ENGLISH

CLASS-XI
CREATIVE ZONE

Topic	Roll no.
Make charts on Educational Thought	01-07
Make collage on Seven Wonders	08-15
Make collage on "Fit India Hit India"	16-22
Write the biography of any author/poet you have in your syllabus	23-30

PRODUCTIVE ZONE

Topic	Roll no.
• Write the rules of "clauses on a chart.	01-10
• Write any 15 words with their antonyms on a chart.	11-20
• Read English news paper regularly and write any 20 words with their synonyms on a chart.	21-ONWARDS

Note-The work must be neat and clean.

CLASS-XII

CREATIVE ZONE

Topic (POSTER MAKING)	Roll no.
Inspirational thoughts with the picture of any great personality.	01-10
Indian culture	11-20
Write any 5 success mantra	21-30
India's achievemnets from 1947-2024	31-onwards

Topic	Roll no.
• Write any 4 formal invitation and replies on a chart paper	All
• Write 4 letters to editor on a chart paper	All
• Write an article on "Importance of education" on a chart paper	1-13
Write an article on "Importance of sports" on a chart paper	14-26
Write an article on "Importance of discipline" on a chart paper	27-ONWARDS

Note-The work must be neat and clean.
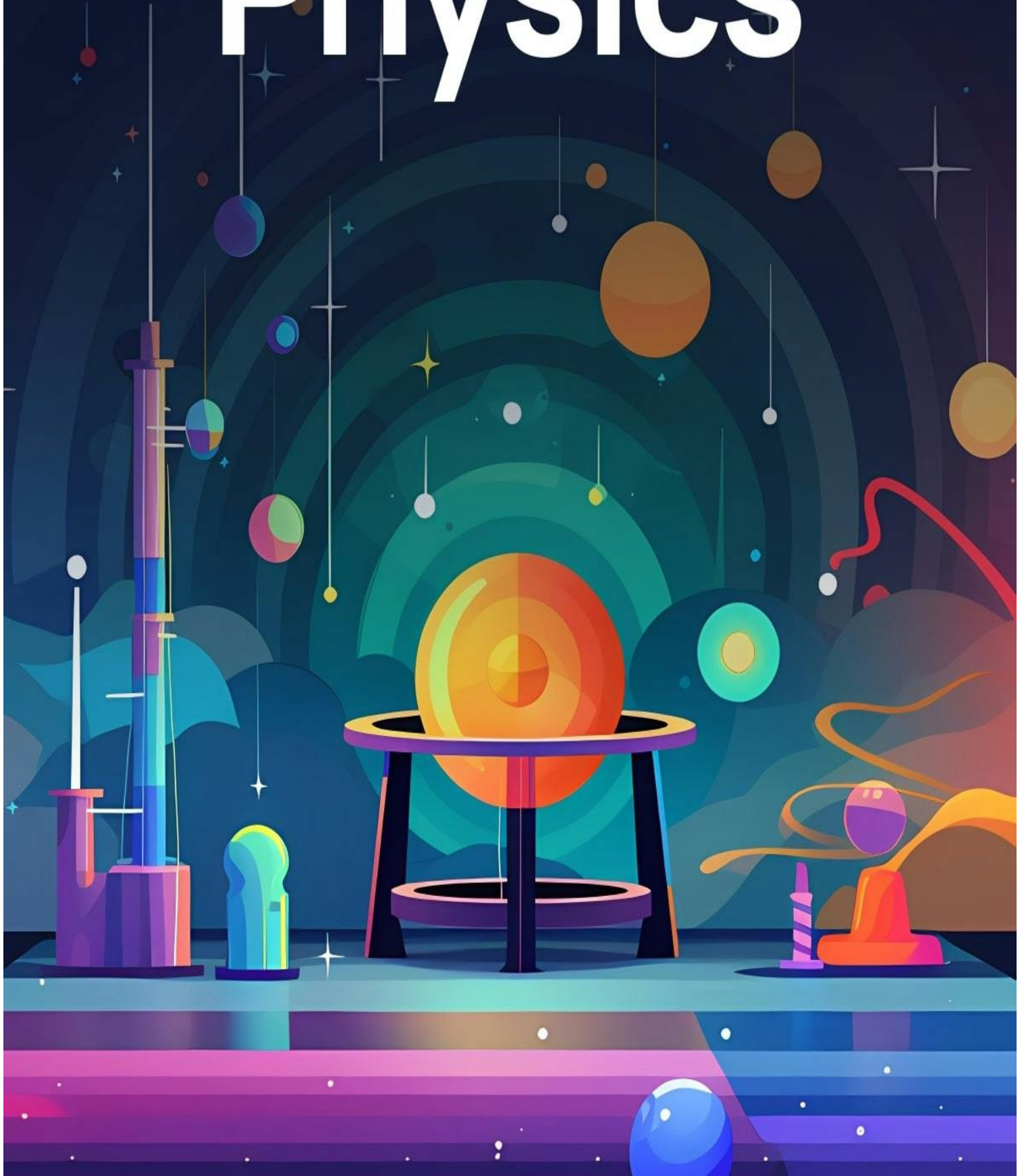
Carbon Purification	Non-Working 3D Model
Rainwater harvesting	Working 3D Model
Motion Sensitive Laser Alarm	Working 3D Model
Crop Field Alarm	Working 3D Model
Nuclear Power Plant	Non-Working 3D Model
Artificial Intelligence	Working Presentation + 2D Model
Sustainable Energy futuristic Village	Non-Working 3D Model
Disc Brake	Working 3D model
Electric Crane	Working 3D Model
Electricity generation using waste material	Working 3D Model
Robotic Hydraullic Arm	Working 3D Model
Bio Gas Plant	Non-Working 3D Model
Hydroelectricty Generation in Dam	Working 3D Model

CLASS-XII

LAB MANUAL

EXPERIMENTS

1A. To determine resistivity of two / three wires by plotting a graph for potential difference versus current.

2A. To find resistance of a given wire / standard resistor using metre bridge.

3A. To verify the laws of combination (series) of resistances using a metre bridge.

4A. To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.

