	The Bodwad Sarvajanik Co-Op. Education Society Ltd., Bodwad **Arts, Commerce and Science College Bodwad** **<u>Question Bank</u>** **Class:-SYBSc** **Sem:-IV** **Subject: Differential Equations** **Paper Name:- MTH 402(A)**	
Sr.No.	Questions	Ans
1)	The Wronkian of the function $y_1 = sinx$ and $y_2 = sinx - cosx$ is…. (A) 0 (B) 1 (C) sin^2x (D) cos^2x	**B**
2)	The Wornkian of the function $y_1 = x$ and $y_2 = 2x$ is ……… (A) 0 (B) 1 (C) sin^2x (D) cos^2x	**A**
3)	The Wronskian of the function $y_1 = 3x$ and $y_2 = 2x$ is ……. (A) 0 (B) 1 (C) sin^2x (D) cos^2x	**A**
4)	The Wronkian of the function $y_1 = x^2$ and $y_2 = 2x$ is …… (A) 0 (B) 1 (C) - $3x^2$ (D) 3x	**C**
5)	The Wronskian of the function $y_1 = x^2$ and $y_2 = 7x^2$ is …….. (A) 0 (B) 1 (C) -$3x^2$ (D) 3x	**A**
6)	The Wronskian of the function $y_1 = x^3$ and $y_2 = 2x^3$ is ……. (A) 0 (B)1 (C) -$3x^2$ (D) 3x	**A**
7)	The functions 1, x, x^2 are …… (A) Linearly Independent (B) Linearly Dependent (C) Linearly Independent and Linearly Dependent (D) None of these	**B**

8)	The functions $y_1 = x$ and $y_2 = 2x$ are …… (A) Linearly Independent (B) Linearly Dependent (C) Linearly Independent and Linearly Dependent (D) None of these	**B**
9)	The functions $y_1 = 3x$ and $y_2 = 2x$ are …….. (A) Linearly Independent (B) Linearly Dependent (C) Linearly Independent and Linearly Dependent (D) None of these	**B**
10)	The functions $y_1 = x^2$ and $y_2 = 3x$, where $x \neq 0$ are …….. (A) Linearly Independent (B) Linearly Dependent (C) Linearly Independent and Linearly Dependent (D) None of these	**A**
11)	The functions $y_1 = x^2$ and $y_2 = 7x^2$ are ……. (A) Linearly Independent (B) Linearly Dependent (C) Linearly Independent and Linearly Dependent (D) None of these	**B**
12)	The functions $y_1 = x^3$ and $y_2 = 2x^3$ are ……. (A) Linearly Independent (B) Linearly Dependent (C) Linearly Independent and Linearly Dependent (D) None of these	**B**
13)	The Wronskian of $e^{2x}cos^3x$ and $e^{2x}sin^3x$ is ……. (A) $3e^{4x}$ (B) 0 (C) $3e^{2x}$ (D) $2e^{3x}$	**A**
14)	Two non-zero functions $f_1(x)$ and $f_2(x)$ of the differential equation are linearly Dependent iff their Wronskian is….. $\forall x \in [a, b]$	**A**

	(A) zero (B) non-zero (c) non vanishing (D) none of these	
15)	The Wronskian of functions e^x and xe^x is ……… (A) e^x (B) e^{2x} (C) xe^x (D) e^{3x}	**B**
16)	If S is defined by the rectangle $\|x\| \leq a, \|y\| \leq b$ then the functions f(x,y)=xsiny+ycosx satisfy the Lipschitz condition and Lipschitz constant K= …….. (A) a (B) -1 (C) a+1 (D) b	**C**
17)	Every continuous function ……satisfy a Lipschitz condition on a rectangle (A) may (B) must (C) may not (D) none of these	**C**
18)	The wronskian of $y_1(x)$ and $y_2(x)$ is denoted by W(y_1, y_2) and is defined as (A) W$(y_1, y_2) = \begin{vmatrix} y_1 & y_2 \\ y_2 & y_1 \end{vmatrix}$ (B)W$(y_1 y_2) = \begin{vmatrix} y_1 & y_2 \\ x_2 & x_1 \end{vmatrix}$ (C) W $(y_1, y_2) = \begin{vmatrix} x_1 & x_2 \\ y_2 & y_1 \end{vmatrix}$ (D) W(y_1, y_2)=$\begin{vmatrix} y_1 & y_2 \\ y_1 & y_2 \end{vmatrix}$	**D**
19)	A function f(x,y) is said satisfy Lipschitz's condition in a region D in XY plane if there exists a positive constant K such that $\|f(x, y_1) - f(x, y_2)\| \leq \cdots$ *whenever the* points (x,y_1) and (x, y_2) both lie in D. (A) K$\|x_1 - x_2\|$ (B)K$\|y_1 - x_2\|$ (C) K$\|y_2 - y_1\|$ (D) K$\|x_1 - y_2\|$	**C**

