	MCQ 19MA201- UNIT V
	Prepared by Vinaya Acharya
1)	One dimensional heat equation is______________________ (a) $\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$ (b) $\frac{\partial u}{\partial t} = c^2 \frac{\partial u}{\partial x}$ (c) $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$ (d) $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial u}{\partial x}$
2)	One dimensional wave equation is______________________ (a) $\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$ (b) $\frac{\partial u}{\partial t} = c^2 \frac{\partial u}{\partial x}$ (c) $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$ (d) $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial u}{\partial x}$
3)	$3xy \frac{\partial z}{\partial y} + 2x^3 y \frac{\partial^2 z}{\partial x^2} = 9$ is a partial differential equation of order ____________ . (a) 1 (b) 2 (c) 3 (d) 4
4)	$x \frac{\partial z}{\partial y} + \frac{\partial^2 z}{\partial x^2} = 5 \frac{\partial^3 z}{\partial y^3}$ is a partial differential equation of order ____________ . (a) 2 (b) 1 (c) 3 (d) 4
5)	$\cos(5x + 6y) \frac{\partial^3 z}{\partial y^3} + \frac{\partial^2 z}{\partial x^2} - xy = 0$ is a partial differential equation of degree ____________ . (a) 1 (b) 2 (c) 3 (d) 4

6)	$5\dfrac{\partial^2 z}{\partial y^2} = \dfrac{\partial^2 z}{\partial x^2}$ is a partial differential equation of order ___________ . (a) 1 (b) 2 (c) 3 (d) 4
7)	The partial differential equation formed by eliminating arbitrary constants from the equation $z = ax + by$ is ______________. (a) $z = px + qy$ (b) $z = px - qy$ (c) $2z = px + qy$ (d) $2z = px - qy$
8)	The partial differential equation formed by eliminating arbitrary constants from the equation $z = ax^3 - by$ is ______________. (a) $3z = px + 3qy$ (b) $z = 3px - qy$ (c) $2z = px + 3qy$ (d) $z = px - 2qy$
9)	The partial differential equation formed by eliminating arbitrary constants from the equation $z = 3ax^2 + 2by^2$ is ______________. (a) $2z = px + qy$ (b) $z = 2px - 2qy$ (c) $2z = px - qy$ (d) $z = px - 2qy$
10)	The partial differential equation $3xy\dfrac{\partial^3 z}{\partial y^3} + x^3 y\dfrac{\partial^2 z}{\partial x^2} = 2$ is ________________ (a) linear (b) non linear (c) of order 1 (d) of order 2

11)	The partial differential equation $z\left(\frac{\partial z}{\partial y}\right)+\frac{\partial^2 z}{\partial x^2}=2$ is ________________ (a) linear (b) non linear (c) of order 1 (d) of order 3
12)	The partial differential equation $z^2\frac{\partial z}{\partial y}+x^3 y\frac{\partial^3 z}{\partial x^2 \partial y}=0$ is ________________ (a) linear (b) non linear (c) of order 1 (d) of order 2
13)	The partial differential equation $\frac{\partial z}{\partial y}+x^3 y\frac{\partial^3 z}{\partial x^2 \partial y}=25$ is ________________ (a) linear (b) non linear (c) of order 1 (d) of order 2
14)	The partial differential equation $z+\frac{\partial^3 z}{\partial x^2 \partial y}+7y=0$ is ________________ (a) linear (b) non linear (c) of order 1 (d) of order 2
15)	The partial differential equation $\frac{\partial^3 z}{\partial y^3}+4z^3\frac{\partial z}{\partial y}=25$ is ________________ (a) of order 1 (b) non linear (c) of order 2 (d) of order 3
16)	Solution of the partial differential equation $\frac{\partial z}{\partial x}+\cos(3x-2y)=0$ by direct integration is ____________________________ (a) $z+\frac{\sin(3x-2y)}{3}=xf_1(y)$.

