CHAPTER-9

DIFFERENTIAL EQUATIONS

MULTIPLE CHOICE QUESTIONS

Q. NO.	Questions
1.	Integration factor of differential equation $\frac{dy}{dx}$ + py = Q, where P and Q are functions of x is
	(a) ∫e ^p dx (b)
	(c) e ^{-∫pdx}
	(d) None of these
2.	The solution of $\frac{dy}{dx} = 1 + x + y + xy$ is
	(a) $x - y = k(1 + xy)$
	(b) $\log(1 + y) = x + \frac{x}{2} + k$
	(c) $\log(1 + x) + y + \frac{y^2}{2} = k$
	(d) None of these
3.	The degree of the differential equation
	$\left(\frac{d^2 y}{dx^2}\right)^2 + \left(\frac{d y}{dx}\right)^2 = x \sin \frac{d y}{dx}$ is
	(a) 1
	(b) 2
	(c) 3
	(a) not defined
4.	If $y = e^{-x}$ (A cos x + B sin x), then y is a solution of
	(a) $\frac{d^2 y}{dx^2} + 2\frac{dy}{dx} = 0$
	(b) $\frac{d^2 y}{dx^2} - 2\frac{dy}{dx} + 2y = 0$
	(c) $\frac{d^2 y}{dx^2} + 2\frac{dy}{dx} + 2y = 0$

	(d) $\frac{d^2 y}{d^2 + 2y} = 0$
	dx
5.	Solution of differential equation xdy – ydx = Q represents
	(a) a rectangular hyperbola
	(b) parabola whose vertex is at origin
	(c) straight line passing through origin
	(d) a circle whose centre is at origin
0.	Integrating factor of the differential equation $\cos x \frac{dy}{dx} + y \sin x = 1$ is
	(a) cos x
	(b) tan x
	(c) sec x
	(d) sin x
7.	+1
	The number of solutions of $\frac{dy}{dy} = \frac{y}{1-1}$ when y(1) = 2 is
	(a) none
	(c) two
	(d) infinite
8.	The differential equation of dy
	The differential equation $y = x = c$ represents
	(a) Family of hyperbolas
	(b) Family of parabolas
	(c) Family of ellipses
	(d) Family of circles
9.	The curve for which the slope of the tangent at any point is equal to the ratio of the
	abcissa to the ordinate of the point is
	(a) an ellipse
	(b) parabola
	(c) circle
10	(d) rectangular hyperbola
10	Thesolution of $\frac{dy}{dx}$ + y = e ^{-x} , y (0) = 0 is
	(a) $y = e^{-x} (x - 1)$
	(b) $y = xe^x$
	(c) $y = xe^{-x} + 1$
	(d) $y = xe^{-x}$
11	The differential equation of the family of curves $y^2 = 4a (x + a)$ is
	(a) $y^2 = 4\frac{dy}{dx}(x + \frac{dy}{dx})$
	dx dx'

	(b) $2y\frac{dy}{dx} = 4a$
	(c) $y \frac{d^2 y}{dx^2} + (\frac{dy}{dx})^2 = 0$
	(d) $2x\frac{dy}{dx} + y(\frac{dy}{dx})^2 - y$
12	. Which of the following is the general solution of $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = 0$
	(a) $y = (Ax + B)e^{x}$ (b) $y = (Ax + B)e^{-x}$ (c) $y = Ae^{x} + Be^{-x}$ (d) $y = A \cos x + B \sin x$
13	The differential equation of all straight lines passing through the origin is (a) y =
	(b) $\frac{dy}{dx} = y^+ x$
	(c) $\frac{dy}{dx} = \frac{y}{x}$
	(d) None of these
14	The differential equation for $y = A \cos \alpha x + B \sin \alpha x$ where A and B are arbitary constants
	(a) $\frac{d^2 y}{dx^2} - \alpha^2 y = 0$
	(b) $\frac{d^2 y}{dx^2} + \alpha^2 y = 0$
	$(c)\frac{d^2y}{dx^2} + \alpha y = 0$
	$(d)\frac{d^2y}{dx^2} - \alpha y = 0$
15	The degree of differential equation
	$\left[1+\left(\frac{dy}{dx}\right)^{2}\right]^{3/2}=\frac{d^{2}y}{dx^{2}}$ is
	(a) 4
	(b) 3/2 (c) 2
	(d) not defined

