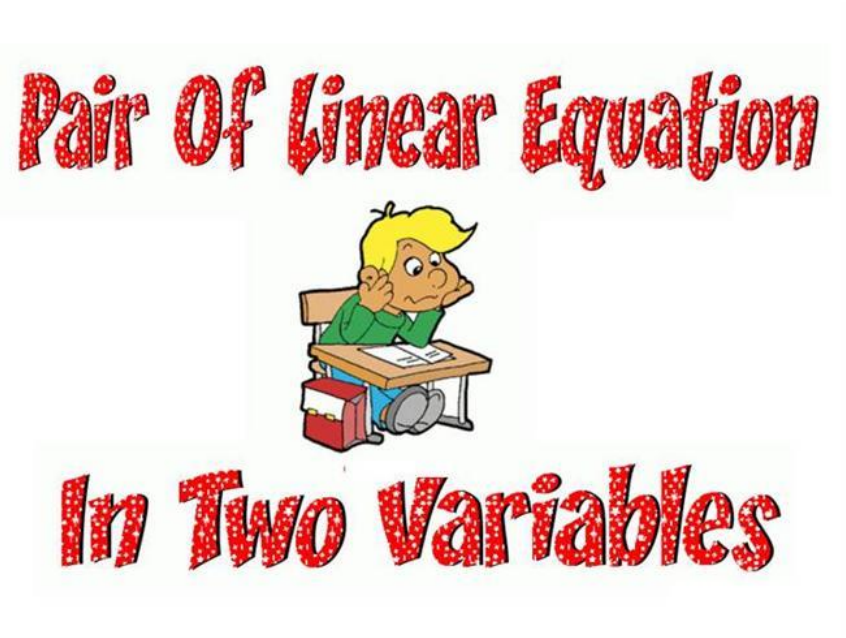
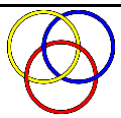
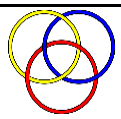
A PAIR OF LINEAR EQUATION IN TWO VARIABLES
CHAPTER-3

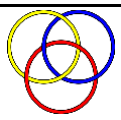
SYNOPSIS

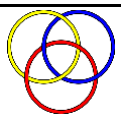


- A **linear equation** is an algebraic equation that contains terms which can either be constants or variables.
- The variables can only be of the first power.
- A **linear equation in two variables** is of the form $ax + by + c = 0$, where x and y are variables and a, b and c are real numbers. Additionally a and b are non-zero.
- The graph of a linear equation in two variables plotted on a Cartesian plane is a **straight line**.
- If the two lines intersect, the pair of equations is said to be consistent. Solving the two equations simultaneously yields a unique value for each of the two variables. These values represent the co-ordinates of the point of intersection.
- If the two lines are parallel, the equations are inconsistent and there is no solution.
- If the two lines are coincident, then there are infinite solutions since every point on these lines is a point of intersection and as we know the line extends infinitely.

A.		**Very Short Answer Questions VSA (1 Mark)**	**Type**
1		For what value of k does the pair of equation given below has infinite solution 3x-y-5=0, 6x-2y+k=0 a) -10 b) 10 c) 2 d) -2	U
2		The system of equations 2x+3y-7=0, 6x+5y-11=0 are consistent or inconsistent? And why?	C
3		If the lines given by 3x+2ky = 2 and 2x + 5y + 1 = 0 are parallel ,then find the value of k. a) 15/2 b) 15/4 c)5/4 d) 5/2	U
4		Find the value of a so that the point (3,a) lies on the line represented by 2x- 3y =12 a) 3 b) -3 c) 2 d)-2	MD
5		The pair of equations y = 0 and y = -7 will have which type of solution? a) infinitely many b) No Solution c) Only one Solution	HOT
6		Name the pair of linear equations in two variable which has a common point i.e. which has only one solution a) Consistent b) Inconsistent c) Parallel	C
7		In the equation Ax + By + C = 0 and ax + by + c = 0 mention the situation so that the equations will represent intersecting lines.	U

