St. XAVIER'S HIGH SCHOOL
EDUCATION FOR ALL
BANKURA, WB
Affiliation No.: 2430130
Affiliated to CBSE (New Delhi) 10+2 level
School Code: 15720

WINTER VACATION ASSIGNMENT (2025-2026)
CLASS-XI-SCIENCE

SUBJECT: ENGLISH

1.You are Avik/Aditi, Head girl / Head boy of your school. You are deeply disturbed by the rising cases of aggressive behaviour of students in your school. You decide to speak during the morning assembly about it. Write a speech on 'Indiscipline in Schools'. (120-150 words)
2.'Homes for the aged is a necessity in India '. Write a debate in 120- 150 words either for or against the motion**.**

SUBJECT: PHYSICS

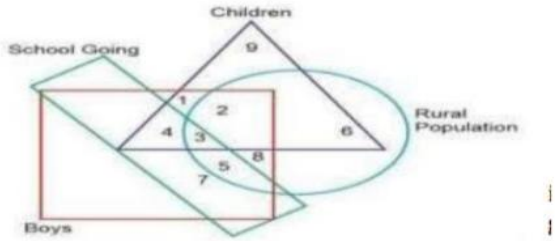
INVESTIGATORY PROJECT
1. To study the variation of range of projectile with angle of projection.
2. To study the working principle of an aeroplane using Bernoulli's principle and aerodynamics.
3. To study the blackbody radiation and Hawking's law.
4. To study the laws of thermodynamics.
5. To study the doppler effect of sound.
*Following points should be followed properly: **1.** The project should be in A4 white sheet in Handwritten form. No printed projects are accepted. **2.** The project must contain: a) Cover page (Printed) with school name, school logo, Topic name, any cover picture related to provided topics, submitted by(Student name), Class, roll no, session, subject -Physics (042), Guided by (Subject Teacher name). b) Certificate (Printed, Format will be provided) c) Acknowledgement (Printed, Format will be Provided) d) Index (Handwritten) e) Content (Handwritten) f) Conclusion (Handwritten) g) Bibliography (Handwritten) **3.** The content must contain Introduction, Topic description, Advantages, Disadvantage, application etc. **4.** Project must contain Picture representation and statistical representation (if any).

5. Compile all pages in a channel file.
NOTE:- STUDENTS HAVE TO WRITE PROJECT ON ANY ONE OF THE GIVEN TOPICS AS PER THEIR CHOICE.

SUBJECT: MATHEMATICS

CHAPTER : SETS

Venn diagrams were invented by a logician John Venn as a way of picturing relationships between different groups of things. These diagrams, also called Set diagrams or Logic diagrams, are widely used in mathematics, statistics, logic, teaching, linguistics, computer science and business In the following diagram, triangle shows children, circle shows rural population, rectangle shows school going population & square shows boys.



Based on the information stated above answer the below given questions:-

(i) The rural boys not going to school are denoted by which number?
(a)1 (b) 2 (c)1,2 (d) 2,8

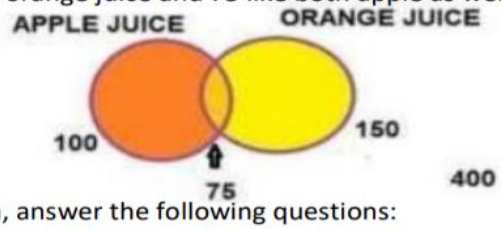
(ii) The children from rural population not going to school are denoted by which number?
(a)1 (b) 2 (c) 6 (d) 2,6

(iii) What is represented by number 4?
(a) Children who are not from rural population (b) Children who are boys (c) School going boys (d) School going boys who are not from rural population

(iv) School going boys from village are denoted by which number?
(a) 3 (b) 3,5 (c) 3,4 (d) 3, 4, 5,7

(v) Number of children who are not from rural population?
(a) 8 (b) 2 (c) 7 (d) 9

In D.A.V School, Bahadurgarh, a survey was done on 400 students it was found that 100 like to take apple juice , 150 like to take orange juice and 75 like both apple as well as orange juice.