20)	Two solutions $y_1(x)$ and $y_2(x)$ of $a_0y^{11} + a_1y^1 + a_2y$ = 0, $a_0 \neq 0$ on (a,b) are Linearly independent if and only if their wronskian is .... at some point $x_0 \in (a, b)$ (A) zero (B) not zero (C) may or may not zero (D) identically zero	**B**
21)	If W$(y_1, y_2) = \begin{vmatrix} 2x^2 & x \\ 4x & 1 \end{vmatrix} = A$ then valve of A is (A) -2x^2 (B) $4x^2$ (C) $3x^2$ (D) 2x	**A**
22)	If W$(y_1, y_2) = \begin{vmatrix} 2x^2 & 3x \\ 4x & 3 \end{vmatrix} = A$ then valve of A is (A)-$6x^2$ (B)$4x^2$ (C) $3x^2$ (D) 2x	**A**
23)	If W$(y_1, y_2) = \begin{vmatrix} 3x & x \\ 3 & 1 \end{vmatrix} = A$ then valve of A is (A) -2x^2 (B) $4x^2$ (C) $3x^2$ (D) 0	**D**
24)	If W $(y_1, y_2) = \begin{vmatrix} 4x & x \\ 3 & 1 \end{vmatrix} = A$ then valve of A is (A) -6x^2 (B) $4x^2$ (C) $3x^2$ (D) 0	**A**
25)	If W$(y_1, y_2) = \begin{vmatrix} 4x & x \\ 4 & 1 \end{vmatrix} = A$ then valve of A is (A)-$2x^2$ (B) $4x^2$ (C)$3x^2$ (D) 0	**D**
26)	If y_1(x) and $y_2(x)$ are any two solutions of $a_0(x)y^{//}(x)$ + a_1(x)+$a_2(x)y(x)$ = 0, then the linear combination	**C**

	$C_1y_1(x) + C_2y_2(x)$, where C_1 and C_2 are constants, is ….. of the given equation. (A) not solution (B) may or may not have solution (C) solution (D) none of these	
27)	The functions x^2, e^x,e^{-x} are linearly …….. if $x = \pm\sqrt{2}$ (A) independent (B) dependent (C) congruent (D) none of these	**B**
28)	If S is defined by the rectangle $\|x\|$ ≤a,$\|y\| \leq b$ then the Lipschitz constant for Function f(x,y) = $x^2 + y^2$ is…… (A) b (B)a (C) 2b (D) 2a	**C**
29)	The Wronskian of sinx and cos x is …… (A) 0 (B) 1 (C)-1 (D) 3	**C**
30)	Taking first and second ratio of simultaneously D.E. $\frac{XdX}{y^2Z} = \frac{dy}{xz} = \frac{dz}{y^2}$ the Solution of D.E is (A) $x^3 + 2y^3 = c_1$ (B) $x^3 - y^3 = c_1$ (C)x^3+4$y^3 = C_1$ D)$4x^2 = 5y^2$	**B**
31)	One solution of the simultaneous D.E.$\frac{dx}{yz} = \frac{dy}{zx} = \frac{dz}{xy}$ is (A) x^2=y^2 (B) $x^2 - y^2 = c$ (C) $x^2 - 3y^2 = c$ (D) $4x^2 = 5y^2$	**B**
32)	Taking first and second fraction of simultaneous D.E $\frac{dX}{1} = \frac{dy}{2} = \frac{dz}{5z+\tan(y-2x)}$ is (A) $xy = c$ (B) $x^2 + z^2 = 0$ (c) $x = 2y + c$ (D) $y = 2x + c$	**D**
33)	Taking first and third ratio of simultaneously D.E. $\frac{XdX}{y^2z} = \frac{dY}{XZ} = \frac{dZ}{y^2}$ the solution of D.E is (A) $x^2 + z^2 = c$ (B) $x^2 - z^2 = c$ (C) $x^2 + 3y^2 = c$ (D) $4x^2 + 5y^2 = c$	**B**
34)	Solution of simultaneously D.E $dx = dy = dz$ is	**C**