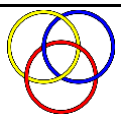
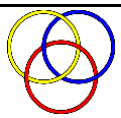
8		If a pair of linear equation Ax+ By + C = 0 and ax + by + c = 0 represents parallel lines then what type of solution will they have?	C
9		How many solutions does the pair of linear equations 8x-5y =7 and 5x-8y = -7 will have? a) One b) two c) zero d) Infinite	U
10		The pair of linear equations 3x + 2y = 5, 6x+4y =10 will have how many solutions?	U
11		If a pair of linear equations is consistent, then which type of lines will be obtained?	U
12		Mention number of solutions of the pair of linear equations x + 2y -8 = 0 and 2x + 4y = 16 a) 0 b) 1 c) 2 d) Infinite	U
13		If the system of equations 2x + 3y = 7, 2ax + (a + b) y = 28 has infinitely many solution then find the relation between a and b. a) b = a b) b=2a c) b = 3a d) 2b = a	MD
14		Find the value of k for which the system of equation x + 2y – 5 = 0 and 3x + ky + 15= 0 has no solution a) 6 b) 5 c) -6 d) 4	U

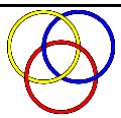
15		The sum of the digits of a two digit number is 9. If 27 is added to it, the digits of the number gets reversed. Find the number a) 25 b)72 c) 63 d) 36	A
16.		The pair of equations y=0 and y=-7 has _____Solutions	U
17.		The pair of equations x=a and y=b graphically represents lines which are a) Parallel b) Intersecting at (b,a) c) coincident d) Intersecting at (a,b)	U
18.		If x=a and y=b are the solutions of the equations x-y = 2 and x+y=4 then the values of a and b are, respectively, a) 3 and 5 b) 5 and 3 c) 3 and 1 d) -1 and -3	A
19.		Do the equations 4x + 3y -1 =5 and 12x + 9y = 15 represent a pair of coincident lines? Justify your answer.	C
20.		Aruna has only Re1 and Rs.2 coins with her. If the total number of coins that she has is 50 and the amount of money with her is Rs. 75, Then the toal number of Re1 and Rs.2 coins are, respectively _____.	A
B.		**Short Answer Questions SA (2 Marks)**	**Type**
21.		Solve: 3(a+3b) = 11 ab 3 (2a + b) = 7ab	U
22.		If x - 4 is a factor of $x^3 + ax^2 + 2bx - 24$ and a - b = 8, find the value of a and b	MD

23.		Find the values of x and y if x + 3y, 7, 13,3x +y are sides of a rectangle taken in order.	MD
24.		A chemist has one solution which is 50% acid and a second which is 25% acid. How much of each should be mixed to make 10 litres of 40% acid.	HOT
25.		Find the value of p and q for which the system of equations represent coincident lines $2x + 3y = 7, (p+q+1)x + (p+2q+2)y = 4(p + q)+1$	HOT
26.		Six years hence a man's age will be three times his son's age and three years ago, he was nine times as old as his son. Find their present ages.	A
C.		**Long Answer Questions LA (3 Marks)**	**Type**
27.		If three times the larger of the two numbers is divided by the smaller one, we get 4 as quotient and 3 as the remainder. Also if seven times the smaller number is divided by the larger one, we get 5 as quotient and 1 as remainder. Find the numbers.	C
28.		Solve $148x + 31y = 527, 231x + 148y = 610$	U

29.		Solve $4/x + 3y = 14$, $3/x - 4y = 23$	U
30.		When the son will be as old as the father today their ages will add up to 126 years. When the father was old as the son is today, their ages add up to 38 years. Find their present ages.	A
31.		The perimeter of a right angles triangle is five times the length of its shortest side. The numerical value of the area of the triangle is 15 times the numerical value of the length of the shortest side. Find the lengths of the three sides of the triangle.	A
32.		The age of a father is equal to sum of the ages of his 6 children. After 15years, twice the age of the father will be the sum of ages of his children. Find the age of the father. 	HOT
33.		Draw the graph of $x - y + 1 = 0$ and $2x + y - 10 = 0$ .Calculate the area bounded by these lines and x axis	HOT
34.		Father's age is three times the sum of ages of his two children. After 5 years his age will be twice the sum of age of two children. Find age of father.	A

