Mark: a, b, c or d for the correct answer in the space provide bellow for Q.1 to Q.10. **[10]**

Q. No	1	2	3	4	5	6	7	8	9	10
Answer										

Q1. Identify the differential equation: $xy''-y'+\frac{4}{x}y = x\ln x$, $x>0$. Assume that $y = f(x)$.

(a) Homogeneous equation equation, (b) with a constant coefficients, (c) Cauchy Euler, (d) None of these

Q.2. The auxiliary equation of the DE: $x^2y''+xy'+5y=0$, $x>0$ is

(a) $m^2+4=0$, (b) $m^2+m+5=0$, (c) $m^2+5=0$, (d) None of these

Q.3. If the auxiliary equation of a homogeneous Cauchy Euler equation is $(m-4i)(m+4i)=0$. Then linearly independent solutions of the DE are

(a) $y_1=\cos(4\ln x)$ and $y_2=\sin(4\ln x)$, (b) $y_1=\cos(\ln 4x)$ and $y_2=\sin(\ln 4x)$,
(c) $y_1=\ln(\cos 4x)$ and $y_2=\ln(\sin 4x)$, (d) $y_1=\ln(4\cos x)$ and $y_2=\ln(4\sin x)$.

Q.4. The best transformation to solve the DE $x^2y''-6y=x^2+x^{-2}$, $x>0$ is

(a) $t=\ln x$, (b) $t=x^{-1}$, (c) $x=\ln t$, (d) None of these.

Q.5. To obtain the general solution of a homogeneous linear differential equation of order n, we must construct a linear combination of

(a) any set of n solutions, (b) any set of solutions, (c) any set of n linearly independent solutions,
(d) any set of n linearly dependent solutions.

Q.6. If $y_1(x)$ and $y_2(x)$ are two linearly independent solutions of the same second order DE, then $\frac{y_1}{y_2}$

(a) is a constant, (b) is a function of x, , (c) is a function of x and y, (d) None of these

Q.7. The DE: $x^2y''-xy'-y=x\tan x$, can be solved by using

(a) Undetermined coefficients method, (b) Reduction of order method , (c) Variation of parameters method,
(d) None of these.

Q.8. A linear homogeneous DE with constant coefficients having the solutions: $4e^{2x}$, $5x$, 2 is

(a) $y'''+y'=0$, (b) $y'''-2y''=0$, (c) $y''+y=0$, (d) $y''+4y'-2y=0$.

Q.9. For the system: $\begin{cases} y'+2x=3 \\ 3x'-y=1 \end{cases}$, the DE in x obtained by using the elimination method is

(a) of order 1, (b) of order 2, (c) of order 3, (d) None of these.

Q.10. The undetermined coefficients method cannot be used if the non-homogeneous term in the DE is

(a) $\ln 2x$, (b) e^{5x}, (c) $6x^3e^{2x}\cos x$, (d) $3x$

Q.11. Use the variation of parameters method to solve: $x^2 y''-3xy'+3y = 2x^4 \sin x$ **[8]**

Q.12. If $y_1 = x_{-2}$ is a solution of the DE: $x^2 y''-6y = 0$, then use the reduction of order method to find the second solution y_2. **[8]**

Q.13. Find the particular solution of the differential equation: $y'''-y''+y'-y=e^{t}$ **[6]**

Q.14. Find the general solution of the system: $\begin{cases} y' = 2y + x + 1 \\ x' = -4y + 2x + e^t \end{cases}$ **[8]**