1B. To find the value of v for different values of u in case of a concave mirror and to find the focal length.

3B. To find the focal length of a convex lens by plotting graphs between u and v or between $1/u$ and $1/v$.

5B. To determine angle of minimum deviation for a given prism by plotting a graph

7B. To find the refractive index of a liquid using convex lens and plane mirror.

ACTIVITIES

3A. To assemble a household circuit comprising three bulbs, three (on/off) switches, a fuse and a power source.

4A. To assemble the components of a given electrical circuit.

6A. To draw the diagram of a given open circuit comprising at least a battery, resistor/rheostat, key, ammeter and voltmeter. Mark the components that are not connected in proper order and correct the circuit and also the circuit diagram.

1B. To identify a diode, an LED, a resistor and a capacitor from a mixed collection of such items.

4B. To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.

6B. To study the nature and size of the image formed by a (i) convex lens, or (ii) concave mirror, on a screen by using a candle and a screen (for different distances of the candle from the lens/mirror).

INVESTIGATORY PROJECT

To study various factors on which the internal resistance/EMF of a cell depends	Project 1
To find the refractive indices of (a) water (b) oil (transparent) using a plane mirror, an equiconvex lens (made from a glass of known refractive index) and an adjustable object needle	Project 2
To investigate the relation between the ratio of (i) output and input voltage and (ii) number of turns in the secondary coil and primary coil of a self-designed transformer	Project 3
To investigate the dependence of the angle of deviation on the angle of incidence using a hollow prism filled one by one, with different transparent fluids	Project 4
To estimate the charge induced on each one of the two identical Styrofoam (or pith) balls suspended in a vertical plane by making use of Coulomb's law	Project 5
To study the earth's magnetic field using a compass needle - bar magnet by plotting magnetic field lines and tangent galvanometer	Project 6

1.	Project on Content of Bone Ash
2.	Project on Measurement of Acetic Acid in Vinegar
3.	Project on Determination and Extraction of Caffeine in Multiple Tea Samples and Other Edible Items
4.	Project on Quantitative Estimation
5.	Project on Rusting of Iron
6.	Project on Characterization and Purification of Organic Substances
7.	Project on **Electrochemical Cell**
8.	Project on Food Adulteration
9.	Project on Sterilization of Water with Bleaching Powder
10.	Project on Setting of Cement
11.	Project on Calculating the pH Balance and Change
12.	Project on Green Chemistry – Biodiesel and Biopetrol
13.	Project on Analysis of Fertilizers
14.	Project on Preparation of Potash Alum
15.	Project on Diffusion of Solid in Liquid
16.	Effect of Heat on Vitamin C in Tomatoes
17.	Dyeing Wool, Silk and Cotton in Malachite Green
18.	Acidity in Tea
19.	Mohr's Salt Experiment
20.	Preparation of Toilet Soap
21.	Impact of Dye on Varied Kinds of Fabric
22.	How to make a smoke bomb?
23.	Hess' Law and Thermochemistry
24.	Analysis of Honey
25.	Catalytic Decomposition