	(A) $(x-y)(y+z)=c$ (B) $(x+y)(y-z)=c$ (C) $(x-y)(y-z)=c$ (D) $(x+2y)(y+z)=c$	
35)	Equating the first and second fraction of simultaneous D.E. $dx=dy=dz$ then Solution is (A) $(x-y)(y+z)=c$ (B) $y-z=c$ (C) $x-y=c$ (D) $x+2y)(y+z)=c$	**C**
36)	Equating the second and third fraction of simultaneous D.E $dx=dy=dz$ then solution Is (A) $(x-y)(y+z)=c$ (B) $y-z=c$ (C) $x-y=c$ (D) $(x+2y)(y+z)=c$	**B**
37)	Equating the first and third fraction of simultaneous D.E. $dx=dy=dz$ then solution is (A) $(x-y)(y+z)=c$ (B) $x-z=c$ (C) $x-y=c$ (D) $(x+2y)(y+z)=c$	**B**
38)	Which of the following set of multipliers used to solve simultaneously differential equation $\frac{dX}{Z(X+Y)}=\frac{dY}{Z(X-Y)}=\frac{dZ}{X^2+Y^2}$ (A) $x,y,-z$ and $x,-y,-z$ (B) $-x,y,z$ and $x,-y,-z$ (C) $y,x,-z$ and $x,-y,-z$ (D) y,x,z and $x,y,-z$	**C**
39)	Equating first and second ratio of simultaneous differential equation $\frac{dX}{x}=\frac{dy}{y}=\frac{dZ}{z}$, then $logx=$ (A) $logy+c$ (B) $logcy+c$ (C) $\log(x+y)+c$ (D) $\log\left(\frac{x}{y}\right)+c$	**A**
40)	Equating first and second ratio of simultaneous differential equation	**B**

	$\frac{dx}{x}=\frac{dy}{y}=\frac{dz}{z}$, then $logx =$ (A) logy (B) logcy (C) $\log(x+y)$ (D)$\log\left(\frac{x}{y}\right)$	
41)	Choosing multipliers a,b,1 for simultaneous differential equation $\frac{dX}{y}=\frac{dy}{-X}=\frac{dz}{bX-ay}$, then we get (A) $aX+by=C_1$ (B) $X+Y+Z=C_1$ (C) $aX-y+Z=C_1$ (D) $aX+by+Z=C_1$	**D**
42)	Which of the following set of multipliers for simultaneous differential equation $\frac{dX}{mz-ny}=\frac{dy}{nx-lz}=\frac{dz}{ly-mx}$ (A) $x, y-z$ and 1,0,0 (B) $-x, y, z$ and $l, -m, -n$ (C) $y, x, -z$ and 1,1,1 (D) x, y, z and l, m, n	**D**
43)	If $\frac{dx}{P}+\frac{dy}{Q}+\frac{dz}{R}=\frac{A}{lP+mQ+nR}$, then $A =$ (A) $ldx+mdy+ndz$ (B) $mdx+ldy+ndz$ (C) $ldx-mdy+ndz$ (D) $ldx+mdy-ndz$	**A**
44)	If $\frac{dx}{P}+\frac{dy}{Q}+\frac{dz}{R}=\frac{xdx+ydy+zdz}{A}$, then $A =$ (A) $xP+yQ+zR$ (B) $xP-yQ+zR$ (C)$xP+yQ-zR$ (D)$yP-xQ+zR$	**A**

