LESSON PLAN

CLASS XI

APPLIED MATHEMATICS

(241)

Chapter – 1

Numbers, Quantification and Numerical Applications

No. of teaching days required to complete this chapter:25

P.K.Testing:
1. What are prime numbers?
2. What are composite numbers?
3. What are binary numbers and decimal number system?

Learning outcomes:

Students will be able to:
1) Understand about prime numbers
2) Learn how to encrypt data using prime numbers
3) Understand the concept of binary numbers
a) How it is different from Decimal Number System
b) Conversion of decimal number to binary number and vice – versa
c) Conversion of fractional numbers from decimal number to binary and vice – versa
d) Binary addition
e) Binary subtraction
4) Understand about Indices, Logarithms and Anti – logarithms a) Laws and properties of logarithms b) Simple applications of logarithm and antilogarithm
5) Solve numerical problems on: a) Averages b) Calendar c) Clock d) Work, Time and Distance.

Procedure:
a) Prime Numbers: A prime number is a natural number greater than 1 that cannot be formal by multiplying two smaller natural numbers. For example, 5 is prime because the only way of writing it as a product, 1 x 5 or 5 x 1

(b) Ratio, Proportion and Logarithms: The value obtaining when two similar quantities are compared by dividing one quantity with the other is called ratio. The ratio of two quantities is that value which gives us how many times one quantity of the other. Only quantities of the same kind i.e. , the quantities with the same units can be compared.

NOTES:
1. The ratio a and b is written as a: b and is measured by the fraction .
2. If two quantities are in the ratio a : b then the first and the second quantities will be times and times the sum of the two quantities respectively. Ex: If x: y =3:5, then x = (x+y) and y = (x+y).
3. The ratio of two quantities can be found , only when both the quantities are of the same kind . Ex: Ratio between 1 meter and 5 seconds cannot be found, as the quantities given are not of the same kind.
4. A ratio is an abstract quantity and a ratio does not have any units. Ex: The ratio of 30 seconds and one minute is 30 seconds: 60 seconds or 1:2.
Terms of a Ratio: For a given ratio a: b we say that is the first term or antecedent and b is second term or consequent.
In the ratio 3:4, 3 is the antecedent while 4 is the consequent.

Properties of a Ratio: The value of a ratio remain the same, if both the terms of the ratio are multiplied or dividedly same none. Zero quantity. If a, b and m are non-realnumber-/$\propto$ 1. . = a : b = am : bm. 2. = / / a : b = :

1. . $\frac{a}{b} = \frac{ma}{mb}$; a : b = am : bm.

2. $\frac{a}{b} = \frac{a/m}{b/m}$; a : b = $\frac{a}{m} : \frac{b}{m}$.

Simplest form of a Ratio: The ratio of two or more quantities is said to be in the simplest form, if the highest common factor (H C F) of the quantities is 1. If the HCF of the quantities is not 1, then each quantity of the ratio is divided by the HCF to convert the ratio into its simplest form.

Types of ratios:

1. A ratio a : b , where a > b. If a positive quantity x is added to the two terms in the ratio a : b , thus a + x : b + x < a : b. 2. A ratio a : b , where a < b , if a positive quantity x is added to the two terms of the ratio a : b,
thus (a + x) : (b + x) > a : b.
3. A ratio a:b where a = b , if a positive quantity x is added to two terms in the ratio a : b thus (a + x) : (b + x) = a : b.
4. The compound ratio of two ratios a : b and c : d is ac : bd.

Logarithm: Logarithm is useful in long calculation involving multiplication and division. Definition: The logarithm of any positive number to a given base (a positive number not equal to 1) is the index of the power of base which is equal to that number. If N and a (1) are any two positive real numbers and for some real number x, a = N, thus x is said to be logarithm of N to the base a. It is written as $\log_a N = x$ i.e., if a = N, then x = $\log_a N$.
1. Natural Logarithm: These were discovered by Napier. They are calculated to the based which approximately equal to 2.71. 2. Common Logarithms: Logarithms to the base 10 are known as common logarithms.
Properties:
1. Logs are defined only for positive real number-/$\propto$
2. Logs are defined only for positive bases different from.
3. In log a,neither a nor b is negative but the value of log acan be negative. Ex: As1 = 0. 1, $\log_0$. 1 = -2
4. Logs of different numbers to the same base are different, i.e. if a b, then log a log . In other words, if log a=log ,
then a = b.
5. Logs of the same number to different bases have different values i.e. if m n, then log a log a . In other words, if log a= log a , then m = n.
6. Log of 1 to any base is 0.
7. Log of 0 is not defined.