INVESTIGATORY PROJECT TOPIC GRADE -12 CHEMISTRY

1. Adulterants in Food

2. Analysis of fertilizers

3. Biodiesel: Fuel for the Future

4. Comparative study and qualitative analysis of different brands of cold drinks

5. Comparing Lactose Percentage between Whole Milk and Powdered Milk

6. Content of Cold Drinks Available in the Market

7. Determination of caffeine in tea samples

8. Determine the quantity of casein in milk

9. DNAs Secret Code

10. Do Oranges Lose or Gain Vitamin C After Being Picked?

11. Effect of Potassium Bisulphite as a Food Preservative

12. Effect of sodium carbonate on the foaming capacity of a soap

13. Purifying Used Cooking Oil

Biology

LIST OF BIOLOGY PROJECT TOPICS FOR CLASS 11

1. Components of Food
2. Pollution
3. Non-Conventional Sources of Energy
4. Human Genome Project
5. Malnutrition
6. Sickle Cell Anemia and its Prevention
7. India's Monsoon
8. Manures and Chemical Fertilizers
9. Importance of Trees
10. Green House Effect
11. To Study of Drug Resistance In Bacteria Using Antibiotics
12. **Blood Circulation**
13. How Does Light Affect Yeast
14. Study on Probiotics and their Preparation
15. Mitosis in Onion Root Tip Cells
16. Cellulitis
17. DNA Fingerprinting
18. Alzheimer's And Dementia
19. Microbes in Human Welfare
20. Study On Gene Therapy
21. Effect of Antibiotics on Microorganisms
22. Effects of Fertilisers on the Rate of Elongation of the Hypocotyl
23. Spermatogenesis
24. Study on Enzymes
25. Drug Addiction
26. Possible Effects of Maternal Behaviour on Foetal Development
27. Pollination
28. Detailed Study on Infertility its Causes and Treatment
29. Eye Diseases
30. Growing Yeast: Sugar Fermentation
31. Effects of Diet on Blood Glucose
32. Effect of Pupil Dilation on Peripheral Vision
33. Ethyl Alcohol vs. E. coli
34. Bacteria Affected by Ultra-Violet Light
35. **Vitamins** or Sources of Vitamins
36. Effects of Diet on Blood Glucose
37. Sources of Energy
38. Transpiration of Plants
39. Phylum Porifera
40. Biomagnifications or Bioconcentration
41. Organic Farming or Organic Agriculture
42. AIDS
43. Study of Bacterial Growth in Acidic Environments
44. Useful Plants and Animals
45. Petroleum
46. Diabetes and Exercise
47. Human Glands
48. Role of Recombinant DNA Technology in Modern Medicine
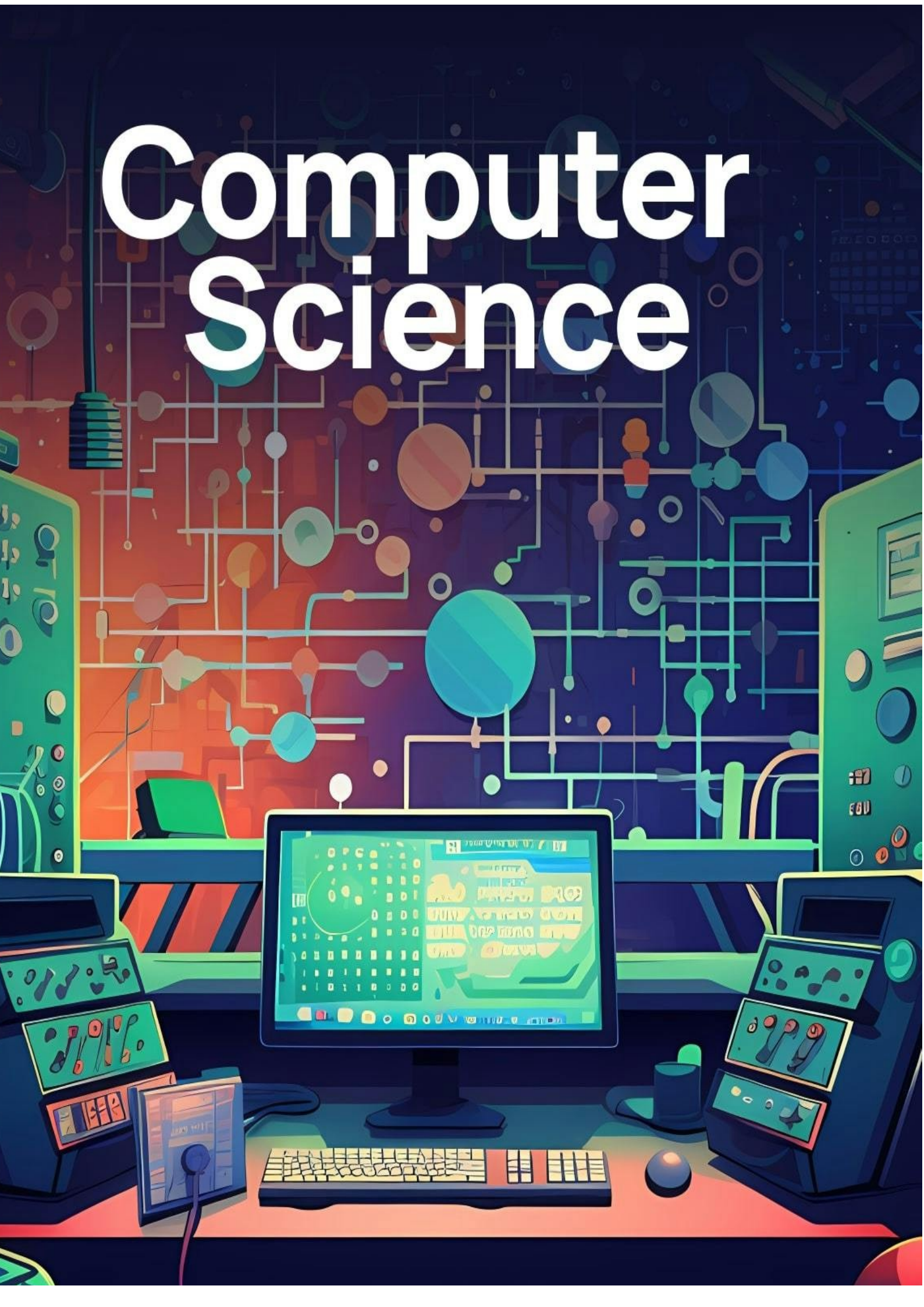49. Types of Soil
50. Malaria

CLASS-XII BIOLOGY INVESTAGATORY PROJECT

1.	Drug Addiction
2.	Possible Effects of Maternal Behaviour on Foetal Development

3.	Pollination	
4.	To Study of Drug Resistance In Bacteria Using Antibiotics	
5.	The Effect of Oil Spills on Oceans	
6.	Study On Gene Therapy	
7.	Study Of Effects Of Antibiotics On Micro-Organisms	
8.	Effects of Fertilisers, Manure and Polythene on therate of elongation of the Hypocotyl	
9.	Spermatogenesis	
10.	Study on Enzymes	
11.	To Study the Coaguable And Non-Coaguable Milk Proteins	
12.	Mitosis in Onion Root Tip Cells	
13.	Cellulitis	
14.	What Music Does Bacteria Enjoy the Most	
15.	How Does Light Affect Yeast	
16.	Coffee Addiction	
17.	Effects of Fertilisers, Manure and Polythene on therate of elongation of the Hypocotyl	
18.	Alzheimer's And Dementia	
19.	Microbes in Human Welfare	
20.	Detailed Study on Infertility its Causes and Treatment	
21.	Eye Diseases	
22.	DNA Fingerprinting	
23.	Recombinant DNA Technology In Todays Medicine	
24.	How to See DNA with the Naked Eye	
25.	Human Genome Project	
26.	Dispersal of Seeds	
27.	Harmful Effects of Mobile Radiation	
28.	On Recent Diseases - Ebola	
29.	What is the Best Way to Disinfect a Toothbrush	
30.	Erasing and Implanting Human Memory	
31.	Does Price and Vitamin C Affect How Fast Fruits Rot	
32.	Strawberry DNA Extraction	

HOLIDAY HOMEWORK- SUMMER VACATION- CLASS XI- COMPUTER SCIENCE

I. Create a PowerPoint presentation on **any one** topics from the given list (minimum 6 slides, 1st slide containing topic name and name, class and section of the student, rest 5 slides of content):

      1)   Application of computers
      2)   Input and output devices
      3)   Types of Software
      4)   Operating Systems
      5)   Types of computers
      6)   Generation of computers

II. Being a Computer Science student, it is important for you to know about different inventors/ developers in the world of technology. Research on **any one** of the following mentioning their achievements and contributions in the field of technology. Create a biography through PowerPoint presentation (minimum 6 slides, 1st slide containing topic name and name, class and section of the student, rest 5 slides of content):

      a.   Charles Babbage
      b.   Steve Jobs
      c.   Bill Gates
      d.   Steve Wozniak
      e.   Bjarne Stroustrup