16	The order and degree of the differential equation y=x
	are
	(a) 1,2
	(b) 2,1
	(c)1,1
	(d)2,2
17	The degree of the differential equation $\frac{d^2 y}{dx^2} + 3\frac{dy}{dx} = x^2 \log(\frac{d^2 y}{dx^2})$ is
	(a) 1
	(b) 2
	(c) 3
	(d) Not defined
18	The order and degree of the differential equation= $1 + \frac{dy}{dx} + \frac{(dy)^2}{2!} + \frac{(dy)^3}{3!} + \frac{(dy)^4}{dx} + \frac{(dy)^4}{3!} + \frac{(dy)^4}{dx} + \frac{(dy)^4}{3!} + \frac{(dy)^4}{dx} + \frac{(dy)^4}{3!} + \frac{(dy)^4}{3!} + \frac{(dy)^4}{dx} + \frac{(dy)^4}{3!} + \frac{(dy)^4}{$
	+ is
	(a) 1 2
	(b) Order 2 degree not defined
	(c) 1.1
	(d) None of these.
19	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
20	The order of the differential equation of a family of curves represented by an equation
	containing five arbitrary constants, will be
	(a) 2
	(b) 3
	(c) 4
	(d) 5
21	Y=4sin3x is a solution of the differential equation
	(a) $\frac{dy}{dx} + 8_y = 0$
	(b) $\frac{dy}{dx} - 8_y = 0$

	2
	(c) $\frac{dy}{dt}$ +9y=0
	dx^2
	2
	(d) $\frac{dy}{2}$ +9y=0
	dx
22	Differential equation of y=sec(tan ⁻¹ x) is
	(a) $(1+x^2)\frac{dy}{dx} = y^+ x$
	(b) $(1+x^2)\frac{dy}{dx} = y^- x$
	(c) $(1+x^2)\frac{dy}{dx} = yx$
	(d) $(1+x^2)\frac{dy}{dx} = \frac{x}{y}$
23	The solution of $\frac{dy}{dx} = e^x (\sin x + \cos x)$ is
	(a) $y=e^{x}(\sin x-\cos x)+c$
	(b) $y=e^{x}(\cos x-\sin x)+c$
	(c) $y=e^x \sin x + c$
	(d) $y = e^x \cos x + c$
24	The equation of the curve that passes through the point(1,2) and satisfies the differential
	-2
	equation $\frac{dy}{dx} = \frac{xy}{(x+1)}$ is
	$u_{\lambda} (\chi^{2+1})$
	(a) $y(y^2+1) = 4 = 0$
	(a) $y(x+1) = 4 = 0$ (b) $y(x^2+1) + 4 = 0$
	(c) $y(x^{2}-1) - 4 = 0$
	(d) $y(x^2-1) + 4 = 0$
25	The solution of $dy = y_{1/3}$ is
	The solution of $\frac{dx}{dx} = \left(\frac{x}{x}\right)^{-13}$
	(a) $x^{2/3} + y^{2/3} = c$
	(b) $x^{1/3} + y^{1/3} = c$
	(c) $-x^{2/3} + y^{2/3} = c$
	(d) $-x^{1/3} + y^{1/3} = c$
26	The solution of the equation $x \frac{dy}{dx} = y - x \tan(y/x)$ is
	(a) $x \sin(x/y) + c = 0$
	(b) $x \sin y + c = 0$
	(c) $x \sin(y/x) = c$

	(d) none of these
27	Which of the following equation is non-linear?
	(a) $\frac{dy}{dx} + \frac{y}{x} = \log x$
	(b) $y \frac{dy}{dx} + 4x = 0$
	(c) $dx^+ dy^= 0$
	(d) $\frac{dy}{dx} = \cos x$
28	The solution of the differential equation $\frac{dy}{dx} = -2ycotx + 3x^2cosec^2x$ is
	(a) $y \sin^2 x = x^3 + c$
	(b) y sin x = c
	(c) $y \cos x^2 + c = 0$
	(d) $y \sin x^2 = c$

29	$[1 + (\frac{dy}{dx})^2]_{3/2}$
	Determine the order and degree of differential equations: $\frac{d^2 y}{d^2 y} = p$
	dx^2
	A) 1, 2
	(B) 2, 1
	(C) 2, 2
	(D) 1, 3
30	Degree of the differential equation $e \frac{dy}{dx} = x$ is
	A) 1
	(B) 2
	(C) 3
	(D) none of these
31	The D.E whose solution is $y^{=} a^{\cos}x^{+} b^{\sin}x^{+} x^{\sin}x$ is
	$(A)y^2 + y^2 \cos_X$
	(B) $y^2 + y^2 = \sin_x$
	(C) $y^2 + y^2 = 2 \sin_X$