Expected Learning Outcomes:
1) Understand about prime numbers
2) Learn how to encrypt data using prime numbers
3) Understand the concept of binary numbers a) How it is different from Decimal Number System b) Conversion of decimal number to binary number and vice – versa c) Conversion of fractional numbers from decimal number to binary and vice – versa d) Binary addition e) Binary subtraction
4) Understand about Indices, Logarithms and Anti – logarithms a) Laws and properties of logarithms b) Simple applications of logarithm and antilogarithm
5) Solve numerical problems on: a) Averages b) Calendar c) Clock d) Work, Time and Distance e) Mensuration

Recapitulation:
1. Add 11000 and 1100.
2.Divide 101100 by 1011.
3.Find Log of 25795
4.What was the day on 25th December 2010?

Resources: Mathematics handbook for Class XI by CBSE, Reference book by ML Aggarwal and Neeraj Raj Jain

Assignment for Students:
1. Multiple Choice Questions will be given.
2. Case study question related to topic will be given.
3.Exercise which are given in book.

Feedback and Remedial teaching: Retest will be taken on the basis of their marks in assessment and required revisions will be given to weak students.

Pedagogical Strategies
Experiential learning: A project on Prime numbers and divisibility rules.
Art Integration:Figures and computer

Inter Disciplinary-linkages and infusion of life skills: Groups of students will be made and project will be given and students will be asked to present the project by PPT.

Chapter – 2
Sets and Relations

No. of teaching days required to complete this chapter:15
P.K.Testing:
☐ What a particular name can be given to all counting numbers?
☐ What can we say to a particular colletion of objects?

Learning Outcomes:
Students will be able to
1. Define set
2. Represent set in roster and set builder form
3. Give subsets of given sets
4. Draw and use venn diagrams
5. Define Cartesian product of sets
6. Define a relation

Innovative methods: An activity to find the number of subsets in a given set will be done.

Vocabulary and important spellings used: Roster form,Set builder form, Subsets,Union and Intersection of sets, Venn diagram.

Procedure:
Teacher will introduce the chapter by giving real life examples of sets like setof same crockery.
Then methods of representing sets will be explained:
1. Roster form
2. Set builder form

Q: Write the set A = { x : x is an integer, $-1 < x < 4$} in roster form .
Sol: The required numbers are 0,1,2,3.So,the given set in the roster form is {0,1,2,3}

Q: Write the set A= { 1,4,9,16,25….} in set-builder form.
Sol: A = {x: x = n2, where n is set of natural numbers}

Then teacher will explain types of sets:
1. Empty sets: A set which does not contain any element is called the *empty set.*
2. Finite and Infinie sets: A set which is empty or contain a definite number of elements is called *finite* otherwise,the set is called *infinite*.
3. Equal sets: Two sets A and B are equal if they have exactly the same elements.
4. Subsets: A set A issaid to be subset of B if every element of A is also an element of B.
5. Power set : The collection of all subsets of set A is called *power set* of A. It is denoted by P(A).
OPERATION ON SETS:
1. Union of sets: Let A and B be two sets. The union of A and B is the set which consists of all the elements of A and B. Symbolically it is written as $A \cup B.$
2. Intersection of Sets: The intersection of two sets A and B is the set of all those elements which belong to both A and B. Symbolically it is written as $A \cap B.$
3. Difference of sets: The difference of the sets A and B in this order is the set of elements which belong to A but not to B. Symbolically we write it as $A - B.$
4. Complement of a set: Let U be the universal set and A be any subset of U,then the complement of A is the set of all elements of U which are not elements of A.

Relations: Teacher will start the chapter by giving real life examples of relations like brother sister, mother – father etc. and then students will learn to link pairs of objects from two sets and then introduce relation between two objects in pair. After that teacher will explain the mathematical definitions :
Cartesian Product: Given two non empty sets A and B. The Cartesian product A X B is the set of all ordered pairs of elements from A to B.
Relation: A relation R from a non-empty set A to a non empty set B is a subset of the Cartesian product A X B.
Domain: The set of all first elements of the ordered pairs in a relation R from a set A to B is

called *domain* of relation R.

Range: The set of all second elements in a relation R from a set A to B is called *range* of the relation R. The whole set B is called *co-domain* of relation R. **Range ⊆ co-domain.**

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ERROR ANALYSIS

ERRORS	REMEDIAL MEASURES
Illustrations through Venn diagrams will help to overcome this problem. **Recapitulation:**	Belongs to be used between an element and a set. Subset is used between sets.
2sets are denoted by small letters	To insist that capital letters only denote a set And small letters for elements of a set
3.AU(B ∩ C) = (AUB) ∩ C	Associate and Distributive formulae should be well versed.
4.While solving practical problems on sets, students neglect n(A ∩ B) and in Venn diagram representation too. Confusion in using belongs to and subset	Illustrations through Venn diagrams will help to overcome this problem.
confusion in the range and the codomain	Insist range always a subset or a set equal to the codomain