Based on above information, answer the following questions:

(i)Number of students who like either of the drink :
(a) 400 (b) 175 (c) 250 (d) 325

(ii) Number of students who likes neither apple juice nor orange juice :
(a) 225 (b) 325 (c) 75 (d) 25

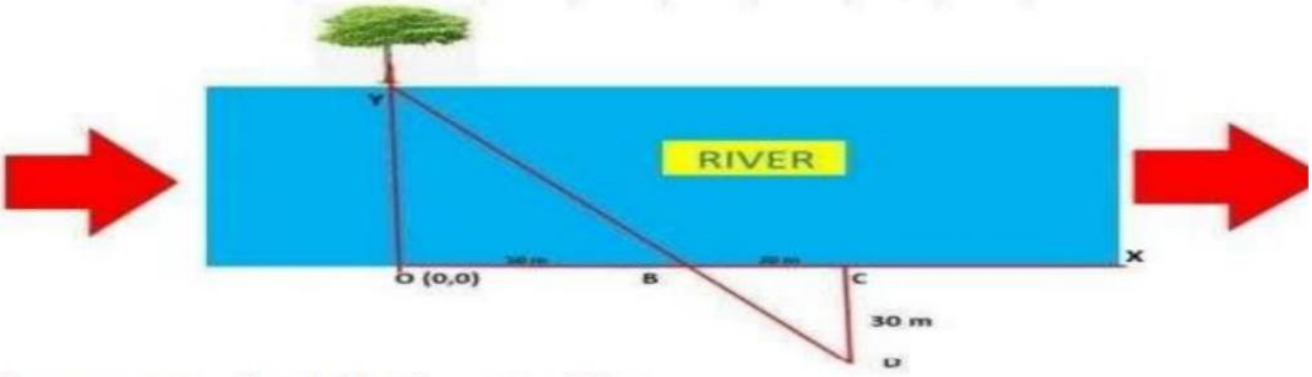
(iii) Number of students who likes only apple juice:
(a) 125 (b) 75 (c) 100 (d) 25

(iv) Number of students who likes only orange juice :
(a) 75 (b) 25 (c) 100 (d) 125 Q75

(v) Which information we get from the given data :
(a) $n(A \cup B) = n(A) + n(B)$ (b) $n(A \cup B) < n(A \cap B)$ (c) $n(A \cup B) < n(U)$ (d) $n(A \cap B) = n(A) + n(B)$

CHAPTER : Straight Lines

Read the Case study given below and attempt any 4 sub parts:
A surveyor was measuring the width of a river. For this, he selected a tree at Y on the other side of the river. He is standing at Point O(0,0). From O he walks 50 m in the right direction, at point B he fixes a stick. From B in the right side at distance 20 m at C fixes a stick. Now from C, he walks perpendicular to line OC. Further, he fixes a stick D so the stick D, B and the tree are in the same straight line approximately. He finds that CD = 30m.
We assume that OC is the x-axis and OY is the y-axis



Now answer the following questions:
What are the coordinates of point D?
a). (50, 30) b). (70, -30) c). (50, 20) d). (70, 30)

ii. What are the coordinates of point C?
a). (0, 500) b). (0, -70)
c). (0, 70) [4] 1 21 / 24 d). (70, 30)

iv. What are the coordinates of point Y?
a). (0, 100) b). (0 ,-70) c). (75, 0) d). (0, 75)

v. What is the equation of straight line BD?
a). $3x + 2y = 150$ b). $3x + 2y = 100$
c). $5x + 2y = 150$ d). $5x - 3y = 150$

CHAPTER : TRIGONOMETRIC FUNCTIONS

TRIGONOMETRIC FORMULA

- An angle can be measured in degrees or in radians.
- 1 radian is an angle subtended at the centre of a circle by an arcwhose length is equal to the radius of the circle.
- π radian = 180 degrees
- Radian measure $= \frac{\pi}{180} \times$ Degree measure

  Degree measure $= \frac{180}{\pi} \times$ Radian measure
- $1° = 60'$
  $1' = 60''$
- 1 radian = 57° 16′ approximately
  1° = 0.01746 radian approximately
- If an arc of length l makes an angle θ radian at the centre of a circle of radius r, we have $l = r\theta$
- Signs of trigonometric functions

	I	II	III	IV
sin x	+	+	-	-
cos x	+	-	-	+
tan x	+	-	+	-
cosec x	+	+	-	-
sec x	+	-	-	+
cot x	+	-	+	-

- Domain and Range of trigonometric functions

Function	Domain	Range
sin x	R	[-1, 1]
cos x	R	[-1, 1]
tan x	$R - \{(2n+1)\frac{\pi}{2} : n \text{ c } N\}$	R
cosec x	$R - \{(n\pi : n \text{ c } N\}$	R – (-1, 1)
sec x	$R - \{(2n+1)\frac{\pi}{2} : n \text{ c } N\}$	R – (-1, 1)
cot x	$R - \{(n\pi : n \text{ c } N\}$	R