45)	The solution of simultaneous differential equation $\frac{dX}{a} = \frac{dy}{a} = dZ$ is (A) $(x - ay)(y + z) = c$ (B) $(x + ay)(y - z) = c$ (C) $(x - y)(y - az) = c$ (D) $(x + ay)(y + az) = c$	**C**
46)	Taking first and second ratio of simultaneous D.E. $\frac{dX}{xy} = \frac{dy}{y^2} = \frac{dz}{zxy-2x^2}$ is (A) $xy = c$ (B) $x^2 + z^2 = 0$ (C) $x - y = c$ (D) $\frac{dX+dy}{2+x+y}$	**D**
47)	Using multipliers 1,1,0 to $\frac{dX}{1+y} = \frac{dy}{1+x} = \frac{dz}{z}$ then each fraction is equal to (A) $\frac{dX+dZ}{2+x+z}$ (B) $\frac{dX+dy}{1+x+y}$ (C) $\frac{dX+dy}{2+y}$ (D) $\frac{dX+dy}{2+x+y}$	**D**
48)	One solution of the simultaneous D.E $\frac{dX}{yz} = \frac{dy}{zx} = \frac{dz}{xy}$ is (A) $x^2 - z^2 = c$ (B) $x^2 + z^2 = 0$ (C) $x^2 - 3y^2 = 0$ (D) $x^2 = 5y^2 + 2$	**A**
49)	Which of the following is true in the Pfaffian different equation $xdx + ydy + zdz = 0$ (A) $\frac{\partial P}{\partial y} = \frac{\partial Q}{\partial x}$ (B) $\frac{\partial P}{\partial z} = \frac{\partial R}{\partial x}$ (C) $\frac{\partial R}{\partial y} = \frac{\partial Q}{\partial Z}$ (D) All above	**D**
50)	If P,Q,R are homogeneous function of x,y,z of same degree n in Pfaffian	**B**

	Differential equation $P(x,y,z)dx + Q(x,y,z)dy + R(X,y,z)dz = 0$ then it is called as..... (A) non-homogeneous equation (B) homogeneous equation (C) may be homogeneous or non- homogeneous equation (D) none of these	
51)	The valve of $\frac{\partial R}{\partial x}$ in the differential equation $yzdX + zXdy + Xydz = 0$ is...... (A) x (B)z (C) y (D)xy	**C**
52)	The value of Q in the differential equation $(YZ + xyz)dx + (ZX + XYZ)dy + (Xy + Xyz)dz = 0$, i,e $Pdx + Qdy + Rdz = 0$ is (A) $yz + xyz$ (B) $zx + xyz$ (C) $xy + xyz$ (D) $xy + xyz + yz$	**B**
53)	The valve of $\frac{\partial Q}{\partial x}$ in the differential equation $(a + z)ydX + (a + z)xdy + xydz = 0$ is.... (A) $a + z$ (B) $a - z$ (C) 1 (D) X	**A**
54)	The differential equation $(Y + Z)dx + (z + X)dy + (X + Y)dz = 0$, i,e $Pdx + Qdy + Rdz = 0$ is ...... (A) exact (B) not exact (C) may or may not be exact (D) none of these	**A**
55)	The differential equation $(y + z)dx + (z + X)dy + (X + Y)dz = 0$,i.e $PdX + Qdy + Rdz = 0$ then valve of P is..... $(A) 2x^2y$ (B) $3xy^2$ (C) y+z (D) x^3	**C**
56)	Which of the following is true in the Pfaffian differential equation$(y + z)dx + (z + x)dy + (x + y)dz = 0$ (A) $\frac{\partial P}{\partial y} = \frac{\partial Q}{\partial x}$ (B)$\frac{\partial P}{\partial z} = \frac{\partial R}{\partial x}$	**D**

	(C) $\frac{\partial R}{\partial y} = \frac{\partial Q}{\partial Z}$ (D) All above	
57)	The Pfaffian differential equation $(x-y)dx - xdy + zdz = 0$ is ..... (A) homogeneous equation (B) non- homogeneous equation (C) may be homogeneous or non- homogeneous equation (D) none of these	**A**
58)	The differential equation $(y+z)dx + dy + dz = 0$ is ..... (A) integrable (B) not integrable (C) may or may not integrable (D) none of these	**A**
59)	The differential equation $2x^2ydx + 3xy^2dy + zdz = 0$,i,e. $Pdx + Qdy + Rdz = 0$ then valve of P is ..... (A) $2x^2y$ (B) $3xy^2$ (C) z (D) x^3	**A**
60)	The differential equation $2x^2ydx + 3xy^2dy + zdz = 0$, i.e. $Pdx + Qdy + Rdz = 0$ then valve Q is .... (A) $2x^2y$ (B) $3xy^2$ (C) z (D) x^3	**B**
61)	The differential equation $2x^2ydx + 3xy^2dy + zdz = 0$, i.e $Pdx + Qdy + Rdz = 0$ then valve of R is ...... (A) $2x^2y$ (B) $3xy^2$ (C) z (D) x^3	**C**
62)	The differential equation $2x^2ydx + 3xy^2dy + zdz = 0$, i.e $Pdx + Qdy + Rdz = 0$ then value of $\frac{\partial P}{\partial y}$ is	**A**

