5t} + 2t^2 + \frac{2}{5}t + \frac{27}{25}, y_2 = -Ae^{-t} + 2Be^{5t} - 4t^2 - \frac{21}{5}t - \frac{121}{25}$

(c) $y_1 = Ae^{-t} + Be^{-5t} + 2t^2 + \frac{2}{5}t + \frac{27}{25}, y_2 = -Ae^{-t} + 2Be^{-5t} - 4t^2 - \frac{21}{5}t - \frac{121}{25}$

(d) $y_1 = Ae^{-t} + Be^{5t} - 2t^2 + \frac{2}{5}t - \frac{27}{25}, y_2 = -Ae^{-t} + 2Be^{5t} - 4t^2 - \frac{21}{5}t - \frac{121}{25}$