Recapitulation:
1) Write the set A = { x : x is an integer, –1 < x < 4} in roster form
2) Write { x : –3 < x <7} as an interval.
3) Write all the possible subsets of A = {5,6}.
4) In a class of 50 students, 30 students like Mathematics, 25 like Science and 16 like both. Find the number of students who like i) either mathematics or science ii) neither Mathematics nor Science.
5) Find a and b if (a – 1, b + 5) = (2, 3)
6) If A = {1, 3, 5}, B = {2,3}, find : a).A × B b).B × A
7) Let A = {1,2}, B = {2,3,4}, C = {4,5}, find a).A × (B U C)

Resources Mathematics handbook for Class XI by CBSE, Reference book by ML Aggarwal and Neeraj Raj Jain
Link Used: SETS: www. mathxtc.com

Assesment:
 Test consist of following questions will be conducted:
1) In a group of 800 people, 500 can speak Hindi and 320 can speak English. Find (i) How many can speak both Hindi and English? (ii) How many can speak Hindi only?
2) A survey shows that 84% of the Indians like grapes, whereas 45%like pineapple. What percentage of Indians like both grapes and pineapple?
3) In a survey of 100 peoples it was found that 28 read magazine A, 30 read magazine B, 42 read magazine C, 8 read magazine A and B, 10 read magazine A and C, 5 read Magazine B and C and 3 read all three magazines. Find.(i) How many read none of the three magazine? (ii) How many read magazine C only?
4) Let A, B be any two sets. Using properties of sets prove that, (i) (A – B) ∪B = A ∪B (ii) (A∪ B) – A = B – A [Hint : A – B = A∩ B' and use distributive law.]
5) If μ={1,2,3,4,5,6,7,8,9}, A = {2,3,5,7,9}, B = {1,2,4,6}, verify (i) (A∪ B)' = A' ∩ B'
(ii) B – A = B ∩ A' = B – (A ∩ B).

Pedagogical Strategies
Experiential learning :Use of Venn diagrams in solving Practical Problems.
Art Integration:Figures and computer

Feedback and Remedial teaching: Retest will be taken on the basis of their marks in assessment and required revisions will be given to weak students.

Inter Disciplinary-linkages and infusion of life skills: Groups of students will be made and project will be given and students will be asked to present the project by PPT.

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Chapter – 3
Sequence and Series

No. of teaching days required to complete this chapter:20

P.K.Testing:
1. What is sequence?
2. What is Series?
3. What is the particular name given to patterns in sequence?

Learning Outcomes:

Students will be able to:
1.Extends the ideas related to Arithmetic progressions learnt earlier to new types of sequences and their series.
2.Use stigma notation and expand corresponding series.
3. Distinguish between sequence and series.
4. Calculate the nth partial sum of sequence.

Procedure:
A succession of numbers arranged in a definite order according to a certain given rule is called a sequence. The number occurring at the nth place of a sequence is called its nth term or the general term, to be denoted by an.

A sequence is said to be finite or infinite according as the number of terms in it is finite or infinite respectively. A sequence can be regarded as a function whose domain is the set of natural numbers or some subset of it of the type {1,2,3,...k}. Sometimes we use the functional notation a(n) for an.
Series: By adding the terms of a sequence, we get a series. Let a1,a2,.....,an. be a given sequence. Thus the expression a1+a2+....+an is called the series associated with the given sequence. Series are often represented in compact forms, called sigma notations. Thus the series a1+a2+.....+an is abbreviated as

$$\sum_{k=1}^{n} a_k$$

Ex. 1 Write the first three terms in each of the following sequence defined by the following: i) an = 2n+5 ii) an = $n-3$ 4 Solution: i) Here an = 2n+5 Substituting n = 1,2,3, we get a1= 2(1)+5 = 7, a2 = 9, a3 = 11
Therefore, the required terms are 7,9 and 11

Progression: Sequence following patterns are called progressions.

Arithmetic Progression (A.P.): It is a sequence in which each term except the first one differs from its preceding term by a constant. This constant difference is called the common difference of the A.P. In an A.P. we usually denote the first term by 'a', the common difference by 'd' and the nth term by a_n

Some properties of an A.P.
 (i) If a constant is added to each term of an A.P. then the resulting progression is an A.P.
 (ii) If a constant is subtracted from each term of an A.P. then the resulting progression is an A.P.
(iii) If each term of an A.P. is multiplied by the same non-zero number then the resulting progression is an A.P.
 (iv) If each term of an A.P. is divided by the same non-zero number then the resulting progression is an A.P.