	(A) $2x^2$ (B) $3y^2$ (C) z (D) x^3	
63)	The differential equation $2x^2ydx + 3xy^2dy + zdz = 0$, i.e. $Pdx + Qdy + Rdz = 0$ then valve of $\frac{\partial Q}{\partial x}$ is ..... (A) $2x^2$ (B)$3y^2$ (C) z (D) x^3	**B**
64)	The differential equation $2x^2ydx + 3xy^2dy + zdz = 0$, i,e. $Pdx + Qdy + Rdz = 0$ then valve of $\frac{\partial R}{\partial x}$ is ...... (A) $2x^2$ (B)$3y^2$ (C) z (D) 0	**D**
65)	The differential equation $2x^2ydx + 3xy^2dy + zdz = 0$, i,e $Pdx + Qdy + Rdz = 0$ then of $\frac{\partial P}{\partial z}$ is ..... (A) $2x^2$ (B)$x^2z - y^3$ (C) $3xy^2$ (D) x^3	**D**
66)	The differential equation $(x^2z - y^3)dx + 3xy^2dy + x^3dz = 0$,, i.e $Pdx + Qdy + Rdz = 0$ then valve of R is ...... (A) y^3 (B) $x^2z - y^3$ (C) $3xy^2$ (D) x^3	**D**
67)	The valve of $\frac{\partial P}{\partial y}$ in the differential equation $(y - Z)(Y + Z - 2x)dx + (z + x - 2y)dy + (x - y)(x + y - 2z)dz = 0$ is ..... (A) $2y - 2x$ (B) $2x - 3y$ (C) $x - z$ (D) $2z + 3y$	**A**

68)	The differential equation $Pdx + Qdy + Rdz = 0$ is ……. If it satisfies the conditions $\frac{\partial P}{\partial y} = \frac{\partial Q}{\partial X}, \frac{\partial Q}{\partial z} = \frac{\partial R}{\partial y}$ and $\frac{\partial R}{\partial X} = \frac{\partial P}{\partial Z}$ (A) exact (B) not exact (C) may or may not be exact (D) none of these	**A**
69)	An equation of the form $Pdx + Qdy + Rdz = 0$, where P,Q, R are function of x, y (A) simultaneous differential equation (B) Pfaffian differential equation (C) linear equation (D) non-linear equation	**B**
70)	Which of the following is true in the Pfaffian differential Equation $(y+z)dx + dy + dz = 0$ (A) $\frac{\partial P}{\partial y} = \frac{\partial Q}{\partial x}$ (B) $\frac{\partial P}{\partial z} = \frac{\partial R}{\partial x}$ (C) $\frac{\partial R}{\partial y} = \frac{\partial Q}{\partial z}$ (D) All above	**C**
71	Which of the following set of multipliers for simultaneous differential equation $\frac{dX}{x(y-z)} = \frac{dy}{y(z-x)} = \frac{dz}{z(x-y)}$ (A) $x, y - z$ and 1,0,0 (B) $1/x, 1/y, 1/z$ and 1,1,1 (C) $y, x, -z$ and 1,1,1 (D) x, y, z and l, m, n	**B**
72	xdy+ydx=d(xy) A)True B)False	**A**
73	[xdy-ydx]/(x^2)=d(x/y) A)True B)False	**A**
74	[xdy-ydx]/(xy)=d(log(x/y))	**A**