	(b) $z - \dfrac{\sin(3x - 2y)}{3} = f_1(y)$ (c) $z + \dfrac{\sin(3x - 2y)}{3} = f_1(y)$ (d) $z - \dfrac{\sin(3x - 2y)}{3} = f_1(x)$.
17)	Solution of the partial differential equation $\dfrac{\partial^2 z}{\partial y^2} + 7x^2y^3 = 5$ by direct integration is ______________________________ (a) $z + \dfrac{7x^2y^5}{20} = (2.5)y^2 + y\ f_1(x) + f_2(x)$. (b) $z + \dfrac{7x^2y^5}{20} = (3.5)y^2 + y\ f_1(x) + f_2(x)$ (c) $z + \dfrac{7x^2y^5}{20} = (2.5)y^2 + y\ f_1(y) + f_2(y)$ (d) $z + \dfrac{7x^2y^5}{20} = (2.5)y^2 + y\ f_1(x) + f_2(y)$
18)	Solution of the partial differential equation $8\dfrac{\partial z}{\partial y} + 3x^2y^3 = 9xy$ by direct integration is ______________________________ (a) $8z + \dfrac{x^2y^4}{4} = x\dfrac{y^2}{2} + f_1(x)$. (b) $8z + \dfrac{3x^2y^4}{4} = 9x\dfrac{y^2}{2} + f_1(y)$ (c) $8z + \dfrac{3x^2y^4}{4} = 9x\dfrac{y^2}{2} + f_1(x)$ (d) $8z + \dfrac{3x^2y^3}{4} = 9x\dfrac{y^2}{2} + f_1(y)$

19)	Solution of the partial differential equation $\frac{\partial u}{\partial x} + 8xy^5 = y$ by direct integration is ____________________ (a) $u + 4x^2y^5 = xy + f_1(y)$. (b) $u + 4x^2y^5 = xy + f_1(x)$ (c) $u + 2x^2y^5 = xy + f_1(y)$ (d) $u + 2x^2y^5 = xy + f_1(x)$
20)	Solution of the partial differential equation $e^x \frac{\partial u}{\partial y} + y^3 + x^2 y = 10$ by direct integration is ____________________ (a) $e^x u + \frac{y^4}{4} + \frac{y^2x^2}{2} + f(x) = 10y$. (b) $e^x u + \frac{y^4}{4} + \frac{y^2x^2}{2} + f(x) = 10x$ (c) $e^x u + \frac{y^4}{4} + \frac{y^2x^2}{2} + f(y) = 10y$ (d) $e^x u + \frac{y^4}{4} + \frac{y^2x^2}{2} + f(y) = 10x$
21)	The order of the partial differential equation obtained by eliminating f from $z = f(x^2 + y^2)$ is ____________ (a) 4 (b) 2 (c) 3 (d) 1
22)	The degree of the partial differential equation obtained by eliminating f from $z = f(x^3 - y^3)$ is ____________ (a) 1 (b) 2 (c) 3 (d) 4
23)	The order of the partial differential equation obtained by eliminating f from

	$f(x^2+y^2, z-xy)=0$ is ______________ (a) 1 (b) 2 (c) 3 (d) 4
24)	Solution of the partial differential equation $\frac{\partial^2 z}{\partial x \partial y} = 2y^5$ by direct integration is ______________________ (a) $z = (\frac{1}{3})xy^6 + f_1(y) + f_2(x)$. (b) $z = (\frac{1}{3})xy^6 + f_1(y)$ (c) $z = (\frac{1}{3})xy^6 + f_2(x)$ (d) $z = (\frac{1}{3})xy^5 + f_1(y) + f_2(x)$
25)	A non linear partial differential equation of form two is ______________ (a) $f(z,x,q)=0$ (b) $f(x,p,q)=0$ (c) $f(z,p,q)=0$ (d) $z=f(x,y,q)$
26)	A non linear partial differential equation of form three is ______________ (a) $g(y,q)=f(p)$ (b) $g(y,q)=f(x)$ (c) $g(y,q)=f(x,p)$ (d) $z=f(x,y,q)$
27)	The partial differential equation $5pqz = 2p+2q$ is ____________ (a) $nonlinear \quad of \quad form \quad 3$ (b) $linear$ (c) $of \quad order \quad 2$ (d) $nonlinear \quad of \quad form \quad 2$

28)	The partial differential equation $p^2z^2 + q^2 = p^2q$ is ______________ (a) $nonlinear \quad of \quad form \quad 2$ (b) $linear$ (c) $of \quad order \quad 2$ (d) $nonlinear \quad of \quad form \quad 3$
29)	On solving the non-linear partial differential equation $p^3 + q^3 = 27z$ of form second taking $q = ap$,we obtain $p =$ __________________ (a) $p = \frac{z(-a \pm \sqrt{a^2+4})}{2}$ (b) $p = \frac{z(-a \pm \sqrt{a^2+3})}{2}$ (c) $p = \frac{z(-a \pm \sqrt{a^2+2})}{2}$ (d) $p = \frac{z(-a \pm \sqrt{a^2+1})}{2}$
30)	On solving the non-linear partial differential equation $p^2z^2 + q^2 = p^2q$ of form second taking $q = ap$,we obtain $p =$ __________________ (a) $p = \frac{z^2+a^2}{a}$ (b) $p = \frac{z(a^2+2)}{2}$ (c) $p = \frac{z^2(a^2+2)}{2}$ (d) $p = \frac{(a^2+2)}{2}$
31)	The partial differential equation $yp + xq + p \quad q = 0$ is ______________ (a) $nonlinear \quad of \quad form \quad 2$ (b) $linear$