Geometrical Progression (GP): A sequence a$_1$, a$_2$,..............a$_n$ is called a geometrical progression, if each term is non zero and a_{k-1}/a_k = r (constant) for all k .
The constant ratio is called its common ratio. In GP we usually denote the first term by a, the common ratio by r and the nth term by Tn
Geometric Series: a$_1$, a$_2$,..............a$_n$,.................. is a GP then the sum a$_1$, a$_2$,..............a$_n$ +..................is called a geometric series.
General Term of a GP: Let us consider a GP in which first term = a and common ration = r. Then the GP is a, ar, ar^2 ......Hence Tn = ar$^{(n-1)}$.

Art Integration:Figures and computer

Learning Outcomes:
At the end of the lesson, the students should have been able to :
a. Find the sum of a finite arithmetic sequence

b. Use an arithmetic series to solve an application problem
c. Find the sum of a finite geometric sequence
d. Use a geometric series to solve an application problem
e. Find the sum of infinite geometric series

Resources Mathematics handbook for Class XI by CBSE, Reference book by ML Aggarwal and Neeraj Raj Jain
Link Used: www. mathxtc.com

<div align="center">Assesment:</div>

1. Write the general term of a G.P where the first term is r and the common ratio is a.
2. Which term of the G.P : 1/16, 1/8, 1/4, 1/2, ………. is 128?
3. The sequence given as 1, 2, 4, 8, 16, 32, ……..How many terms required from the beginning to make total of at least 1000?
4. Find the geometric mean of the following numbers a) 5 and 25 b) 7 and 63 c) -2 and -8 5. Insert 3 numbers between 4 and 324 such that the resulting sequence in a G.P.
6. A G.P is given 1/2, 1, 2, 4, ……… If a constant k is multiplied in each term of the G.P., then find the 10th term of the G.P.
7. Find the following sums a) $1 + 1/2 + 1/4 + 1/8 +$ …….. upto ∞ b) $(-4) + 8 + (-16) + 32 +$ ……. Upto 9 terms
8. Show that the Arithmetic mean is always greater than or equal to the Geometric mean of two numbers.
9. Arithmetic mean of two numbers is 10 and geometric mean is 8. Find the numbers. 1
0.If the 2nd , 3rd and 6th terms of an A.P are in G.P. Find the common ratio of G.P if the first term of the A.P is 6.

Feedback and Remedial teaching: Retest will be taken on the basis of their marks in assessment and required revisions will be given to weak students.

Pedagogical Strategies
Experiential learning : Fibonacci sequence-its history and presence in nature.
Art Integration:Figures and computer

Inter Disciplinary-linkages and infusion of life skills: Groups of students will be made and project will be given and students will be asked to present the project by PPT.

Inter Disciplinary-linkages and infusion of life skills: Groups of students will be made and project will be given and students will be asked to present the project by PPT.

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Chapter –4

Permutation and Combinations

No. of teaching days required to complete this chapter:20

Learning Outcomes:
The students should be able to
1. Students are able to solve the problems by using Fundamental principle of counting
2.Students understand Permutation as an arrangement and apply their knowledge in solving problems
3. Students can differentiate permutation and combination and can apply in solving problems.

P.K.Testing: Students will be asked about the simple questions regarding making Combinations.

Procedure:
Permutations
The word Permutation will be explained as an arrangemet .e.g. There are three objects A,B,C then permutation of three objects taking two at a time are AB,BC,CA,BA,CB,AC i.e. 6.
Fundamental Principle of Addition: If one event can occur in m different ways and other event can occur in n different ways then the number of ways of occurrence of either the first or second event is (m + n). Many examples will be discussed in class.
Fundamental Principle of Multiplication: If an event can occur in m different ways , following with another event can occur in n different ways then total number of ways of occurrence of both events in the given order is m X n. Many examples will be explained.
Factorial Notation: $n!$ $is\ called\ n\ factorial.\ n! = (n-1)(n-2) \dots \dots \dots .3.2.1$
The number of permutation of n objects taken r at a time, $0 \le r \le n$.
$nPr = (n-1)(n-2) \dots \dots \dots \dots . (n-r+1)$
Permutations when some of objects are similar: The number of permuation of n objects , taken all at a time when p of them are similar to one kind and q of them are similar to another kind and remaining are all different is given by
$n!$
$p!q!$
.
Circular Permutations:
☐ Number of permutations of n different objects in a circle is given by (n – 1)!
☐ Number of permutations of n objects in a circle p of them are similar of one kind and q of them are similar to another kind and remaining all are different is given by
$(n-1)!$
$p!q!$
.
Combinations: Each of different selections made by taking same or all of a number of objects, irrespective of their arrangements is called combination.
$nCr = number\ of\ combination\ of\ n\ different\ objects\ taken\ r\ at\ a\ time.$
Properties of nCr:
- $nC0 = nCn = 1$
- $nCr = nCn-r$
- $nCr-1 + nCr = n+1Cr$, $1 \le r \le n$
- $nCx = nCy$ implies x+ y = n or x = y.
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Recapitulation: Teacher will ask following questions :
1. Three tourists A, B & C arrive in a city where there are four hotels. In how many ways can they take up their accommodation, each at a different hotel?
2. A Coin is tossed 3 times and the outcomes are recorded. How many possible outcomes are there?
3.Given 5flags of different colours , how many different signals can be generated if each signal requires the use of 2 flags one below the other?
4. In a class are 27 boys and 14 girls .the teacher wants to select 1boy and 1 girl to represent the class for a function. In how many ways can the teacher make this selection?