35.		2 tables and 3 chairs together cost Rs.2000 whereas 3 tables and 2 chairs together cost Rs.2500.Find the total cost of 1 table and 5 chairs.	U
D.		**V Long Answer Questions VLA (4 Marks)**	**Type**
36.		From Delhi station, if we buy 2 tickets to station A and 3 tickets to station B, the total cost is Rs. 77, but if we buy 2 tickets to station A and 5 tickets to station B the total cost is Rs. 124. What are the fares from Delhi to station A and to station B?	U
37.		In an election contested between A and B, A obtained votes equal to twice the no. of persons on the electoral roll who did not cast their votes & this later number was equal to twice his majority over B. If there were 18000 persons on the electoral roll. How many voted for B.	HOT
38.		Solve graphically the pair of linear equations; $3x + y - 3 = 0$, $2x - y + 8 = 0$. Write the coordinates of the vertices of the triangle formed by two lines with x-axis.	MD
39.		A boat goes 24 km upstream and 28 km downstream in 6 hours. It goes 30km upstream and 21 km downstream in 6.5 hrs. Find the speed of the boat in still water and the speed of stream. 	MD

40.		The length of the sides of a triangle are $2x + \frac{y}{2}$, $\frac{5x}{3} + y + \frac{1}{2}$ and $\frac{2x}{3} + 2y + \frac{5}{2}$. If the triangle is equilateral. Find its perimeter	MD
41.		There are some students in the two examination halls A and B. To make the number of students equal in each hall, 10 students are sent from A to But if 20 students are sent from B to A ,the number of students in A becomes double the number of students in B. Find the number of students in the two halls. 	A
42.		A Railway half ticket c ges are the same on a half ticket as on a full ticket. One reserved one full first class ticket from A to B costs Rs 2530.Also one reserved one full ticket and one half ticket from A to B costs Rs 3810.Find the full first class fare from A to B and also the reservation charges for a ticket.	HOT
43.		Find the value of p and q for which the following system of linear equations has infinite Number of solutions? 2x-y=5, (p + q) x + (2p-q) y =15	MD
44.		Students of a class are made to stand in rows . If one student is extra in a row, there would be 2 rows less. If one student is less in a row there would be 3 rows more. Find the number of students in the class.	A

45.		5 years hence the age of a father shall be three times the age of his son while 5 years earlier the age of the father was 7 times the age of his son. Find their present age.	MD
46.		The monthly income of A and B are in the ratio of 9:7. And their monthly expenditure is in the ratio 4:3. If each saves Rs 1600 per month, find the monthly income of each. Who is more economical?	A
47.		It can take 12 hours to fill a swimming pool using two pipes. If the pipe of larger diameter is used for 4 hours and the pipe of smaller diameter for 9 hours, only half the pool can be filled. How long would it take for each pipe to fill the pool separately?	HOT

ANSWERS

1. K=-10

2. Constant

3. 15/4

4. -2

5. No solution

6. Consistent

7. $A/a \neq B/b$

8. $A/a = B/b \neq C/c$

9. One

10. Infinitely many

11. Intersecting or coincident

12. Infinitely many

13. B=2a

14. K=6

15. 36

16. No Solution

17. Intersecting at (a,b)

18. 3 and 1

19. No, As they do not represent a pair of coinciding lines

20. 25 and 25

21. a=1, b=3/2

22. a = 1, b = -7

23. X = 6, y = 4

24. 6lit, 4lit

25. P = 3, q = 2

26. 30Yrs, 6yrs

27. The numbers are 25 and 18

28. x = 2, y = 1

29. x = 1/5 y = -2

30. 52yrs, 30yrs

31. 16 cm, 30 cm and 34 cm.

32. 45 years

33. 12 sq. unit

34. 65yrs

35. Rs. 1700

36. Delhi to Station A = Rs. 13

    Delhi to Station B = Rs. 17

37. 6000

38. From the graph.

39. 4km/hr, 10km/hr

40. 19.5cm

41. 100, 80

42. Rs.2500, Rs.30

43. P = 1, q = 5

44. 60 students

45. 40yrs, 10yrs

46. Rs. 14400, Rs.11200

47. Larger diameter pipe takes 20 hours & smaller diameter pipe takes 30 hours.