- $sin^2x + cos^2x = 1$
  $sec^2x - tan^2x = 1$
  $cosec^2x - cot^2x = 1$

- $1.\sin(\frac{\pi}{2} - x) = \cos x$ $2.\cos(\frac{\pi}{2} - x) = \sin x$
  $3.\tan(\frac{\pi}{2} - x) = \cot x$ $4.\cot(\frac{\pi}{2} - x) = \tan x$
  $5.\sec(\frac{\pi}{2} - x) = \text{cosec } x$ $6.\text{cosec}(\frac{\pi}{2} - x) = \sec x$

- 1. $\sin(\frac{\pi}{2}+x)=\cos x$ 2. $\cos(\frac{\pi}{2}+x)=-\sin x$
  3. $\tan(\frac{\pi}{2}+x)=-\cot x$ 4. $\cot(\frac{\pi}{2}+x)=-\tan x$
  5. $\sec(\frac{\pi}{2}+x)=-\operatorname{cosec} x$ 6. $\operatorname{cosec}(\frac{\pi}{2}+x)=\sec x$

- 1. $\sin(\pi-x)=\sin x$ 2. $\cos(\pi-x)=-\cos x$
  3. $\tan(\pi-x)=-\tan x$ 4. $\cot(\pi-x)=-\cot x$
  5. $\sec(\pi-x)=-\sec x$ 6. $\operatorname{cosec}(\pi-x)=\operatorname{cosec} x$

- 1. $\sin(\pi+x)=-\sin x$ 2. $\cos(\pi+x)=-\cos x$
  3. $\tan(\pi+x)=\tan x$ 4. $\cot(\pi+x)=\cot x$
  5. $\sec(\pi+x)=-\sec x$ 6. $\operatorname{cosec}(\pi+x)=-\operatorname{cosec} x$

- 1. $\sin(2\pi-x)=-\sin x$ 2. $\cos(2\pi-x)=\cos x$

  3. $\tan(2\pi-x)=-\tan x$ 4. $\cot(2\pi-x)=-\cot x$
  5. $\sec(2\pi-x)=\sec x$ 6. $\operatorname{cosec}(2\pi-x)=-\operatorname{cosec} x$

- 1. $\sin(2\pi+x)=\sin x$ 2. $\cos(2\pi+x)=\cos x$
  3. $\tan(2\pi+x)=\tan x$ 4. $\cot(2\pi+x)=\cot x$
  5. $\sec(2\pi+x)=\sec x$ 6. $\operatorname{cosec}(2\pi+x)=\operatorname{cosec} x$

- The values of sin x, cos x, cosec x and sec x repeat after an interval of 2π.
  The values of tan x and cot x repeat after an interval of π.

- $\sin(x+y)=\sin x\cos y+\cos x\sin y$
  $\sin(x-y)=\sin x\cos y-\cos x\sin y$
  $\cos(x+y)=\cos x\cos y-\sin x\sin y$
  $\cos(x-y)=\cos x\cos y+\sin x\sin y$

- $\tan(x+y)=\frac{\tan x+\tan y}{1-\tan x\tan y}$ $\tan(x-y)=\frac{\tan x-\tan y}{1+\tan x\tan y}$

- $\cot(x+y)=\frac{\cot x\cot y-1}{\cot y+\cot x}$ $\cot(x-y)=\frac{\cot x\cot y+1}{\cot y-\cot x}$

- $\sin 2x=2\sin x\cos x=\frac{2\tan x}{1+\tan^2 x}$
  $\cos 2x=\cos^2 x-\sin^2 x=2\cos^2 x-1=1-2\sin^2 x=\frac{1-\tan^2 x}{1+\tan^2 x}$
  $\tan 2x=\frac{2\tan x}{1-\tan^2 x}$

- $\sin 3x=3\sin x-4\sin^3 x$
  $\cos 3x=4\cos^3 x-3\cos x$
  $\tan 3x=\frac{3\tan x-\tan^3 x}{1-3\tan^2 x}$

- $\cos x + \cos y = 2\cos\frac{x+y}{2}\cos\frac{x-y}{2}$
  $\cos x - \cos y = -2\sin\frac{x+y}{2}\sin\frac{x-y}{2}$
  $\sin x + \sin y = 2\sin\frac{x+y}{2}\cos\frac{x-y}{2}$
  $\sin x - \sin y = 2\cos\frac{x+y}{2}\sin\frac{x-y}{2}$

- $2\cos x\cos y = \cos(x+y) + \cos(x-y)$
  $-2\sin x\sin y = \cos(x+y) - \cos(x-y)$
  $2\sin x\cos y = \sin(x+y) + \sin(x-y)$
  $2\cos x\sin y = \sin(x+y) - \sin(x-y)$