	(c) $of \quad order \quad 2$ (d) $nonlinear \quad of \quad form \quad 3$
32)	On solving the non-linear partial differential equation $yp + xq + pq = 0$ taking $f(x, p) = g(y, q) = a$,we obtain $p =$ _______ and $q =$ ______ (a) $p = \frac{x}{a-1}, q = \frac{-y}{a}$ (b) $p = \frac{x}{a-1}, q = \frac{y}{a}$ (c) $p = \frac{x^2}{a-1}, q = \frac{-y}{a}$ (d) $p = \frac{x}{a-1}, q = \frac{-y^2}{a}$
33)	On solving the non-linear partial differential equation $p^2 + q^2 = x + y$ taking $f(x, p) = g(y, q) = a$,we obtain $p =$ _______ and $q =$ ______ (a) $p = \sqrt{x+a}, q = \sqrt{y-a}$ (b) $p = \sqrt{x-a}, q = \sqrt{3y-a}$ (c) $p = \sqrt{x-a}, q = \sqrt{y+a}$ (d) $p = \sqrt{x-a}, q = \sqrt{3y-a}$
34)	Solution of the partial differential equation $\frac{\partial^3 z}{\partial x^3} = 0$ by direct integration is ____________________________ (a) $z = f_1(y) + xf_2(y) + x^2 f_3(y)$. (b) $z = f_1(y) + xf_2(y)$ (c) $z = xf_2(y) + x^2 f_3(y)$ (d) $z = f_1(y) + f_2(x)$
35)	The partial differential equation formed by eliminating arbitrary constant from the equation $z = (a + x)^2 + y$ is ________________. (a) $4z = p^2 + 4y$ (b) $z = px - 4y$

	(c) $2z = p + 4y^2$ (d) $2z = p - y$
36)	On solving $u_x - u_y = 0$ by method of separation of variables by substituting $u = XY$,we obtain (a) $u = e^{a(x+y)}C_1C_2$ (b) $u = e^{a(x-y)}C_1C_2$ (c) $u = ye^{a(x)}C_1C_2$ (d) $u = xe^{a(y)}C_1C_2$
37)	On solving $u_x - 2u_t = u$ by method of separation of variables by substituting $u = XY$,we obtain (a) $u = e^{-ax}e^{(\frac{a-1}{2})t}C_1C_2$ (b) $u = e^{ax}e^{(\frac{a-1}{2})t}C_1C_2$ (c) $u = e^{\frac{ax}{3}}e^{(\frac{a-1}{2})}C_1C_2$ (d) $u = e^{a}e^{(\frac{a-1}{2})t}C_1C_2$
38)	On solving $2z_x = 3z_y$ by method of separation of variables by substituting $z = XY$,we obtain (a) $z = e^{a(2x+y)}C_1C_2$ (b) $z = e^{a(2x-3y)}C_1C_2$ (c) $z = 2xye^{a(x+3)}C_1C_2$ (d) $z = e^{a(\frac{3x+2y}{6})}C_1C_2$
39)	On solving $u_x - u_y = 0$ by method of separation of variables by substituting $u = XY$,we obtain (a) $u = e^{a(x+y)}C_1C_2$ (b) $u = e^{a(x-y)}C_1C_2$ (c) $u = ye^{a(x)}C_1C_2$ (d) $u = xe^{a(y)}C_1C_2$
40)	On solving $3u_x - 2u_t = 5u$ by method of separation of variables by substituting $u = XY$,we obtain (a) $u = e^{-ax}e^{(\frac{a-1}{2})t}C_1C_2$ (b) $u = e^{ax}e^{(\frac{a-1}{2})t}C_1C_2$