	A)True B)False	
75	Xdy-ydx=d(xy) A)True B)False	**B**
76	[xdy-ydx]/(x^2)=d(y/x) A)True B)False	**B**
77	[xdy-ydx]/(xy)=d((x/y)) A)True B)False	**B**
78	[xdy-ydx]/(xy)=d(log(y/x)) A)True B)False	**B**
79	[xdy-ydx]/(x^2+y^2)=d($\tan^{(-1)}$(y/x)) A)True B)False	**A**
80	[xdy-ydx]/(x^2+y^2)=d($\tan^{(-1)}$ (x/y)) A)True B)False	**B**
81	The differential equation $Pdx + Qdy + Rdz = 0$ is exact then it is integrable. A)True B)False	**A**
82	The differential equation $Pdx + Qdy + Rdz = 0$ is exact then it is not integrable. A)True B)False	**B**
83	The functions 1, x, 2x are …… (A) Linearly Independent (B) Linearly Dependent (C) Linearly Independent and Linearly Dependent (D) None of these	**B**
84	Which of the following set of multipliers for simultaneous differential equation $\frac{yzdx}{(y-z)} = \frac{zxdy}{(z-x)} = \frac{xydz}{(x-y)}$ (A) $x, y - z$ and 1,0,0 (B) $1/x, 1/y, 1/z$ and 1,1,1 (C1/yz, $1/zx$, $1/xy$ and 1,1,1	**C**

	(D) x, y, z and l, m, n	
85	Which of the following set of multipliers for simultaneous differential equation $\frac{adx}{bc(y-z)} = \frac{bdy}{ca(z-x)} = \frac{cdz}{ab(x-y)}$ (A) ax, by, cz and a,b,c (B) $1/x, 1/y, 1/z$ and 1,1,1 (C$1/yz, 1/zx, 1/xy$ and 1,1,1 (D) x, y, z and l, m, n	**A**
86	Which of the following set of multipliers for simultaneous differential equation $$\frac{dx}{x(2y^4 - z^4)} = \frac{dy}{y(z^4 - zx^4)} = \frac{dz}{z(x^4 - y^4)}$$ (A) $1/x, 1/y, 2/z$ and x^3, y^3, z^3 (B) $1/x, 1/y, 1/z$ and 1,1,1 (C$1/yz, 1/zx, 1/xy$ and 1,1,1 (D) x, y, z and l, m, n	**A**
87	Which of the following set of multipliers for simultaneous differential equation $$\frac{dx}{x(y^2 - z^2)} = \frac{dy}{-y(z^2 + x^2)} = \frac{dz}{z(x^2 + y^2)}$$ (A) -$1/x, 1/y, 1/z$ and x, y, z (B) $1/x, 1/y, 1/z$ and 1,1,1	**A**

	(C1/yz, $1/zx$, $1/xy$ and 1,1,1 (D) x, y, z and l, m, n	
88	The functions cos2x,sin2x are …… (A) Linearly Independent (B) Linearly Dependent (C) Linearly Independent and Linearly Dependent (D) None of these	**A**
89	The functions cos2x,4cos2x are …… (A) Linearly Independent (B) Linearly Dependent (C) Linearly Independent and Linearly Dependent (D) None of these	**B**
90	The functions x^2,e^x,e^{4x} are …… (A) Linearly Independent (B) Linearly Dependent (C) Linearly Independent and Linearly Dependent (D) None of these	**A**
91	The functions Sin2x,4Sin2x are …… (A) Linearly Independent (B) Linearly Dependent (C) Linearly Independent and Linearly Dependent (D) None of these	**B**
92	In variation parameter method for second order DEq we have to assume that y=Au+BV A)True B)False	**A**
93	In variation parameter method for second order DEq is useful for finding Particular Integral A)True B)False	**A**
94	Forward differential operator Δ is defined as $\Delta f(x) = f(x+h) - f(x)$	**A**

	A)True B)False	
95	Forward differential operator Δ is defined as $\Delta = E - 1$. A)True B)False	**A**
96	Operator Ef(x)=f(x+h) A)True B)False	**A**
97	Operator E^2 f(x)=f(x+2h) A)True B)False	**A**
98	Forward differential operator Δ is defined as $\Delta = E + 1$. A)True B)False	**B**
99	E^3 f(x)=f(x+3h) A)True B)False	**A**
100	E^3 f(x)=f(x-3h) A)True B)False	**B**
101	$\Delta^2 = E^2 - 2E + 1$. A)True B)False	**A**