5. How many numbers are there between 99 and 1000 having 7 in the unit's place?

Learning Outcomes:

The students should be able to

1. Define an inequality.
2. differentiate in equations and equations
3. Identify various types of inequalities. (Numerical inequalities, Literal inequalities. Double inequalities, Slack inequities, linear inequalities in one variable, linear inequalities in two variables x and y, system of linear inequalities in two variables)
4. Solve the in equations algebraically and graphically.
5. Apply their knowledge and understanding in solving the Application of inequalities in the present day situations .

Resources: Mathematics text book for Class XI by NCERT,Reference book by Dr.R.D.Sharma

Link Used: :www.xpowerpoint.com/ppt/permutation.html

Assesment:

1. Find n, if P(n,4):P(n-1,3)=9:1
2. Find n if, C(n,7)=C(n,17).
3. If C(n-1,r):C(n,r):C(n+1,r)=6:9:13, find n and r.
4. How many numbers greater than a million can be formed by using the digits 4,6,0,6,7,4,6?
5. A polygon has 44 diagonals, find the number sides of a polygon.
6. How many words each of 3 consonants and 2 vowels can be formed from the letters of the word INVOLUTE?
7. How many different arrangements of the letters of the word INDEPENDENCE can be formed so that vowels always occur together?
8. In how many ways can 5 boys and 3 girls be seated in a row, so that no two girls sit together?
9. The different permutations of all the letters of the word EXAMINATION are listed as in a dictionary. If these permutations are considered as words, how many words are there before the first word starting with E?

Feedback and Remedial teaching: Retest will be taken on the basis of their marks in assessment and required revisions will be given to weak students.

Pedagogical Strategies

Experiential learning : Fibonacci sequence-its history and presence in nature.

Art Integration:Figures and computer

Inter Disciplinary-linkages and infusion of life skills: Groups of students will be made and project will be given and students will be asked to present the project by PPT.

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Ch-5
Co-ordinate Geometry

No. of teaching days required to complete this chapter:15

Learning Outcomes:
To enable the students to understand and apply:
1. Concept of Straight Line
2. Graphical representation in two-dimensional Plane
3. Concept of Circles
4. Graphical representation of Circles in two dimensional Plane
 5. Concept of Parabola
6. Graphical representation of Parabola in two dimensional plane

P.K.Testing:
Students will be asked about line,circle and plane.

Procedure:
Various forms of Straight Lines
1.Horizontal and Vertical Lines : If a horizontal line L is at a distance a from the x-axis, then the ordinate (y-coordinate) of every point lying on the line is either a or –a. So the equation of the line parallel to x-axis is y = a or y = - a.
Simillarly, Equation of the vertical line at a distance b from y-axis is either x = b or x = -b
2.Point-slope form Suppose Po (xo ,yo)is a fixed point on the line L. Let P(x,y) any arbitrary point on the line. Then by definition of slope of line m $= y-yo$ $x-$. i.e, y – yo = m(x-xo) This is the equation of the line in Slope-point form.
3. Two- point form Let P1 (x1 ,y1) and P2 (x2 ,y2) be two points passing through the line L. Let P(x,y) be any general point on L. Since the three points P1,P2 and P are collinear, Slope of PP1=Slope of P1P2 i.e, $y-y1$ $x-x1 = y2-y1$ $x2-x1$ (OR) y – y1= $\pmb{y2-y1}$ $\pmb{x2-x1}$ (x – x1) This is the equation of the line in two point form
 4.Slope-intercept form Suppose a line L with slope m cuts the y-axis at a☐ distance 'c' from the origin. The distance c is called the y-intercept. Equation of such straight line is☐ y = mx + c Simillarly, if the line cuts x-axis at a distance 'd' from the origin, then the equation of the line is y = m(x –d), here d is called the x – intercept
5.Intercept form If a line makes x-intercept 'a' and y-intercept 'b' on the axes, then the equation of the line will be of the form $\pmb{x}$ $\pmb{a}$ + $\pmb{y}$ $\pmb{b}$ = 1
6. Normal Form: Suppose a non vertical line is known to us with the following data: Length of the perpendicular(normal) from the origin to the line. Angle with the normal makes with the positive direction of x-axis
The equation of the line in normal form is $\pmb{x.cos\ w + y\ sin\ w = p}$.