	(c) $u = e^{\frac{ax}{3}} e^{(\frac{a-5}{2})t} C_1 C_2$ (d) $u = e^{a} e^{(\frac{a-1}{2})t} C_1 C_2$
41)	The solution of $\frac{\partial^3 z}{\partial x^2 \partial y} + \cos(x+y) = 0$ is ________________________ (a) $z - \sin(x+y) = [f_3(y)]x + g(y) + h(x)$ (b) $z + \sin(x+y) = [f_3(y)]x + g(y)x + h(x)$ (c) $z + \sin(x+y) = [f_3(y)]x + g(y) + h(x)$ (d) $z - \sin(x+y) = [f_3(y)]x + g(y) + yh(x)$
42)	The solution of $\frac{\partial^2 u}{\partial x \partial y} - y^2 = 0$ is ________________________ (a) $u = [f_3(y)]x + g(y) + h(x)$ (b) $z - \frac{xy^3}{3} + g(y) + h(x) = 0$ (c) $z - \frac{xy^3}{3} + g(y) + yh(x) = 0$ (d) $z = x + g(y) + yh(x)$
43)	The solution of $\frac{\partial^2 z}{\partial x^2} + 3x^5 + 9xy = 0$ is ________________________ (a) $z + \frac{x^7}{14} + \frac{3}{2} yx^3 = xg(y) + h(y)$ (b) $z - \frac{xy^7}{14} + g(y) + h(x) = 0$ (c) $z - \frac{x^7}{14} + g(y) + h(x) = 0$ (d) $z - \frac{xy^7}{14} + g(y) + yh(x) = 0$
44)	

	The solution of $\frac{\partial^3 z}{\partial x^3} + \sin(2x+y) = 0$ is ________________________ (a) $z + \frac{\sin(x+3y)}{27} + \frac{y^2 f_1(x)}{2} + \frac{xy^3}{6} = yf_2(x) + f_3(x)$ (b) $z + \frac{\sin(x+3y)}{27} + \frac{y^2 f_1(x)}{2} - \frac{xy^3}{6} = yf_2(x) + f_3(y)$ (c) $z - \frac{\sin(x+3y)}{27} + \frac{y^2 f_1(x)}{2} - \frac{xy^3}{6} = yf_2(x) + f_3(x)$ (d) $z + \frac{\sin(x+3y)}{27} + \frac{y^2 f_1(x)}{2} - \frac{xy^3}{6} = yf_2(x) + f_3(x)$
45)	The solution of $\frac{\partial^3 z}{\partial y^3} = \cos(x+3y)$ is ________________________ (a) $z - \frac{\cos(2x+y)}{8} + \frac{x^2 f_1(y)}{2} = xg(y) + h(y)$ (b) $z + \frac{\cos(2x+y)}{8} + \frac{x^3 f_1(y)}{2} = xg(y) + h(y)$ (c) $z + \frac{\cos(2x+y)}{8} + \frac{x^2 f_1(y)}{2} = xg(y) + h(y)$ (d) $z + \frac{\cos(2x+2y)}{8} + \frac{x^2 f_1(y)}{2} = xg(y) + h(y)$
46)	The partial differential equation obtained by eliminating arbitrary constants from the equation $z = (x-a)^2 + (y-b)^2 + 5$ is ______________. (a) $2z = p^2 x + qy$ (b) $2z = p^2 - q^2$ (c) $4z = p^2 + q^2$ (d) $z = px - 2qy$
47)	The partial differential equation obtained by eliminating arbitrary constants from the equation

$2z = \frac{x^2}{a^2} + \frac{y^2}{b^2}$ is ______________.

(a) $2z = px + qy$
(b) $z = 2px - 2qy$
(c) $2z = px - qy$
(d) $z = px - 2qy$

48) The partial differential equation obtained by eliminating arbitrary constants from the equation

$z = a \log[\frac{b(y-1)}{(1-x)}]$ is ______________.

(a) $2z = px + qy$
(b) $z = 2px - 2qy$
(c) $p = px - qy$
(d) $p + q = qy + px$

49) The partial differential equation obtained by eliminating arbitrary function from the equation

$z + x + y = f(x^2 + y^2 + z^2)$ is ______________.

(a) $(1 + p)(y + zq) = (1 + q)(x + zp)$
(b) $z = 2px - 2qy$
(c) $p = px - 2qy$
(d) $(1 + 2xp)(3y + zq) = (1 + 5q)(x + zp)$

50) The partial differential equation obtained by eliminating arbitrary functions from the equation

$z = f(x) + e^{y} g(x)$ is ______________.

(a) $z_x = z_y$
(b) $z_x = 2z_y$
(c) $z_{yy} = z_y$
(d) $z_{xx} = z_y$

ANSWERS

1.a
2.c
3.b
4.c
5.a
6.b

	7.a 8.a 9.a 10.a 11.b 12.b 13.a 14.a 15.d 16.c 17.a 18.c 19.a 20.a 21.d 22.a 23.a 24.a 25.c 26.c 27.d 28.a 29.a 30.a 31.d 32.a 33.a 34.a 35.a 36.a 37.b 38.d 39.a 40.c 41.a 42.b 43.a 44.c 45.d 46.c 47.a 48.d 49.a 50.c