SAINIK SCHOOL BHUBANESWAR
SUMMER VACATION TASK FOR THE SESSION 2024-25
CLASS – XI
SUBJECT- MATHEMATICS

Chapter-01
Set Theory

Sets are the basic building block for types of objects in discrete mathematics. Set theory is the foundation of mathematics just like Cell theory in Biology or Alphabets in a Language. This concept came into existence in 18th Century and became an integral part of the so called "Modern Mathematics". *If you are wondering that which Mathematics then we have been studying till now?* Well that's what is so called Classical Mathematics – Arithmatic (which develops to Number Theory), 300 BC Euclidean Geometry and Cartesian Geometry of 16th Century, Trigonometry of Vedic period, Mensuration and Classical Algebra [*Mathematics is indeed the oldest subject, the "language" which marked the birth of civilization*]. It will never be that at any point we will discard or leave these "old" ones (*unlike Science we do not discard any existing theory in Mathematics*) as they form the **basis** of whatever we will venture to study now *(+2 kind of serves as a bridge between the Classical Mathematics and Modern Mathematics that one pursues in College)* .In recent times it has become apparent that algebra of sets illuminates many branches of Mathematics such as Analysis, Measure Theory, Number Theory, Abstract & Linear Algebra, Probability Theory and Statistics, cryptography, Differential Geometry, Topology , Tensor Analysis by systematic reduction of Mathematical concepts to their logical basis (can do further search in Internet on these topics) .

Mathematics deals with objects of very different kinds; from your previous experience, you are familiar with many of them: Numbers, points, lines, planes, triangles, circles, angles, equations, functions and many more. Objects of a similar nature or with a common property are collected into sets; the objects which are collected in a set are called the elements of that set. This collection can be anything in the Universe, pack of wolves to collection of books, collection of numbers, collection of special type of polynomials, anything, provided that **the elements should be well defined**. "Well defined" here means By giving a rule or specifying the elements which determines if a given object is in the set or not. The elements in a set **need not be of any order .**

So a set is a **well defined**, **unordered** collection of distinct objects .

The notation $x \in S$ denotes that x is an element of the set S.
If x is not a member of S, write $x \notin S$.

Describing a Set: Roster Method

- $S = \{ a, b, c, d \}$.
- Order not important $S = \{a, b, c, d \} = \{ b, c, a, d \}$.
- Each distinct object is either a member or not; listing more than once does not change the set. $S = \{ a, b, c, d \} = \{ a, b, b, c, d , c\}$.
- Dots "… " may be used to describe a set without listing all of the members when the pattern is clear.
  Example : $S = \{ a, b, c,…, g \}$. $T = \{1,2,4,…,20\}$
  Do not overuse this. Patterns are not always as clear as the writer thinks.

Set Builder Notation

Specify the property (or properties) that all members of the set must satisfy.
A predicate can be used,
e.g. S = { x : P(x) } where P(x) is true iff x is a prime number . *Read this "as x such that P(x)"* .
Then S = { 2,3,5,7,11,13,…} in Roster form.

Some Important Sets

B = Boolean values = { true; false }= { 0, 1}
W = whole numbers = { 0, 1,2,3, …}
N = natural numbers = { 1,2,3, …}
Z = integers = { …, -2,-1,0,1,2,3,…}
Z+ = **Z**$_{>0}$ = positive integers = {1,2,3,…} , **Z-** = negative integers = { -1,-2,-3,…}
Q = set of rational numbers = { x∈ **R** : x = $\frac{p}{q}$, p, q ∈ **Z**, q ≠ 0 }

R = set of real numbers
R+ = **R**$_{>0}$ = set of positive real numbers
C = set of complex numbers.

Interval Notation

Used to describe subsets of sets upon which an order is defined,
closed interval [a, b] = {x : a ≤ x ≤ b), open interval (a, b) = $\{x : a < x < b\}$
half-open intervals [a; b) = $\{x : a ≤ x < b\}$, half-open intervals (a, b] = $\{x : a < x ≤ b\}$

Definitions :