Pedagogical Strategies
Experiential learning : Students will be asked to derive equation of circle by coordinate of a fixed point and a general point.

Art Integration:Figures and computer.

Resources: Mathematics text book for Class XI by NCERT,Reference book by ML Aggarwal and Neeraj Raj Jain.

Assessment
1. Find the equation of the set of points which are equidistant from the points (1, 2, 3) and (3, 2, –1).
2. Prove that the points: (0, 7, 10), (–1, 6, 6) and (–4, 9, 6) are the vertices of a right-angled triangle.
3.Find the equation of the circle passing through (0,6),(0,0) and(0,8).
4. Determine the focus coordinates, the axis of the parabola, the equation of the directrix and the latus rectum length for $y^2 = $ -8x.

Feedback and Remedial teaching: Retest will be taken on the basis of their marks in assessment and required revisions will be given to weak students.
Inter Disciplinary-linkages and infusion of life skills: Groups of students will be made and project will be given and students will be asked to present the project by PPT.

Ch-6
Logical Reasoning

No. of teaching days required to complete this chapter:15

Learning Outcomes:
Students would be able to understand concept of:
1) Logical reasoning
a) Coding – Decoding
b) Odd man out
 c) Blood relation
d) Syllogism
2)Form „New statements from old statements"
3)Form „Compound statements"
4)Use words like "AND" and "OR" in appropriate place/statements
5)Prove things by using contradiction approach
6)Code and Decode messages/puzzles 1
7)Relate themselves with their own family members.

PK Testing.
Students will be aware of different relations,symbols and simple aptitude.

Procedure:
Logical reasoning is a type of problem-solving that involves working through a set of rules that govern a scenario. This set of rules or steps is referred to as an algorithm. Logical reasoning involves testing different sets of steps - or algorithms - to determine which sequence of rules leads to the correct solution.

Pedagogical Strategies
Experiential learning : Students Visit the census site of India and depict the information given there in pictorial form.

Art Integration:Figures and computer.

Resources Mathematics handbook for Class XI by CBSE, Reference book by ML Aggarwal and Neeraj Raj Jain**.**

Assessment
1.Complete the series 1,6,13,22,33,..
2. In the following number series a wrong number is given. Find out the wrong number.
150, 450, 750, 1060, 1350, 1650, 1950
3. Fill the question mark in following:
PRODUCTIVITY, RODUCTIVIT, ODUCTIVI, ?
4. Pointing to a photograph of a boy Suresh said, "He is the son of the only son of my mother." How is Suresh related to that boy?

Feedback and Remedial teaching: Retest will be taken on the basis of their marks in assessment and required revisions will be given to weak students.

Inter Disciplinary-linkages and infusion of life skills: Groups of students will be made and project will be given and students will be asked to present the project by PPT.

Ch-7
Calculus

No. of teaching days required to complete this chapter:35

Learning Outcomes:
Students would be able to
1.Identify the function and find out Domain and Range of a function
2.Explain the concept of limit and continuity.
3.Corelate Instantaneous rates of change with differentiation
4. Find out Derivatives of algebraic functions using Chain rule
5.Tangent line and equations of tangents
6. Approach for solving daily life problems.

PK Testing:
Students should have knowledge of algebraic terms.

Procedure:
The concept of the limits and continuity is one of the most important terms to understand to do calculus. A limit is stated as a number that a function reaches as the independent variable of the function reaches a given value. For example, consider a function f(x) = 4x, we can define this as,The limit of f(x) as x reaches close by 2 is 8.

Mathematically, It is represented as

$$\lim_{x \to 2} f(x) = 8$$

.

A function is determined as a continuous at a specific point if the following three conditions are met.
- f(k) is defined.

$$\lim_{x \to k} f(x) \; exists$$

- A function will only be determined as continuity of a function if its graph can be drawn without lifting the pen from the paper. But a function is defined as discontinuous when it has any gap in between.

Continuity Meaning

A function is said to be continuous if and only if it is continuous at each point of its domain. A function is determined to be continuous on an interval, or subset of its domain, if and only if it is continuous at each point of its domain. The addition, subtraction, and multiplication of continuous functions with similar domain are also continuous excluding the point in which the denominator is equivalent to zero. Continuity can also be defined with respect to limits by stating that f(x) is continuous at x_0 of its domain if and only if, for values of x in its domain,

$$\lim_{x \to 0} f(x) = f(x_0) \,.$$

Pedagogical Strategies
Experiential learning : Differentiation concept will be explained graphically.

Art Integration:Figures and computer.

Resources:Mathematics handbook for Class XI by CBSE, Reference book by ML Aggarwal and Neeraj Raj Jain**.**

Assessment

Questions from Book will be given.

Feedback and Remedial teaching: Retest will be taken on the basis of their marks in assessment and required revisions will be given to weak students.