III. Solve the following:

1. Convert the following:
(i) $(514)_8 = (?)_{10}$ (ii) $(4D9)_{16} = (?)_{10}$ (iii) $(220)_8 = (?)_2$ (iv) $(11001010)_2 = (?)_{10}$

2. Express the following octal numbers into their equivalent decimal numbers.
(i) 6796   (ii) 10.75

3. Express the following decimal numbers into hexadecimal numbers.
(i) 4052   (ii) 100.25

4. Express the following hexadecimal numbers into equivalent decimal numbers.
(i) 9E1A   **(ii) 6C.34**

5. Convert the following binary numbers into octal and hexadecimal numbers.
(i) 1110001000   **(ii) 1010.1001**

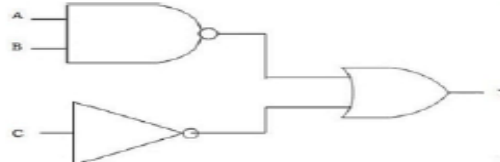**Write binary equivalent of the following octal numbers:**
(i) 2306   **(ii) 65.203**

Write binary representation of the following hexadecimal numbers.
(i) BCA1   **(ii) 132.45**

IV. Boolean Logic questions:

1. Consider the following digital circuit shown below and answer the following:

     a) Write expression for the output Y.
     b) Which logic gates are used in the given digital circuit?
     c) Create truth table for the expression in (a).

2. Draw logical circuits for the following: Y = a'.b' + (a.b)'

HOLIDAY HOMEWORK- SUMMER VACATION- CLASS XII- COMPUTER SCIENCE

I. Complete the documentation work of the project.

II. Answer the following questions:

1. What are the different file processing modes in Python? Explain each.

2. Write a statement in Python to perform the following operations:
   - To open a text file "MYPET.TXT" in write mode
   - To open a text file "MYPET.TXT" in read mode

3. Write a function SumEvenOdd(mylist) to find the sum of all the even elements ans odd elements present in the list 'mylist'
For example- if mylist = [8,12,17,19,25,29,33,32,56,90]
output should be:
even_sum= 198
odd_sum= 123

4. Write a Python program to count the number of characters (character frequency) in a string.
Sample String : google.com'
Expected Result : {'o': 3, 'g': 2, '.': 1, 'e': 1, 'l': 1, 'm': 1, 'c': 1}

5. A blood bank maintains data file "Blood.dat" that contains following information for every donor: donor name, donor date of birth, donor address, donor phone number and donor blood group. Write a complete program to do the following:
   a) Create a file of the donor
   b) Append a record in the file
   c) Display the records
   d) Given the blood group display name, address of the donor
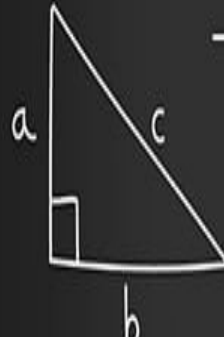   e) Modify the existing information of the donor

6. Write a function in python, Push (employee) to add a new employee name and POP(employee) to delete an employee name from a list of employee names, considering them to act as push and pop operations of the stack.

$$Me = L + I\left[\dfrac{\frac{n}{2} - F}{f}\right]$$

$$(ab)^m \, a^n b^n$$

$$\pi = 3,14$$

$$\sqrt{2}$$

$$x = \dfrac{1}{1+y}$$

$$\delta$$
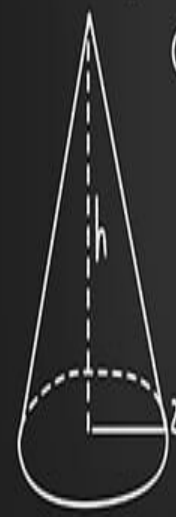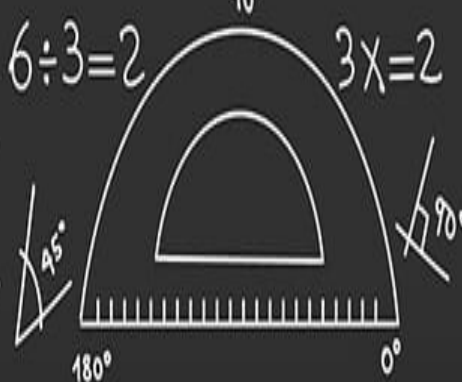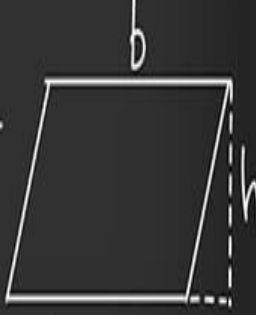
$$2+2=4 \quad \beta$$

$$E = mc^2 \quad \sqrt[n]{x}$$

$$z = y + 3$$

$$\pi$$

$$\pi = 3,14$$

$$b^2 = (a+b)$$

$$\theta$$

$$(x,y) \quad (0,1) \quad (-1,0) \quad (1,0) \quad (0,-1)$$

MATH

$$z = y + 3 \quad \Sigma$$

$$x + 2ax + a^2 = (x+a)^2$$

$$y = \dfrac{1}{1+x} \quad \cos(-x) = \cos(x)$$

$$\pi$$

$$\alpha$$

$$c^2 = a^2 + b^2 \qquad 6 \div 3 = 2 \qquad 3x = 2$$

$$c = \sqrt{a^2 + b^2}$$

$$a = \sqrt{c^2 + b^2}$$

$$90°$$

$$45° \quad 180° \quad 0°$$

$$2+2=4$$

$$a^2 = 2ab + b^2 = (a+b)^2$$

$$b = \sqrt{c^2 + a^2} \qquad E = mc^2 \qquad S_n = \dfrac{n}{2}\left[2a_1 + (n+1)d\right]\alpha$$