- The **universal set** U is the set containing everything currently under consideration.
- The **empty set** is the set with no elements. Symbolised as { } or .
- A set A is a **subset** of a set B, written as A⊆ B, if every element of A is also an element of B.
- If A is a set, then P(A) = {X : X ⊆ A} is called the **power set** of A. It is the set of all subsets of A.
- Two sets A and B are **equal**, if A⊆ B and B ⊆ A. If A and B are equal, we write A = B.
- A set M is **called finite**, if M = ∅, or if there is natural number n such that the elements of M can be numbered 1, . . . , n in such a way that every element of M appears exactly once in the list.
- A is called a **singleton** if A = {x} for some x, i.e. if A has exactly one element.
- The **intersection** A ∩ B of A and B is defined by A ∩ B = {x : x ∈ A and x ∈ B}
- If A ∩ B = ∅, then A and B are called **disjoint**.
- The **union** A ∪ B of A and B is defined by A ∪ B = {x : x ∈ A or x ∈ B}.
- The set **difference** A - B of A and B is the set A - B = {x : x ∈ A and x ∉ B}.
- A - B is also called the relative complement of B with respect to A.
- If U is a given universal set, then U - A is just called the **complement of A**, written as A' or $\bar{A}$.

Observe that A ∩ B is the set of those objects which are simultaneously in both A and B, while A ∪ B is the set of those objects which are in A or in B or in both of them; observe carefully that we do not interpret "or" as exclusive; in our terminology, "or" always means "one, or the other, or both".

Let g1 and g2 be two non–parallel lines in the plane. Then, their intersection g1 ∩ g2 is just the point where the two lines meet. Their union g1 ∪ g2 is the set of all points which are on g1 or on g2 (or on both lines).

Let R be the set of all nCovid- 19 positive people, and let S be the set of all people in India.
Then S ∩ R is the set of all nCovid- 19 positive people in India, and S ∪ T is the set of all those people which are in India or which are nCovid- 19 positive or both. R' is the set of all nCovid- 19 negative people .
R - S is the set of all nCovid- 19 positive people outside India. S – R is the set of all nCovid- 19 negative people in India .

Laws of Algebra of Sets	
For three sets *A, B* and *C*	(*vii*) (a) $A - B = A \cap B'$
(*i*) **Idempotent law**	(b) $B - A = B \cap A'$
(a) $A \cup A = A$ (b) $A \cap A = A$	(c) $A - B = A \Leftrightarrow A \cap B = \phi$
(*ii*) **Identity law**	(d) $(A - B) \cup B = A \cup B$
(a) $A \cup \phi = A$ (b) $A \cap U = A$	(e) $(A - B) \cap B = \phi$
(*iii*)**Commutative law**	(f) $A \cap B \subseteq A$ and $A \cap B \subseteq B$
(a) $A \cup B = B \cup A$ (b) $A \cap B = B \cap A$	(g) $A \cup (A \cap B) = A$
(*iv*)**Associative law**	(h) $A \cap (A \cup B) = A$
(a) $(A \cup B) \cup C = A \cup (B \cup C)$	
(b) $A \cap (B \cap C) = (A \cap B) \cap C$	(*viii*) (a) $(A - B) \cup (B - A) = (A \cup B) - (A \cap B)$
(*v*) **Distributive law**	(b) $A \cap (B - C) = (A \cap B) - (A \cap C)$
(a) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$	(c) $A \cap (B \Delta C) = (A \cap B) \Delta (A \cap C)$
(b) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$	(d) $(A \cap B) \cup (A - B) = A$
(*vi*)**De-Morgan's law**	(e) $A \cup (B - A) = (A \cup B)$
(a) $(A \cup B)' = A' \cap B'$	
(b) $(A \cap B)' = A' \cup B'$	(*ix*) (a) $U' = \phi$ (b) $\phi' = U$
(c) $A - (B \cap C) = (A - B) \cap (A - C)$	(c) $(A')' = A$ (d) $A \cap A' = \phi$
(d) $A - (B \cup C) = (A - B) \cup (A - C)$	(e) $A \cup A' = U$ (f) $A \subseteq B \Leftrightarrow B' \subseteq A'$
Results on Number of Elements in Sets	
(*i*) $n(A \cup B) = n(A) + (B) - n(A \cap B)$	(*vi*) *n* (number of elements in exactly two of the sets *A, B,C*)
(*ii*) $n(A \cup B) = n(A) + n(B)$, if *A* and *B* are disjoint.	$= n(A \cap B) + n(B \cap C) + n(C \cap A) - 3n(A \cap B \cap C)$
(*iii*) $n(A - B) = n(A) - n(A \cap B)$	(*vii*) *n* (number of elements in exactly one of the sets *A,*
(*iv*) $n(A \Delta B) = n(A) + n(B) - 2n(A \cap B)$	$B,C) = n(A) + n(B) + n(C) - 2n(A \cap B) - 2n(B \cap C) - 2n(A \cap C)$
(*v*) $n(A \cup B \cup C) = n(A) + n(B) + n(C)$	$+ 3n(A \cap B \cap C)$
$- n(A \cap B) - n(B \cap C) - n(A \cap C) + n(A \cap B \cap C)$	(*viii*) $n(A' \cup B') = n(A \cap B)' = n(U) - n(A \cap B)$
	(*ix*) $n(A' \cap B') = n(A \cup B)' = n(U) - n(A \cup B)$