	(D) $y^2 + y^2 = 2\cos_X$
32	What are the number of arbitrary constants in the particular solution of a differential
	(A) 2
	(B) 3
	(C) 0 (D) 4
33	The solution of the differential equation ydx+xdy =0 is
	(A)xy = c
	(C) $\log x \cdot \log y = c$
	(D none of these
34	Find the sum of the order and degree of differential equations: $2 - \frac{1}{2}$
	$\frac{d^2 y}{dt^2} + 3\frac{dy}{dt^2} + (1 + x) = 0$
	dx^{-} dx
	(A) 2
	(B) 3 (C) 4
	(D) 5
35	The solution of $\frac{dy}{dx} = e^{3x^+y}$ given y = 0 when x = 0 is:
	$(A)e^{3_{x}} + 3_{e^{-y}} = 4$
	(B) $e^{-y} = e^{3x+4}$
	(C) ${}^{3}e^{-y} = e^{3x} + 12$
	(D) $y = \frac{e^{3x^{+}y}}{3}$
36	Which substitution can we make to solve the homogenous D.E of the form $\frac{dy}{dx} = f(\frac{y}{x})$
	(A) $y = vx$
	(B) $x = vy$
	(D) $f = xy$
37	The differential equation $\frac{d^2 y}{dx^2} = 2$ represents
	(A) a parabola whose axis is parallel to x-axis
	(B) a parabola whose axis is parallel to y-axis

	(D) none of these
38	Write the general solution of a D.E of the Type $\frac{dy}{dx}^+ Py^= Q$ where P and Q are either
	constant or the function of x
	(Δ)
39	Let y(t) be the solution of the differential equation $(1 + t)\frac{dy}{dt} - ty = 1$ and $y(0) = -1$,
	Then, v(1) is equal to
	(A) $e^{-(1/2)}$
	(B) 1/2
	(C) = (1/2)
	(D) - 1/2
40	The integrating factor of the differential equation $\cos(\frac{dy}{dx})^+$ ysinx = 1 is
	(A) tony
	(C) sinv
	(C) Sinx (D) Not defined
11	The integrating factor of the D.E. is
41	
12	What is the number of arbitrary constants in the general solution of a differential equation
42	of fifth order
	(A) 2 (D) 5
	(U) 4

43	What is integrating factor of $(x \log x) \frac{dy}{dx} + y = 2 \log_x$
	(A) log x
	(B) x+log x
	(C) xlogx
	(D) x-logx

44	Which of the following is a solution of the differential equation $\frac{d^2y}{dx^2} + 9y = 0$
	(A) y=4 sin 3x
	(B) y=3sin 4x
	(C) y= sin 4x
	(D) None of the above
45	Write the order of the differential equation $\frac{d^3y}{dx^3} + (\frac{d^2y}{dx^2})^3 + \frac{dy}{dx} + 4y^2 = sinx$
	(A) 3
	(B) 2
	(C) 1
	(D) None of the above
46	Write the degree of the differential equation $\left[\frac{1+(dy)^2}{dx}\right]^{3/2} = \frac{d^2y}{dx^2}$
	(A) 3
	(B) 2
	(C) 1
	(D) None of the above
47	The degree of a differential equation $y''' + y^2 + ey' = 0$ is
	(A) 3
	(B) 2
	(C) 1
	(D) Not defined
48	The equation of a curve passing through the point $(-2, 3)$, given that the slope of the
	tangent to the curve at any point (x, y) is $2x/y^2$
	(A) $y = (3x^{2} + 25)^{1/3}$
	(B) $y = (5x^{2} + 15)^{1/3}$
	(C) $y = (^{3}x^{2} + 15)^{1/3}$

	(D) $y = (^{3}x^{2} + ^{5})^{1/3}$
49	The general solution of the differential equation $\frac{dy}{dx} - y^{=} \cos x$
	(A) $y = \frac{(sinx - cosx)}{2} + C e^{x}$
	(B) $y = \frac{(sinx + cosx)}{2} + C e^{x}$
	(c) $y = \frac{(sinx - cosx)}{2} - C e^{x}$
	(D) None of the above
50	The general solution of the differential equation $x^{dy} + 2y = y^2 (y \neq 0)$
	$\frac{dx}{dx}$ $\frac{dx}{dx}$
	(A) $y = \frac{x^2}{4} - Cx^2$
	(B) $y = \frac{x^2}{4} + Cx^2$
	(C) $y = \frac{x^2}{4} - Cx^{-2}$
	(D) $y = \frac{x^2}{4} + Cx^{-2}$
51	A homogeneous differential equation of the from $\frac{dx}{dy} = h(\frac{x}{y})$ can be solved by
	making the substitution.
	(A) $y = vx$
	(B) v = yx
	(C) x = vy
	(D) x = v