Inter Disciplinary-linkages and infusion of life skills: Groups of students will be made and project will be given and students will be asked to present the project by PPT.

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Ch-8
Probability

No. of teaching days required to complete this chapter:25

Learning Outcomes:
Students will be able to Builds up the axiomatic approach to Probability through the terms
Random experiment,
Sample space,
Events etc.
Apply Baye's theorem in practical solutions.

PK Testing:
Students should know the basic concepts of sample space,outcomes,events,random experiments.

Procedure:
Event: A subset of the sample space associated with a random experiment is called an event or a case.
e.g. In tossing a coin, getting either head or tail is an event.

Equally Likely Events: The given events are said to be equally likely if none of them is expected to occur in preference to the other.
e.g. In throwing an unbiased die, all the six faces are equally likely to come.

Mutually Exclusive Events: A set of events is said to be mutually exclusive, if the happening of one excludes the happening of the other, i.e. if A and B are mutually exclusive, then $(A \cap B) = \Phi$
e.g. In throwing a die, all the 6 faces numbered 1 to 6 are mutually exclusive, since if any one of these faces comes, then the possibility of others in the same trial is ruled out.

Exhaustive Events: A set of events is said to be exhaustive if the performance of the experiment always results in the occurrence of at least one of them.
If $E_1, E_2, \ldots, E_n$ are exhaustive events, then $E_1 \cup E_2 \cup \ldots \cup E_n = S$.
e.g. In throwing of two dice, the exhaustive number of cases is $6^2 = 36$. Since any of the numbers 1 to 6 on the first die can be associated with any of the 6 numbers on the other die.

Complement of an Event: Let A be an event in a sample space S, then the complement of A is the set of all sample points of the space other than the sample point in A and it is denoted by A'or \bar { A }.
i.e. A' = {n : n ∈ S, n ∉ A]
Note:
(i) An operation which results in some well-defined outcomes is called an experiment.
(ii) An experiment in which the outcomes may not be the same even if the experiment is performed in an identical condition is called a random experiment.

Pedagogical Strategies
Experiential learning : To write the sample space, when a coin is tossed once, two times, three times, four times.

Art Integration:Figures and computer.

Resources:Mathematics handbook for Class XI by CBSE, Reference book by ML Aggarwal and Neeraj Raj Jain.

Assessment

1. From a group of 2 boys 3 girls ,two children are selected. Find the sample space associated to this random experiment.
2.A coin is tossed .if head comes up,a die is thrown but if tail comes up,the coin is tossed again . find the probability of obtaining i) two tails ii) head and number 6 iii) head and an even number.
3. Two urns contain respectively 2 red, 3 white, and 3 red, 5 white balls. One ball is drawn at random from the first urn and transferred into the second one. A ball is then drawn from the second urn and it turns out that the ball is red. What will be the probability that the transferred ball was white?

4. In a bolt factory, three machines M_1, M_2, and M_3 manufacture 2000, 2500, and 4000 bolts every day. Of their output 3%, 4%, and 2.5% are defective bolts. One of the bolts is drawn very randomly from a day's production and is found to be defective. What is the probability that it was produced by machine M_2?

Feedback and Remedial teaching: Retest will be taken on the basis of their marks in assessment and required revisions will be given to weak students.

Inter Disciplinary-linkages and infusion of life skills: Groups of students will be made and project will be given and students will be asked to present the project by PPT.

Ch-9
Descriptive Statistics

No. of teaching days required to complete this chapter:35

Learning Outcomes:
Students will be able to
1. develop an understanding of everyday data.
2.Understand the organization,visualisation and analysis of data.
3.Draw meaningful conclusion from the data
4.make comparisons among two distributions.
5.translate real world problems and make meaningful inferences out of it.

PK Testing:
Students should have knowledge of mean, median and mode.

Procedure:
Measure of Dispersion
The dispersion is the measure of variations in the values of the variable. It measures the degree of scatteredness of the observation in a distribution around the central value.

Range
The measure of dispersion which is easiest to understand and easiest to calculate is the range.
Range is defined as the difference between two extreme observation of the distribution.
Range of distribution = Largest observation – Smallest observation.

Mean Deviation

Mean deviation is the basic measure of deviations from value, and the value is generally a mean value or a median value. In order to find out the mean deviation, first take the mean of deviation for the observations from value is $d = x - a$ Here x is the observation, and a is the fixed value.

The basic formula to find out the mean deviation is

Mean Deviation = Sum of absolute values of deviations from 'a' / Number of observations

Mean Deviation for Ungrouped Data

Calculation of mean deviation for ungrouped data involves the following steps :

Let us assume the observations $x_1, x_2, x_3, \ldots x_n$

Mean Deviation for Grouped Data

The data can be grouped into two ways namely,

- Discrete frequency distribution
- Continuous frequency distribution

Pedagogical Strategies
Experiential learning : To write the sample space, when a coin is tossed once, two times, three times, four times.