A convenient pictorial representation of the operations defined above are the Venn diagrams. Use Venn diagrams while solving out the numerical problems.

**Read the Chapter thoroughly from any book that you possess, before attempting the Assignment.

SAINIK SCHOOL BHUBANESWAR
SUMMER VACATION TASK FOR THE SESSION 2024-25
CLASS – XI
SUBJECT- MATHEMATICS

ASSIGNMENT CHAPTER 1: SETS

Insructions :
- *Answer all the questions mentioning proper Question number.*
- *Write the Answers in A4 sheet papers and the staple them.*
- *In the cover page mention the above Heading along with your Name and School Number.*

1) 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. Find the values of m and n respectively.

2) If A and B are two sets containing 3 and 6 elements respectively, find the maximum and minimum number of elements in AUB.

3) Describe the following sets in the set builder form:

i. A = {1, 2, 3, 6, 9, 18}

ii. B = {1, 12,13,14,15,…}

iii. C = {12,25,310,417,526,637,750}

4) Write the following in the roster form:

i. A={x : x ϵZ and −12 < x < 72 }

ii. C= { x : x is a positive integer and $x2 = x$}

iii. D= { x : x is a perfect square and x< 50}

iv. C= { x : $x4 = x, x \in R$}

5) If A,B and C are any three sets, then prove that:
i. A – (B ∩ C) = (A – B)∪ (A – C)
ii. A ∩ (B – C) = (A ∩ B) – (A ∩ C)

6) Prove the following using Venn Diagram:
i. A – (B – C) = (A – B) ∪ (A ∩C)
ii. A ∪ (B ∩ C) = (A∪B) ∩ (A ∪C)

7) Using properties, prove that :
i. (A – B) ∪ B = A ∪B
ii. (A – B) ∪$A=A$
iii. (A – B) ∩ B = ∅
iv. (A – B) ∩$A=A$∩ B**/**
v. A – (B∪C)= (A – B) ∩ (A – C)
vi. A – (B ∩C)= (A – B) ∪ (A – C)
vii. (A ∪B) - C = (A – C) ∪ (B – C)

8) 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 out many students were taking neither apple nor orange juice?

9) Find the power set of (a) {1, 2,3 } (b) $\left\{ \varphi, \{\varphi\} \right\}$.

10) In a university, out of 100 students 15 offered Mathematics only; 12 offered Statistics only; 8 offered Physics only; 40 offered Physics and Mathematics; 20 offered Physics and Statistics; 10 offered Mathematics and Statistics; 65 offered Physics. Find the number of students who
a) Offered Mathematics
b) Offered Statistics
c) Offered exactly 2 of the three subjects
d) Did not offer any of the three subjects
e) Atleast one of the three subjects
f) Offered Mathematics and Statistics but not Physics
g) Offered Mathematics or Statistics but not Physics

11) An investigator interviewed 100 students to determine the performance of three drinks: milk, coffee and tea. The investigator reported that 10 students take all three drinks; 20 take milk and coffee; 25 take milk and tea; 20 take coffee and tea; 12 take milk only; 5 take coffee only and 8 take tea only. Find the number of students who did not take any of the three drinks.

12) In a competition, a school awarded medals in different categories. 36 medals in dance, 12 medals in dramatics and 18 medals in music. If these medals went to a total of 45 persons and only 4 persons got medals in all the three categories, how many received medals in exactly two of these categories?

13) Out of 280 students in class XII of a school, 135 play Hockey, 110 play Football, 80 play Volleyball, 35 of these play Football and Hokey, 30 play Volleyball and Hockey, 20 play Football and Volleyball. Also each student plays at least one of these games. How many students play all the three games?

14) For all sets A,B,C,
Prove that (a) A ∩ (B ∪ C) = (A ∩ B) ∪ (A ∩ C)   (b) A ∪ (B ∩ C) = (A ∪ B) ∩ (A ∪ C).