designed by freepik

- Do Activity 1,2,5,7,9,13,16,21,22,26,27 in your Laboratory Manual book

1. To verify that the relation R in the set L of all lines in a plane, defined by R = {(l, m) : l ⊥ m} is symmetric but neither reflexive nor transitive.
2. To verify that the relation R in the set L of all lines in a plane, defined by R = {(l, m) : l || m} is an equivalence relation.
3. To draw the graph of − sin x , using the graph of sin x and demonstrate the concept of mirror reflection (about the line y = x).
4. To sketch the graphs of ax and loga x, a > 0, a ≠ 1 and to examine that they are mirror images of each other.
5. To find analytically the limit of a function f (x) at x = c and also to check the continuity of the function at that point.
6. To understand the concepts of decreasing and increasing functions.
7. To construct an open box of maximum volume from a given rectangular sheet by cutting equal squares from each corner.
8. To verify that amongst all the rectangles of the same perimeter, the square has the maximum area.
9. To verify that angle in a semi-circle is a right angle, using vector method.
10. To locate the points to given coordinates in space, measure the distance between two points in space and then to verify the distance using distance formula.
11. To measure the shortest distance between two skew lines and verify it analytically.
12. To explain the computation of conditional probability of a given event A, when event B has already occurred, through an example of throwing a pair of dice.

- Revise Entire syllabus Covered in the class.
- Project Work:

Project-1-Jagrati House

Project on to minimize the cost of the food, meeting the dietary requirements of the staple food of the adolescent students of your school. Task to be done (1) select two food items constituting one cereal and one pulse.(2) find the minimum cost of the selected cereal and pulse from market. (3) formulate the converponding linear programming problem. (4) solve the problem graphically.

Project-2-Jyoti House

Estimation of the population of a particular region/country under the assumptions that there is no migration in or out of the existing population in a particular year.

Project-3-Pragati House

Finding the coordinates of different points identified in your classroom using the concepts of three dimensional geometry and also find the distances between the identified points. Tasks to be done 1. Choose any corner of your classroom as the origin. 2. Take three perpendicular edges of walls as x–, y– and z-axes. 3. Find the coordinates of each corner of the room, corners of windows, doors and blackboard etc. 4. Find the coordinate of the tips of ceiling fan, bulbs and all other possible points in the space of the classroom. 5. Find the distances between different points by measurement as well as by using distance formula. 6. Find the coordinates of the diagonals of the room and length of the diagonals by distance formula.

formation of differential equations to explain the process of cooling of boiled water to a given room temperature?

HOLIDAY HOMEWORK
MATRIX AND DETERMINANTS
CLASS-XII

1. If A is a square matrix such that $A^2 = I$, then find the simplest value of $(A - I)^3 + (A + I)^3 - 7A$.
2. Write the number of all possible matrices of order 2 x 2 with each entry 1,2 or 3.
3. If $[2 \quad 1 \quad 3]\begin{pmatrix} -1 & 0 & -1 \\ -1 & 1 & 0 \\ 0 & 1 & 1 \end{pmatrix}\begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix} = A$, the write the order of matrix A.
4. If $2\begin{bmatrix} 3 & 4 \\ 5 & x \end{bmatrix} + \begin{bmatrix} 1 & y \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}$, then find (x-y).
5. Solve the following matrix equation for x. $(x \quad 1)\begin{bmatrix} 1 & 0 \\ -2 & 0 \end{bmatrix} = O$.
6. If matrix $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ and $A^2 = kA$, then write the the value of k.
7. In the interval $\frac{\pi}{2} < x < \pi$, find the value of x for which the matrix $\begin{bmatrix} 2\sin x & 3 \\ 1 & 2\sin x \end{bmatrix}$ is singular matrix.
8. For what value of x, $A = \begin{bmatrix} 2(x+1) & 2x \\ x & x-2 \end{bmatrix}$ is a singular matrix?
9. For what value of k, the system of linear equations
   $x + y + z = 2; 2x + y - z = 3; 3x + 2y + kz = 4$ has a unique solution?
10. If A is a square matrix of order 3 such that $|adjA| = 64$, find the $|A|$.
    Short Answer (2 marks)
11. If $\begin{vmatrix} x & \sin\theta & \cos\theta \\ -\sin\theta & -x & 1 \\ \cos\theta & 1 & x \end{vmatrix} = 8$, then write the value of x.
12. If $A = [3 \quad 5], B = [7 \quad 3]$ then find matrix C such that $AC = BC$.
13. If $A = \begin{bmatrix} 0 & 0 \\ 5 & 0 \end{bmatrix}$ find A^{16}.
14. If $A = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$, find α satisfying $0 < \alpha < \frac{\pi}{2}$ when $A + A^T = \sqrt{2}I_2$; where A^T is transpose of A.
15. Show that $\begin{bmatrix} 2 & -1 & 3 \\ -5 & 3 & 1 \\ -3 & 2 & 3 \end{bmatrix}$ is inverse of the matrix $\begin{bmatrix} -7 & -9 & 10 \\ -12 & -15 & 17 \\ 1 & 1 & -1 \end{bmatrix}$.

16. Find the matrix A such that $\begin{bmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{bmatrix} A = \begin{bmatrix} -1 & -8 & -10 \\ 1 & -2 & -5 \\ 9 & 22 & 15 \end{bmatrix}$.
17. The co-operative store of a particular school has 10 dozen physics books, 8 dozen chemistry books and 5 dozen mathematics books. Their selling prices are Rs. 45, 40 and 30 each respectively. Find the total amount the store will receive by selling all books.
18. Let $f(t) = \begin{vmatrix} \cos t & t & 1 \\ 2\sin t & t & 2t \\ \sin t & t & t \end{vmatrix}$ then find $\lim_{t \to 0} \frac{f(t)}{t^2}$
19. A total amount of Rs.7000 is deposited in three different saving bank accounts with annual interest rates 5%, 8% and $8\frac{1}{2}\%$ respectively. The total annual interest from these three accounts is Rs.550. Equal amounts have been deposited in the 5% and 8% savings accounts. Find the amount deposited in each of the three accounts, with the helps of matrices.
20. Given that $A = \begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$ find AB. Use this result to solve the following system of linear
    equations :x-2y+z=4; x-2y-2z=9; 2x+y+3z=1.
21. Find A^{-1} if $A = \begin{bmatrix} -1 & 2 & 5 \\ 2 & -3 & 1 \\ -1 & 1 & 1 \end{bmatrix}$ and hence, solve the system of linear equations :
    -x+2y+5z=2; 2x-3y+z=15; -x +y +z=-3..