Art Integration: Figures and computer.

Resources: Mathematics handbook for Class XI by CBSE, Reference book by ML Aggarwal and Neeraj Raj Jain**.**

Assessment

Questions from Book will be given.

Feedback and Remedial teaching: Retest will be taken on the basis of their marks in assessment and required revisions will be given to weak students.

Inter Disciplinary-linkages and infusion of life skills: Groups of students will be made and project will be given and students will be asked to present the project by PPT.

Ch-10
Basics Of Financial Maths

No. of teaching days required to complete this chapter:45

Learning Outcomes:
Students will be able to

1. Explain the origin and history of interest rate
2. Have an outlook of various economic theory associated with interest rate
3. explain the steps involved in computation of tax and GST

develop understanding on the concepts associated with the financial mathematics.

PK Testing:
Students should have knowledge of simple interst and compound interest.

Procedure

Unit VII Basics of Financial Mathematics	Sub-topics
Interest and interest rate	Origin of the concept of interest; Forms of interest rate; practical applications of interest rate; economic theories associated with interest rate.
Accumulation with simple and compound interest	Meaning and significance of simple and compound interest; formulae; calculations under simple and compound interest rates; compound interest rates application on various financial products etc.
	VideoLink for reference: https://www.khanacademy.org/economics finance-domain/core-finance/interest tutorial/compound-interest-tutorial/v/introduction to-compound -interest

Simple and compound interest rates with equivalency	Annual Equivalent Rate Youtube link: https://www.youtube.com/watch?v= 1gxpwItFlnw
Effective rate of interest	Concept and practical applications, especially in calculating coupon interests on bonds / debentures, wherein interest is compounded half yearly / quarterly. Youtube link: https://www.youtube.com/watch?v=86
Present value, net present value and future value	Concept and its applications; concept of compounding and discounting; usage of PVAF, FVAF tables; computation of net present value; application of net present value in capital budgeting decisions etc. Youtube link: https://www.youtube.com/watch?v=zGRVVSC4UUQ https://www.youtube.com/watch?v=Dtot7qLEtPc Case studies / Caselets on net present value from various reference books on Financial Management would be discussed.

Annuities, calculating value of regular annuity	Immediate Annuity; Annuity Due; Deferred Annuity; Perpetuity and General Annuity Youtube link: https://www.youtube.com/watch?v=Rq66DqfDQf8 https://www.youtube.com/watch?v=joBu9TnFngQ
Simple applications of regular annuities (up to 3 period)	----------------------do--------------------
Tax, calculation of tax and simple applications of tax calculation in Goods and service tax, Income Tax	Fundamentals of taxation; direct and indirect tax; tax incidence and impact; Income Tax- Assessment of Individuals; GST- Integrated Goods and Services (IGST); State Goods and Services Tax (SGST); Central Goods and Services Tax (CGST) and Union Territory Goods and Services Tax (UTGST). Calculation of GST in hospitality sector; power sector etc. Project: Practical questions from various reference books on Income Tax and Indirect Tax (GST) would be discussed.

Bills, tariff rates, fixed charge, surcharge, service charge	Types of bills; tariff rates-its basis of determination; concept of fixed charge; service charge and their applications in various sectors of Indian economy. Refer: https://www.dvvnl.org/UploadFiles/tariffPlan/NPCL%20Tariff%20Order%20-%20Ver%207.pdf
Calculation and interpretation of bill, water supply bill and electricity other supply bills	water supply bills; units consumed in electricity bills; consumer protection laws for redressal of complaints relating to overcharging in electricty, water supply and other supply bills; concept of Ombudsman. Youtube link: https://www.youtube.com/watch?v=4WG8 TBi50xU https://www.youtube.com/watch?v=x5lnOgkdBic Refer:https://www.theenergydetective.com/b Project: Students would be assigned with the task of taking reading of power consumption of various electrical gadgets installed in their residence and compute the electricity bill based on the KWH concept.
(Comparing interest rates on various types of savings; calculating income tax; electricity bills, water bill; service surcharge using realistic data)	Interest rates on various savings, fixed and recurring deposits products; steps involved in computation of income tax of individuals and factors considered; computation of electricity bills based on realistic consumption of electric units of households in delhi (data may be accessed from BSES Rajdhani Power Ltd.)

Pedagogical Strategies

Experiential learning : Students will be assigned withthe task of taking reading of power consumption of various electric gadgets installed in their residence and compute the electricity bills .

Art Integration: Figures and computer.

Resources: Mathematics handbook for Class XI by CBSE, Reference book by ML Aggarwal and Neeraj Raj Jain**.**

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Assessment
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