CASE BASED/SOURCE BASED / PASSAGE BASED

CASE STUDY -1 :- Trigonometry is the combination of 2 words – 'Trigonon' means Triangle and 'metron' means measure. It is a branch of geometry that studies relationship between lengths and angles of a triangle. Degree and radian units of measurement of angles are used, also called Indian system of measurement of triangles. In this system $\pi\, radian = 180^\circ$; 1°=60minuteand 1minute=60 seconds;1 rt angle $=90^\circ$.The length of arc l is given by $\theta = lr$.On the basis of above information answer the following questions:

(i) 11/36 radians into degree minutes and seconds

(a) $17^\circ 14' 30''$ (b)$17^\circ 14'$ (c)$17^\circ 30''$ (d) None of these

(ii) $\frac{7\pi}{18}$into degrees will be

(a)60° (b)70° (c)100° (d)80°

(iii) Find the length of arc made by minute's hand of a clock in 5 minutes having radius 7cm.

(a)$\frac{7\pi}{5}$ (b)$\frac{7\pi}{6}$ (c)$\frac{7\pi}{3}$ (d)$\frac{7\pi}{4}$

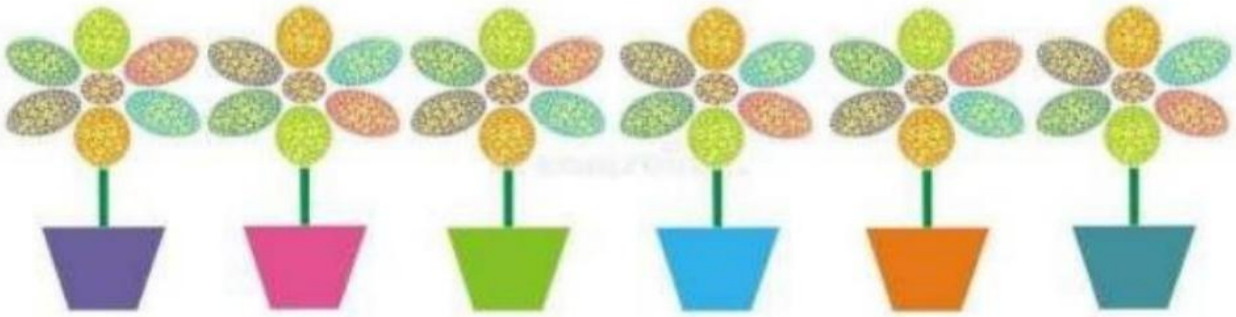
(iv) If the arcs of the same length in two circles subtend angles 65 and 80 at the centre, then the ratio of their radii.

(a)13:16 (b) 3:16 (c)16:13 (d) 5:16

CHAPTER: PERMUTATION AND COMBINATION

Rahul being a plant lover decides toopen a nursery and he bought fewplants with pots. He wants to place potsin such a way that number of pots infirst row is 2, in second row is 4 and in third row is 8 and so on.

Answer the following questions based on the above information.



(i) Find the number of pots in the 8^{th} row.

(ii) Find the total number of pots in 10 rows.

(iii) If Rahul wants to place 510 pots in all, how many rows will be formed?

A company produces 500 computers inthe third year and 600 computers in theseventh year. Assuming that theproduction increases uniformly by aconstant number every year, answer the following questions.

(i) How many computers were produced in the first year?

(ii) By what number does the production increase every year?

(iii) How many computers will be produced in the 21^{st} year?

(iv) Find the total production in 10 years.

MAKE A MATHEMATICS FORMULA CHART ON CHART/ART PAPER(TRIGONOMETRY, PERMUTATION AND COMBINATION, STRAIGHT LINE, CONIC SECTIONS, LIMITS AND DERIVATIVES)

SUBJECT: CHEMISTRY

Solve the following questions.