1. Check whether the relation R in the set {1, 2, 3} given by R = {(1,3),(3,1)} is transitive.
2. If f: R → R defined by f(x)= 3x+2 defined f[f(x)].
3. Let A be the set of all students of a boys school. Show that the relation R in A given by R = { (a,b) ; a is sister of b } is the empty relation and $R' = \{ (a,b) :$ the difference between heights of a and b is less than 3 meters } is the universal relation.
4. Show that the relation R in the set Z of integers given by R = {(a, b) : 2 divides a – b } is an equivalence relation. Find the equivalence class [0].
5. Show that the number of equivalence relations in the set { 1 , 2, 3 } containing (1 , 2) and (2 , 1) is two.
6. Show that the relation ' is a factor of ' on the set N of all natural numbers is reflexive and transitive but not symmetric.

12. If f : A → B and g: B → C are onto functions , then show that gof: A → C is also onto.

<mark>CLASS-XI</mark>

Miscellaneous Assignment
Chapter 1 &2– Sets &Relations and Functions
Multiple Choice Questions

1. In a group of 72 students, 47 have background is Electronics, 59 have background in Mathematics and 42
have background in both the subjects. How many students do not have background in any of the, subjects?
A. 8
B. 13
C. 25
D. 34

2. If A and B be sets, , denote the complements of the sets A and B, then set
(A — B) ∪ (B — A) ∪ (A ∩ B) is equal to

A. $A \cup B$

B. $A^c \cup B^c$

C. $A \cap B$

D. $A^C \cap B^C$

3. A partition of {1, 2, 3, 4, 5} is the family
A. { (1, 2),(3, 4),(3,5)}
B. { φ(1, 2),(3, 4),(5)}
C. 1, 2, 3),(5)}
D. { (1, 2,), (3, 4, 5)}

4. Which of the following relations may be characterised as a function defined on the set I = {1, 2, 3, 4, 5} ?
A. { (x, y) I x, y ∈ I, X < Y }
B. { (x, y) I x, y ∈ I, X > Y }
C. {(x, y) I x, Y ∈ I, x = y/2}
D. None of these

5. The number of functions f : (1, 2, 3,........, n), → (1, 2,..........., m), which are one-to-one is
A. m_n
B. m (m - 1) (m - 2) ....(m - n + 1)
C. n_m
D. n (n - 1) (n - 2)..........(n - m + 1)

6. If R be a relation from A= {1, 2, 3, 4} to B = {1, 3, 5}. i.e. (a, b) ∈ R if a < b, then RoR-1 is
A. {(1, 3); (1, 5), (2, 3), (2, 5), (3, 5), (4, 5)}

B. {(3, 1), (5, 1) (3,2), (5,2), (5,3), (5,4)}
C. {(3, 3), (3, 5), (5, 3), (5, 5)}
D. {(3, 3), (3, 4), (4, 5)}
7. If x, y are real numbers such that ordered pairs (x + y, x -y) and (2x + 3y, 3x - 2y) are equal, then (x, y) is
equal to
A. (1, 1)
B. (2, 3)
C. (3, -2)
D. (0, 0)
8. If Q be the set of non-zero rational numbers and the relation R be defined over the set Q by xRy if x = 1/y, x,
y ∈ Q, then
A. R is an equivalence relation
B. R is reflexive
C. R is symmetric
D. R is transitive
9. Let R1 and R2 be two equivalence relations on a set. Consider following assertions :
I. R1 ∪ R2 is an equivalence relation.
II. R1 ∩ R2 is an equivalence relation.
Which of the following is correct ?
A. Both assertions are true
B. assertions I is true but II is not true
C. assertions II is true but I is not true
D. Both assertions are not true 10. With respect to the relation 'x divides y', which of the following sets are totally ordered ?
I. {36, 3, 9}
II. {7, 77, 11}
III. {3,6, 24,12}
IV. {1, 2, 3,......}
A. I, II and III only
B. II and III only
C. I and III only
D. All of these
11. Let P(S) denote the power set of set S. Which of the following is always TRUE ?
A. P(P(S)) = P(S)
B. P(S) ∩ S = P (S)
C. P(S) ∩ P(P(S)) = [φ]
D. S ∉ P(S)
12. Number of bijective functions from set A to itself when A contains 106 elements, is
A. 106
B. 106²
C. 106!
D. 2
13. If set A has 3 elements and set B has 4 elements, then number of Injections that can be defined from A into
B is
A. 144
B. 12
C. 24
D. 64
14. The binary relation S = Φ (empty set) on set A = {1, 2,3} is
A. neither reflexive nor symmetric
B. symmetric and reflexive
C. transitive and reflexive
D. transitive and symmetric 15. The function f : Z → Z given by f(x) = x² is

A. one-one
B. onto
C. one-one and onto
D. None of these

16. The function $f : R - \{2\} \to R$ defined by $f(x) = (x^2 + 2x)/(x - 2)$ is
A. Only one-one
B. Only onto
C. neither one-one nor onto
D. Both one-one and onto

17. If $f : X \to Y$ and $a, b \subseteq X$, then $f(a \cap b)$ is equal to
A. $f(a) - f(b)$
B. $f(a) \cap f(b)$
C. a proper subset of $f(a) \cap f(b)$
D. $f(b) - f(a)$

18. The number of functions from an m element set to an n element set is
A. $m+n$

B. m^n

C. n^m

D. $m*n$

19. Let $f : A \to B$ be a function, and let E and F be subsets of A.
Consider following statements about images.
S1 : $f(E \cup F) = f(E) \cup f(F)$
S2 : $f(E \cap F) = f(E) \cap f(F)$ Which of the following is TRUE about S1 and S2?
A. Only S1 is correct
B. Only S2 is correct
C. Both S1 and S2 are correct
D. None of S1 and S2 are correct

