1. The order of the differential equation of all circles of radius r, having centre on y-axis and passing through the origin is
(a) 1 (b) 2 (c) 3 (d) 4

2. The order of the differential equation, whose general solution is $y = c_1e^x + c_2e^{2x} + c_3e^{3x} + c_4e^{x+c_5}$, where c_1, c_2, c_3, c_4, c_5 are arbitrary constants is
(a) 5 (b) 4 (c) 3 (d) None of these

3. The order of the differential equation of all tangent lines to the parabola $y = x^2$ is
(a) 1 (b) 2 (c) 3 (d) 4

4. The equation to the curve, which is such that portion of the axis of x cut off between the origin and the tangent at any point is proportional to the ordinate of that point, is
(k is constant of proportionality)
(a) $x = y(c - k \log y)$ (b) $\log x = ky^2 + c$
(c) $x^2 = y(c - k \log y)$ (d) None of these

5. The solution of differential equation $y - x\frac{dy}{dx} = a\left(y^2 + \frac{dy}{dx}\right) = a\left(y^2 + \frac{dy}{dx}\right)$ is -
(a) $(x + a)(x + ay) = cy$ (b) $(x + a)(1 - ay) = cy$
(c) $(x + a)(1 - ay) = c$ (d) None of these

6. The order and degree of the differential equation $y = x\frac{dy}{dx} + \sqrt{a^2\left(\frac{dy}{dx}\right)^2 + b^2}$ are
(a) 1, 2 (b) 2, 1 (c) 1, 1 (d) 2, 2

7. The order and degree of the differential equation $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^{\frac{1}{3}} + x^{\frac{1}{4}} = 0$, are respectively
(a) 2, 3 (b) 3, 3 (c) 2, 6 (d) 2, 4

8. The degree of the differential equation $\frac{d^2y}{dx^2} + 3\left(\frac{dy}{dx}\right)^2 = x^2 \log\left(\frac{d^2y}{dx^2}\right)$ is
(a) 1 (b) 2 (c) 3 (d) None of these

9. The order of the differential equation whose solution is $x^2 + y^2 + 2gx + 2fy + c = 0$, is
(a) 1 (b) 2 (c) 3 (d) 4

10. The degree of the differential equation satisfying $\sqrt{1 - x^2} + \sqrt{1 - y^2} = a(x - y)$ is
(a) 1 (b) 2 (c) 3 (d) None of these

11. The order and degree of $y = 1 + \frac{dy}{dx} + \frac{1}{2!}\left(\frac{dy}{dx}\right)^2 + \frac{1}{3!}\left(\frac{dy}{dx}\right)^3 + \ldots\ldots$ is
(a) 1, 2 (b) 1, 1
(c) Order 1, degree not defined (d) None of these

12. The order and degree of $\frac{d^2y}{dx^2} = \sin\left(\frac{dy}{dx}\right) + x$ is
(a) 2, 1 (b) Order 2, degree not defined
(c) 2, 0 (d) None of these

13. Differential equation whose general solution is $y = c_1x + \frac{c_2}{x}$ for all values of c_1 and c_2 is
(a) $\frac{d^2y}{dx^2} + \frac{x^2}{y} + \frac{dy}{dx} = 0$
(b) $\frac{d^2y}{dx^2} + \frac{y}{x^2} - \frac{dy}{dx} = 0$
(c) $\frac{d^2y}{dx^2} - \frac{1}{2x}\frac{dy}{dx} = 0$
(d) $\frac{d^2y}{dx^2} + \frac{1}{x}\frac{dy}{dx} - \frac{y}{x^2} = 0$

14. $y = \frac{x}{x+1}$ is a solution of the differential equation
(a) $y^2\frac{dy}{dx} = x^2$ (b) $x^2\frac{dy}{dx} = y^2$
(c) $y\frac{dy}{dx} = x$ (d) $x\frac{dy}{dx} = y$

15. The differential equation of all parabolas whose axes are parallel to y axis is
(a) $\frac{d^3y}{dx^3} = 0$ (b) $\frac{d^2x}{dy^2} = c$
(c) $\frac{d^3y}{dx^3} + \frac{d^2y}{dx^2} = 0$ (d) $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = c$

16. The differential equation of family of curves whose tangent form an angle of $\pi/4$ with the hyperbola $xy = c^2$ is
(a) $\frac{dy}{dx} = \frac{x^2 + c^2}{x^2 - c^2}$
(b) $\frac{dy}{dx} = \frac{x^2 - c^2}{x^2 + c^2}$
(c) $\frac{dy}{dx} = -\frac{c^2}{x^2}$
(d) None of these

17. The solution of the differential equation $(1 + x^2)\frac{dy}{dx} = x(1 + y^2)$ is
(a) $2\tan^{-1} y = \log(1 + x^2) + c$
(b) $\tan^{-1} y = \log(1 + x^2) + c$
(c) $2\tan^{-1} y + \log(1 + x^2) + c = 0$
(d) None of these

18. The solution of the differential equation $\frac{dy}{dx} = x^2 + \sin 3x$ is
(a) $y = \frac{x^3}{3} + \frac{\cos 3x}{3} + c$
(b) $y = \frac{x^3}{3} - \frac{\cos 3x}{3} + c$
(c) $y = \frac{x^3}{3} + \sin 3x + c$
(d) None of these

19. The solution of $\frac{dy}{dx}=\frac{1}{y^2+\sin y}$ is

(a) $x=\frac{y^3}{3}-\cos y+c$ (b) $y+\cos y=x+c$

(c) $x=\frac{y^3}{3}+\cos y+c$ (d) None of these

20. The solution of the differential equation $\frac{dy}{dx}=(4x+y+1)^2$ is

(a) $4x - y + 1 = 2\tan(2x - 2c)$

(b) $4x - y - 1 = 2\tan(2x - 2c)$

(c) $4x + y + 1 = 2\tan(2x + 2c)$

(d) None of these

21. The solution of the differential equation

$x\frac{dy}{dx}=y(\log y-\log x+1)$ is

(a) $y=xe^{cx}$ (b) $y+xe^{cx}=0$

(c) $y+e^x=0$ (d) None

22. The solution of differential equation $yy'=x\left(\frac{y^2}{x^2}+\frac{\phi(y^2/x^2)}{\phi'(y^2/x^2)}\right)$

is

(a) $\phi(y^2/x^2)=cx^2$

(b) $x^2\phi(y^2/x^2)=c^2y^2$

(c) $x^2\phi(y^2/x^2)=c$

(d) $\phi(y^2/x^2)=\frac{cy}{x}$

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

(a) $(x^2-y^2)^3=Bx^2y^2$

(b) $(x^2+y^2)^3=Bx^2y^2$

(c) $(x^2-y^2)^3=x^2y^2$

(d) None of these

24. The solution of $\frac{dy}{dx}=\frac{x-3y+2}{3x-y+6}$ is

(a) $y^2+6(x+2)y+(x+2)^2=c$

(b) $y^2-6(x+2)y+(x+2)^2=c$

(c) $y^2-6(y+2)x+x^2=c$

(d) None of these

25. The general solution of the differential equation $(x + y)dx + xdy = 0$ is

(a) $x^2+y^2=c$ (b) $2x^2-y^2=c$

(c) $x^2+2xy=c$ (d) $y^2+2xy=c$