1. An unsaturated hydrocarbon "A' adds two molecules of H2 and on reductive ozonolysis gives butane-1,4-di-al, ethanal and propanone. Give the structure of 'A', write its IUPAC name and explain the reactions involved.
2. 2. 896 mL vapour of a hydrocarbon 'A' having carbon 87.80% and hydrogen 12.19% weighs 3.28g at STP. Hydrogenation of "A' gives 2-methyl pentane. Also, "A' on hydration in the presence of H2SO4 and HgSO4 provides a ketone with 'B' having molecular formula C6H12O. The ketone 'B' gives a positive iodoform test. Find the structure of "A' and give the reactions involved.
3. 3.An alkyl halide C5H11Br (A) reacts with ethanolic KOH to give an alkene 'B', which reacts with Br2 to give a compound 'C', which on dehydrobromination provides an alkyne with 'D'. On treatment with sodium metal in liquid ammonia, one mole of 'D' gives one mole of the sodium salt of 'D' and half a mole of hydrogen gas. Complete hydrogenation of 'D' yields a straight-chain alkane. Identify A, B, C and D. Give the reactions involved.
4. 4. The relative reactivity of 1°, 2°, 3° hydrogen's towards chlorination is 1: 3.8: 5.
5.
6. Calculate the percentages of all monochlorinated products obtained from 2-methylbutane

7. Write a relation between ΔG and Q and define the meaning of each term and answer the following:
(a) Why a reaction proceeds forward when Q < K and no net reaction occurs when Q = K.
(b) Explain the effect of an increase in pressure in terms of reaction quotient O. for the reaction: CO (g) + 3H2 (g) ⇋ CH4 (g) + H2O (g)

8.On the basis of the Le Chatelier principle explain how temperature and pressure can be

adjusted to increase the yield of ammonia in the following reaction.

N2 (g) + 3H2 (g) ⇋ 2NH3 (g) ΔH = – 92.38 kJ mol-1

What will be the effect of addition of argon to the above reaction mixture at constant

volume?

9.How can you predict the following stages of a reaction by comparing the value of Kc and

Qc?

(i) Net reaction proceeds in the forward direction.

(li) Net reaction proceeds in the backward direction.

(iii) No net reaction occurs

10.PC15, PC13 and Cl2 are at equilibrium at 500 K in a closed container and their concentrations are 0.8 x 10“3 molL-1, 1.2 x 10-3 mol L 1 and 1.2 x 10-3 mol L-1 The value of Kc for the reaction PCl5(g) ⇌PCl3(g) + Cl2(g) will be… . . . .

SUBJECT: BIOLOGY

Write the following practicals in the given practical notebook:

1. To study the given specimens/slides/models and identify with reasons –
    a) Bacteria
    b) Oscillatoria
    c) Spirogyra
    d) Rhizopus
    e) Mushroom
    f) Yeast
    g) Liverwort
    h) Moss
    i) Fern
    j) Pine

2. To study the virtual specimens/slides/models and identify them. features
    a) Amoeba
    b) Hydra
    c) Liverfluke
    d) Ascaris
    e) Leech
    f) Earthworm
    g) Prawn
    h) Silkworm
    i) Snail
    j) Starfish
    k) Shark
    l) Rohu
    m) Frog
    n) Lizard
3. To study the human skeleton and identify the various bones:

    a) Skull
    b) Vertebrae
    c) Ribs
    d) Pectoral girdle
    e) Pelvic girdle

SUBJECT: COMPUTER SCIENCE

1. Write python code for the following program and submitted in channel file with proper colour front page:

Python Programming

- Input a welcome message and display it.
- Input two numbers and display the larger / smaller number.
- Input three numbers and display the largest / smallest number.
- Generate the following patterns using nested loops:

Pattern-1	Pattern-2	Pattern-3
* ** *** **** *****	12345 1234 123 12 1	A AB ABC ABCD ABCDE

- Write a program to input the value of x and n and print the sum of the following series:
  - $1 + x + x^2 + x^3 + x^4 + \cdots x^n$
  - $1 - x + x^2 - x^3 + x^4 - \cdots x^n$
  - $x + \frac{x^2}{2} + \frac{x^3}{3} + \frac{x^4}{4} + \cdots \frac{x^n}{n}$
  - $x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \cdots \frac{x^n}{n!}$
- Determine whether a number is a perfect number, an Armstrong number or a palindrome.
- Input a number and check if the number is a prime or composite number.
- Display the terms of a Fibonacci series.
- Compute the greatest common divisor and least common multiple of two integers.
- Count and display the number of vowels, consonants, uppercase, lowercase characters in string.
- Input a string and determine whether it is a palindrome or not; convert the case of characters in a string.
- Find the largest/smallest number in a list/tuple
- Input a list of numbers and swap elements at the even location with the elements at the odd location.
- Input a list/tuple of elements, search for a given element in the list/tuple.
- Create a dictionary with the roll number, name and marks of n students in a class and display the names of students who have marks above 75.

SUBJECT: PHYSICAL EDUCATION

1. Olympics related to any one game (history,rules, dimension, official, players name, etc.)
2. Any one lifestyle disease(diabetes, asthma, obesity, arthritis, etc.)