20. If [x] denotes integer part of the real number, then the function $f(x) = x - [x]$ is
A. An even function
B. An Odd function
C. periodic function
D. Constant function

21. Which of the following relations are functions? I. N = {(x, y)/y = x², x ∈ {-1, 0, 1, 2, 3}},
II. P = {(x, y)/y² = x, x ∈ {4, 9, 16}), III. Q = {(x, y)/y = 4x² -14, x ∈ {-1, 1, 2, 3}}
A. I only
B. I and II only
C. I and III only
D. III only

22. Let x and y are sets and |x| and |y| are their respective cardinalities. It is given that there are exactly 97
functions from x to y. From this one can conclude that
A. $|x| = 1, |y| = 97$
B. $|x| = 97, |y| = 1$
C. $|x| = 97, |y| = 97$
D. none of these

23. If $|A|=m$ and $|B|=n$, then number of possible relations R: A → B is

    A. mn

    B. $(mn)^2$

    C. 2^{m+n}

    D. 2^{mn}

24. Given f(x) = 3x – 5, for what value of x does 2*[f(x)] – 1 = f(3x – 6)
A. 0
B. 4
C. 6
D. 7

25. Given $f(x) = \frac{x}{x+1}$, for what value k does $f(fk)=\frac{2}{3}$?

 A. –2
B. 5/3
C. 1
D. 2

26. The function f is defined for all positive integers n by the following rule. f(n) is the number of positive integers each of which is less than n and has no positive factor in common with n other than 1. If p is any prime, number then f(p)=
A. p-1
B. p-2
C. (p+1)/2
D. (p-1)/2

27. The function f is defined for all positive integers n by the following rule: f(n) is the product of the distinct
prime factors of n. If f(n) < 100 and n is not prime, what is the greatest possible value of f(n)?
A. 99   B. 95   C. 91   D. 87

28. The function f is defined for all positive integers n as f(n) = n/(n + 1). Then f(1)*f(2) – f(2)*f(3) =
A. –1/6
B. 1/5
C. 1/4
D. 1/3

29. For an integer n, the function f(n) is defined as the product of all integers from 1 to n, where n is greater
than 10. Which of the following is NOT a factor of f(n)+1?
I. 2
II. 3
III. 10
A. I, II and III
B. II only
C. I and II only
D. I and III only

30. The function f(n) is defined as the product of all integers from 1 to n, inclusive, and the function g(n) is
defined as the product of all odd integers from 1 to n, inclusive, where n is a positive integer. If p is a prime

factor of {f(150)/g(150)} + 1, then which of the following must be true?
A. p < 10
B. 10 < p < 50
C. 50 < p < 75
D. p > 75
31. For every positive even integer n, the function h(n) is defined to be the product of all the even integers from
2 to n, inclusive. If p is the smallest prime factor of h(100) +1, then p is?
A. Between 2 and 20
B. Between 20 and 30
C. Between 30 and 40
D. Greater than 40
32. The function f(m) is defined for all positive integers m as the product of m + 4, m + 5, and m + 6. If n is a
positive integer, then f(n) must be divisible by which one of the following numbers?
A. 4
B. 5
C. 6
D. 7

SUBJECT – MATHEMATICS, CLASS – XI
CHAPTER – 1(SETS)
WORKSHEET(BASIC)
TIME - 45Min   MAXIMUM MARKS:20

Choose the correct option: (3× 1 = 3)

1. For any set A, $(A')'$ is equal to
   (a) A' (b) A (c) $\emptyset$ (d) none of these
2. Let X, Y, Z be three sets given as
   $n(X) = 15, n(Y) = 22, n(Z) = 14 \, and \, n(X \cap Y) = 11, n(Y \cap Z) = 8, n(X \cap Z) = 5, n(X \cap Y \cap Z) = 3$, then $n(X \cup Y \cup Z)'$ equals if $X, Y, Z \, are \, subsets \, of \, U \, and \, n(U) = 35$,
   (a) 35   (b) 30   (c) 26   (d) 5
3. Let $S = \{x: x \, is \, a \, positive \, multiple \, of \, 3 \, less \, than \, 100\}, P = \{x: x \, is \, a \, prime \, number \, less \, than \, 20\}$. Then $n(S) + n(P)$ is
   (a) 34   (b) 31   (c) 33   (d) 41

Fill in the blanks: $(2 \times 1 = 2)$

4. If A and B are two finite sets, then $n(A) + n(B)$ is equal to _____.
5. Power set of the set $A = \{1, 2\}$ is _____.

Answer the following: $(3 \times 1 = 3)$

6. Write the following sets in the roaster form.
   $A = \{x \mid x$ is a positive integer less than 10 and $2^x - 1$ is an odd number$\}$.
7. Write the following in set builder form.
   $A = \{3, 9, 27, 81\}$
8. If the universal set $U = \{1, 3, 5, 7, 9, 11, 13, 15, 17\}, B = \{1, 3, 7, 13, 15\}$ then find B'.

Short Answer Type questions: $(2 \times 2 = 4)$

9. Let A, B, and C be the sets such that $A \cup B = A \cup C$ and $A \cap B = A \cap C$. Then show that B=C.
10. For any sets A and B, Show that $P(A \cap B) = P(A) \cap P(B)$.

Long Answer Type - I Questions: $(2 \times 4 = 8)$

11. In a survey of 400 students in a school, 100 were listed as taking apple juice. 150 as taking orange juice and 75 were listed as taking both apple as well as orange juice. Find how many students were taking neither apple juice nor orange juice.
12. There are 200 individuals with a skin disorder, 120 had been exposed to chemical C_1, 50 to chemical C_2, and 30 to both chemicals C_1 and C_2. Find the number of individuals exposed to Chemical C_1, but not chemical C_2, (ii) Chemical C_2 but not chemical C_1, (iii) Chemical C_1 or chemical C_2.