15) Are the following sets finite or infinite?
a) {x ∈R : x^2 + 2x − 1 = 0}
b) {x ∈N : x ≤ 0}
c) {x ∈Q : 0 ≤ x ≤ 1}

<div align="center">**********</div>

SAINIK SCHOOL BHUBANESWAR

SUMMER VACATION HOMEWORK 2024-25

CLASS-XI

BIOLOGY

1. Collect different types of leaves (minimum 25) and make herbarium file.
   Also write its scientific name, common name, collection date, and place.
2. Write the 10 scientific name and common name for each of the following-
   a. Fruits name
   b. Pulses name
   c. Birds name
   d. Mammals name
   e. Reptiles name
   f. Ornamental plants
   g. Eatable fresh water fishes
   h. Eatable marine water fishes
   i. Aquarium fishes.
3. Revise the Chapters- 1, 2 and 8 well for class test after the break.
4. Write 20 MCQs each for Chapter-1,2 & 8.
5. Write the textbook Q/A given at the end of these chapters.
6. Write about structure, and ecological importance of *Nostoc* with well labelled diagram.
7. Give hierarchical classification of house fly, mango and wheat.

1. Two students performed the same experiment separately and each one of them recorded two readings of mass which are given below. Correct reading of mass is 3.0 g. On the basis of given data, mark the correct option out of the following statements.

Student	Readings	
	(i)	(ii)
A	3.01	2.99
B	3.05	2.95

(i) Results of both the students are neither accurate nor precise.

(ii) Results of student A are both precise and accurate.

(iii) Results of student B are neither precise nor accurate.

(iv) Results of student B are both precise and accurate.

2. A measured temperature on Fahrenheit scale is 200 °F. What will this reading be on Celsius scale?

(i) 40 °C (ii) 94 °C (iii) 93.3 °C (iv) 30 °C

3. What will be the molarity of a solution, which contains 5.85 g of NaCl(s) per 500 mL?

(i) 4 mol L^{-1} (ii) 20 mol L^{-1}

(iii) 0.2 mol L^{-1} (iv) 2 mol L^{-1}

4. If 500 mL of a 5M solution is diluted to 1500 mL, what will be the molarity of the solution obtained?

(i) 1.5 M (ii) 1.66 M

(iii) 0.017 M (iv) 1.59 M

5. The number of atoms present in one mole of an element is equal to Avogadro number. Which of the following element contains the greatest number of atoms?

(i) 4g He (ii) 46g Na

(iii) 0.40g Ca (iv) 12g He

6. If the concentration of glucose ($C_6H_{12}O_6$) in blood is 0.9 g L^{-1}, what will be the molarity of glucose in blood?

(i) 5 M (ii) 50 M (iii) 0.005M (iv) 0.5M

7. What will be the molality of the solution containing 18.25 g of HCl gas in 500 g of water?

(i) 0.1 m (ii) 1 M (iii) 0.5 m (iv) 1 m

8. One mole of any substance contains 6.022×10^{23} atoms/molecules. Number of molecules of H_2SO_4 present in 100 mL of 0.02M H_2SO_4 solution is

(i) 12.044×10^{20} molecules   (ii) 6.022×10^{23} molecules

(iii) 1×10^{23} molecules   (iv) 12.044×10^{23} molecules

9. What is the mass percent of carbon in carbon dioxide?

(i)   0.034%   (ii)   27.27%   (iii)   3.4% (iv)   28.7%

10. The empirical formula and molecular mass of a compound are CH_2O and 180 g respectively. What will be the molecular formula of the compound?

(i) $C_9H_{18}O_9$ (ii) CH_2O (iii) $C_6 H_{12}O_6$ (iv) C_2H4O_2

11. If the density of a solution is 3.12 g mL–1, the mass of 1.5 mL solution in significant figures is

(i)   4.7g   (ii) 4680×10^{-3}g   (iii)   4.680g   (iv)   46.80g

12. Which of the following statements about a compound is incorrect?

 (i)   A molecule of a compound has atoms of different elements.

 (ii)   A compound cannot be separated into its constituent elements by physical methods of separation.

(iii)   A compound retains the physical properties of its constituent elements.

(iv)   The ratio of atoms of different elements in a compound is fixed.