52	Which of the following is a homogeneous differential equation?	
	(A) $(4x + 6y + 5) dy - (3y + 2x + 4) dx = 0$	
	(B) (xy) dx - (x ³ + y ³) dy= 0	
	(C) $(x^3 + 2y^2) dx + 2xy dy = 0$	
	(D) $y^2 dx + (x^2 - xy - y^2) dy = 0$	
53	Order and degree (if defined) of a differential equation are always	
	(A) Positive integers.	
	(B) Real Number	
	(C) Negative integers	
	(D) Any Integers.	
54	The general solution of the differential equation $\frac{ydx - xdy}{y} = 0$ is	
	(A) xy= C	
	(B) $x = Cy^2$	
	(C) $y = Cx$	
	(D) $y = Cx^2$	
55	The number of arbitrary constants in the general solution of a differential equation of	
	fourth order are:	
	(A) 0	
	(B) 2	
	(C) 3	
	(D) 4	
56	The general solution of the differential equation $e^{x}dy+(y e^{x}+2x) dx = 0$ is	
	(A) x e^{y} + x^{2} = C	
	(B) x $e^{y} + y^2 = C$	
	(C) y $e^{x} + x^{2} = C$	
	(D) y $e^{y} + x^{2} = C$	

Q. NO.	Question:
57	

	Determine the order and degree of differential equations: $x \frac{dy}{dx} + \frac{3}{\frac{dy}{dx}} = y^2$ A) 1, 2 (B) 2, 1 (C) 2, 2 (D) 1, 1
58	 What is the number of arbitrary constants in the particular solution of a differential equation of fifth order. (A) 2 (B) 3 (C) 0 (D) 4
59	The solution of D.E $\frac{dy}{dx} = \sec x$, given that $y(0) = 0$ is (A) $x = \sin y$ (B) $y = \sin x$ (C) $x = \cos y$ (D) $y = \cos x$
60	The differential equation $x \frac{dy}{dx} + x^{=} A$ where A is a constant represents a set of (A)circles centre at y - axis (B) circles centre at x - axis (C) parabolas (D) ellipses
61	Determine degree of differential equations: $\frac{d^2 y}{dx^2} = x \log \left(\frac{dy}{dx}\right)$ (A) 2 (B) 0 (C) 1 (D) Not defined
62	On putting y = vx the equation $x^2 dy^+ y(x^+ y) dx^{=0}$ transformed to (A) $x dv^+ (v^2 + 2v) dx^{=0}$ (B) $v dx^+ (2x^+ x^2) dv^{=0}$

	(C) $v^2 dx = (x + x^2) dv$
	(D) $v dv^+ (2_x^+ x^2) dx^= 0$
63	Let y(x) be the solution of the differential equation
	$x \log x \frac{dy}{dx} + y^{=2} x \log x (x^{\geq 1})$. Theny(e) is equal to
	(A) e
	(B) O
	(C) 2e
	(D) 2
64	Find the degree of homogeneity of function $f(x, y) = \frac{\sin(\frac{x}{y})}{y}$
	(A) 1
	(B) O
	(C) 2
	(D) Not defined
65	The integrating factor of the D.E : is (A)
	(B)
	(C)
	(D)
66	 What is the number of arbitrary constants in the general solution of a differential equation of third order. (A) 2 (B) 3 (C) 0 (D) 4

67	The radius of a circle is increasing at the rate of 0.4 cm/s. The rate of increasing of its
	circumference is
	(a) 0.4 π cm/s
	(b) 0.8 π cm/s
	(c) 0.8 cm/s

	(d) None of these
68	The order and degree of the differential equation
	$\frac{d^2 y}{dx^2} + \left(\frac{d y}{d x}\right)\frac{1}{4} + \frac{1}{x_3} = 0$ respectively, are
	(a) 2 and not defined
	(b) 2 and 2
	(c) 2 and 3
	(d) 3 and 3
69	Family $r = Ax + A^3$ of curves is represented by the differential equation of degree
	(a) 1
	(b) 2
	(c) 3
	(d) 4
70	Integrating factor of $x \frac{dy}{dx} - y = x^4 - 3x$ is
	(a) x
	(b) log x
	1
	$(c)\overline{2}$
	(d) -x
71	Which of the following is a second order differential equation?
	(a) $(y')^2 + x = y^2$
	(b) $y'y'' + y = \sin x$
	(c) $y'' + (y'')^2 + y = 0$
	(d) $y' = y^2$

ANSWER KEY

1 (b)

2	(b)
3	(d)
4	(c)
5	(c)
6	(c)
7	(b)
8	(d)
9	(d)
10	(d)
11	(c)
12	(a)
13	(c)
14	(b)
15	(c)
16	(a)
17	(d)
18	(c)
19	(c)
20	(d)
21	(c)
22	(c)
23	(c)
24	(a)
25	(c)
26	(c)
27	(b)
28	(a)
29	C
30	D
31	D
32	C
33	A
34	D
35	Α
36	A
37	В
38	А
39	D
40	А
41	В
42	В
43	А
44	А

45	Α
46	В
47	D
48	C
49	Α
50	D
51	C
52	D
53	A
54	C
55	D
56	С
57	A
58	C
59	A
60	В
61	D
62	A
63	D
64	В
65	В
66	В
67	(b)
68	(a)
69	(b)
70	(c)
71	(b)

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