TIME - 45Min   MAXIMUM MARKS:20

Choose the correct option: $(3\times 1 = 3)$

1. Given two finite sets A and B such that $n(A) = 115; n(B) = 326; n(A - B) = 47; then\ n(A \cup B)$ is
   (a) 373   (b) 165   (c) 370   (d) None of these

2. Given two finite sets A and B such that $n(A) = 3$ $and\ n(B) = 6$. Then minimum numbers of elements in $A \cup B$ is
   (a) 3   (b) 6   (c) 9   (d) 18

3. If a set A containing 6 elements, then number of non-empty subsets of A is
   (b) 36   (b) 30   (c) 64   (d) 63

Fill in the blanks: $(2\times 1 = 2)$

4. If A and B are two finite sets, then $n(A) + n(B)$ is equal to _____.
5. Power set of the set $A = \{1, 2\}$ is _____.

Answer the following: $(3\times 1 = 3)$

6. Write the following sets in the roaster form.
   $H = \left\{x : x = \dfrac{n}{n^2+1}\ and\ 1 \leq n \leq 3, where\ n \in N\right\}$.

7. Write the following in set builder form
   $E = \left\{\dfrac{1}{2}, \dfrac{2}{3}, \dfrac{3}{4}, \dfrac{4}{5}, \dfrac{5}{6}, \dfrac{6}{7}, \dfrac{7}{8}, \dfrac{8}{9}, \dfrac{9}{10}\right\}$

8. Write the following in interval form
   $\{x : x \in R, -4 \leq x < 6\}$

Short Answer Type questions: $(2\times 2 = 4)$

9. Show that if $A \subset B$, $then\ C - B \subset C - A$.
10. Assume that $P(A) = P(B)$, $Show\ that\ A = B$.

Long Answer Type - I Questions: $(2\times 4 = 8)$

11. A college awarded 38 medals in football, 15 in basketball and 20 in cricket. If these medals went to a total of 58 men and only three men got medals in all the three sports, how many received medals in exactly two of the three sports?

12. In a survey of 60 people, it was found that 25 people read newspaper H, 26 read newspaper T, 26 read newspaper I, 9 read both H & I, 11 read both H and T. 8 read both T & I, 3 read all three newspapers. Find:
    (i)   The number of people who read at least one of the newspapers.
    (ii)   The number of people who read exactly one newspaper.

CHAPTER – 1(SETS)
WORKSHEET(ADVANCE)

TIME - 45Min MAXIMUM MARKS:20

Choose the correct option: $(3 \times 1 = 3)$

1. Let $A = \{(x,y): y = e^{2x}, x \in R\}$ and $B = \{(x,y): y = e^{-2x}, \forall x \in R\}$, then $A \cap B$ is
   (a) Not a set   (b) Singleton set   (c) Empty Set   (d) None of these
2. If $A = \{x: x = 4n + 1, \forall\ 2 \leq n \leq 6\}$, then the number of subsets of A are
   (a) 2^2 (b) 2^3 (c) 2^5 (d) 2^6
3. If $N_a = \{na, n \in N\}$, then $N_3 \cap N_5$ is equal to
(a) N_8 (b) N_5 (c) N_3 (d) N_{15}

Fill in the blanks: $(2 \times 1 = 2)$

4. For all sets $A\ and\ B$, $A - (A \cap B)$ is equal to _____.
5. If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}, A = \{1, 2, 3, 5\}, C = \{2, 3, 4, 8\}$, then $(C - A)'$ is _____.

Answer the following: $(3 \times 1 = 3)$

6. Write the following sets in the roaster form.
   $N = \{x: x^4 - 5x^2 + 6 = 0, x \in R\}$
7. Write the following in set builder form.
   $F = \left\{1, \dfrac{1}{4}, \dfrac{1}{9}, \dfrac{1}{16}, \dfrac{1}{25}, \dots \dots \dots \dots\right\}$
8. If A is a finite set containing n elements, then how many subsets of set A are obtained?

Short Answer Type questions: $(2\times 2 = 4)$

9. Assume that $P(A) = P(B)$, Show that $A = B$.
10. Let A and B be two sets. If $A \cap X = B \cap X = \emptyset$ and $A \cup X = B \cup X$ for some set X, then Show that $A = B$.

Long Answer Type - I Questions: $(2\times 4 = 8)$

11. Prove that (a) $(\bigcup_{i=1}^{n} A_i)' = \bigcap_{i=1}^{n} A_i'$, (b) $(\bigcap_{i=1}^{n} A_i)' = \bigcup_{i=1}^{n} A_i'$
12. From 50 students taking examinations in Mathematics, Physics and Chemistry, each of the student has passed in at least one of the subject, 37 passed Mathematics, 24 Physics and 43 Chemistry. At most 19 passed Mathematics and Physics, at most 29 Mathematics and Chemistry and at most 20 Physics and Chemistry. What is the largest possible number that could have passed all three examinations?

CHAPTER – 1(SETS)
WORKSHEET(HOTS)

TIME - 45Min   **MAXIMUM MARKS:20**

Choose the correct option: $(3\times 1 = 3)$

1. Each set X_r contains 5 elements and each $set Y_r$ contains 2 elements and $\bigcup_{r=1}^{20} X_r = S = \bigcup_{r=1}^{n} Y_r$. If each element of S belong to exactly 10 of the $X_r's$ and to exactly 4 of the Y_r's then n is
   (a) 10   (b) 20   (c) 100   (d) 50
2. Two finite sets have m and n elements respectively. The total number of subsets of first set is 56 more than the total number of subsets of the second set. The values of m and n respectively are
   (a)7, 6   (b) 5, 1   (c) 6, 3   (d) 8, 7
3. Let $A = \{x : x \in R, |x| < 2\}, B = \{x : x \in R, |x - 2| \geq 2\}$ and $A \cup B = R - C$, then the set C equals
   $(a)\{x : -2 < x \leq 2\}$, $(b)\{x : -2 \leq x \leq 4\}$
   (c) $\{x : 2 \leq x < 4\}$ (d) None of these

Fill in the blanks: (2× 1 = 2)

4. If A *and* B are finite sets such that $A \subset B$, then $n(A \cup B) =$ _____.
5. If A is a finite set containing n elements, then number of nonempty subsets of A is _____.

Answer the following: (3× 1 = 3)

6. Show that $A \cup B = A \cap B$ *implies* $A = B$.