13. Which of the following statements is correct about the reaction given below:

$$4Fe(s) + 3O_{2(g)} \rightarrow 2Fe_2O_3(g)$$
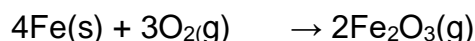
(i)   Total mass of iron and oxygen in reactants = total mass of iron and oxygen in product therefore it follows law of conservation of mass.

(ii)   Total mass of reactants = total mass of product; therefore, law of multiple proportions is followed.

(iii)   Amount of Fe_2O_3 can be increased by taking any one of the reactants (iron or oxygen) in excess.

(iv)   Amount of Fe_2O_3 produced will decrease if the amount of any one of the reactants (iron or oxygen) is taken in excess.

14. Which of the following reactions is not correct according to the law of conservation of mass.

(i) $2Mg(s) + O_2(g)$ $\rightarrow$ $2MgO(s)$

(ii) $C_3H_8(g) + O_2(g)$ $\rightarrow$ $CO_2(g) + H_2O(g)$

(iii) $P_4(s) + 5O_2(g)$ $\rightarrow$ $P_4O_{10}(s)$

(iv) $CH_4(g) + 2O_2(g)$ $\rightarrow$ $O_2(g) + 2H_2O$ (g)

15. Which of the following statements indicates that law of multiple proportion is being followed.

(i)   Sample of carbon dioxide taken from any source will always have carbon and oxygen in the ratio 1:2.

(ii)   Carbon forms two oxides namely CO_2 and CO, where masses of oxygen which combine with fixed mass of carbon are in the simple ratio 2:1.

(iii)   When magnesium burns in oxygen, the amount of magnesium taken for the reaction is equal to the amount of magnesium in magnesium oxide formed.

(iv)   At constant temperature and pressure 200 mL of hydrogen will combine with 100 mL oxygen to produce 200 mL of water vapour.

SHORT ANSWER QUESTION

16.   What will be the mass of one atom of C-12 in grams?

17.   How many significant figures should be present in the answer of the following calculations?

        2.5 X 1.25 X 3.5 / 2.01

18.   What is the symbol for SI unit of mole? How is the mole defined?

19.   What is the difference between molality and molarity?

20.   Calculate the mass percent of calcium, phosphorus and oxygen in calcium phosphate $Ca_3(PO4)_2$.

21.   45.4 L of dinitrogen reacted with 22.7 L of dioxygen and 45.4 L of nitrous oxide was formed. The reaction is given below:

        $2N_2(g) + O_2(g) \rightarrow 2N_2O(g)$ Which law is being obeyed in this experiment? Write the statement of the law?

22.   If two elements can combine to form more than one compound, the masses of one element that combine with a fixed mass of the other element, are in whole number ratio.

(a)   Is this statement true?   (b)   If yes, according to which law?

(c)   Give one example related to this law.

23.   Calculate the average atomic mass of hydrogen using the following data :

Isotope	% Natural abundance	Molar mass
1H	99.985	1
2H	0.015	2

24. Hydrogen gas is prepared in the laboratory by reacting dilute HCl with granulated zinc. Following reaction takes place.

        $Zn + 2HCl \rightarrow ZnCl_2 + H_2$
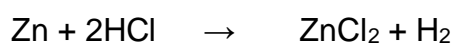
Calculate the volume of hydrogen gas liberated at STP when 32.65 g of zinc reacts with HCl. 1 mol of a gas occupies 22.7 L volume at STP; atomic mass of Zn = 65.3 u.

25.   The density of 3 molal solution of NaOH is 1.110 g mL^{-1}. Calculate the molarity of the solution.

26. If 4 g of NaOH dissolves in 36 g of H_2O, calculate the mole fraction of each component in the solution. Also, determine the molarity of solution (specific gravity of solution is $1g\ mL^{-1}$).

27. The reactant which is entirely consumed in reaction is known as limiting reagent.

In the reaction $2A + 4B \rightarrow 3C + 4D$, when 5 moles of A react with 6 moles of B, then

(i) which is the limiting reagent?

(ii) calculate the amount of C formed?

LONG ANSWER TYPE

28. A vessel contains 1.6 g of dioxygen at STP (273.15K, 1 atm pressure). The gas is now transferred to another vessel at constant temperature, where pressure becomes half of the original pressure.

Calculate (i) volume of the new vessel. (ii) number of molecules of dioxygen.

29. Calcium carbonate reacts with aqueous HCl to give $CaCl_2$ and CO_2 according to the reaction given below: $CaCO_3$ (s) + 2HCl (aq) $\rightarrow$ $CaCl_2$(aq) + CO_2(g) + H_2O

(I) What mass of $CaCl_2$ will be formed when 250 mL of 0.76 M HCl reacts with 1000 g of $CaCO_3$? Name the limiting reagent. Calculate the number of moles of $CaCl_2$ formed in the reaction.

30. Define the law of multiple proportions. Explain it with two examples. How does this law point to the existance of atoms?

31. A box contains some identical red coloured balls, labelled as A, each weighing 2 grams. Another box contains identical blue coloured balls, labelled as B, each weighing 5 grams. Consider the combinations AB, AB_2, A_2B and A_2B_3 and show that law of multiple proportions is applicable.

32. Volume of a solution changes with change in temperature, then, will the molality of the solution be affected by temperature? Give reason for your answer.

1. What are fundamental and derived quantities?
2. Find the dimensional formula for the following physical quantities.

   Impulse, momentum, power, angular velocity, frequency, velocity gradient, work, energy, torque, the moment of force, thermal capacity, entropy, universal gas constant and Boltzmann's constant, force constant, surface tension, surface energy, angular momentum, Planck's constant, latent heat, gravitational potential, force, thrust, stress, pressure, modulus of elasticity.

3. Two equal vectors have a resultant equal to either of them. What is the angle between both the vectors?

4. What is the dot product of two vectors of magnitude 3 and 5 and angle between them is 60^0 ?

5. Find a unit vector perpendicular to 3i+j+2k and 2i-2j+4k.

6. When a wave travels in a medium, the displacement of the particle located at x in time t is given by,

$$y = a \sin(bt - cx)$$

Where a, b and c are constants of the wave. Find the dimension of b/c.

7. The sum of the magnitude of two forces acting at a point is 18 and the resultant is 12. If the resultant is at 90^0 with force of smaller magnitude. Then find their magnitudes.

8. If speed of light c, acceleration due to gravity g and pressure p, are taken as fundamental units, find the dimension of gravitational constant.

9. State triangle law of vector addition. Derive an expression for the resultant of two vectors applying triangle law.

10. Suppose speed of light, force and kinetic energy are taken as fundamental units, find the dimension of mass.

11. If time period of a simple pendulum depends on mass of the bob, length of the thread and acceleration due to gravity, derive a formula for the time period applying dimensional analysis.

12. In the formula of $x = 3yz^2$, x has dimension of energy, y has dimension of force. Find the dimension of z.

13. Given K= kinetic energy, V= velocity and T= time. If they are chosen as fundamental units, what will be the dimensional formula for surface tension?

14. What are dimensional constants and dimensionless constants?

15. Using dimensional analysis, convert 5N from SI to CGS unit.

16. Convert 76 cm of mercury pressure into Nm^{-2} using the method of dimensions.

17. If the value of universal gravitational constant in SI is 6.6×10^{-11} Nm2 kg^{-2}, then find its value in CGS System?

18. Check the correctness of the equation using dimensional analysis method

$$\frac{1}{2}mv^2 = mgh$$

19. The force F acting on a body moving in a circular path depends on mass of the body (m), velocity (v) and radius (r) of the circular path. Obtain the expression for the force by dimensional analysis method. (Take the value of k=1).

20. Write the dimensions of a/b in the relation P= $\frac{a-t2}{bx}$; where P is the pressure, x is the distance, and t is the time.

****

Sainik School Bhubaneswar
Summer Vacation Task
Session 2024 - 25
Class - XI
Subject - Computer Science

Q1. *Convert the following numbers*.

    (i) $(FEDA.97)_{16}$ to Decimal

    (ii) $(1010101)_2$ to Octal

    (iii) $(75612)_8$ to Binary

    (iv) $(234.56)_{10}$ to Binary

    (v) $(11001010.101)_2$ to Decimal

    (vi) $(1726354.65)_8$ to Decimal

    (vii) $(12345)_2$ to Decimal

    (viii) $(A8B7C6)_{16}$ to Decimal

    (ix) $(101001010.0010)_2$ to Hexadecimal

    (x) $(117572.43)_8$ to Hexadecimal

Q2. *Simplify the following binary expressions.*

    (i)   110010101 x 110

    (ii)   111110011 + 10100101

    (iii)   1111101011 / 101

    (iv)   11100001001-10011110110

Q3.   *Simply the following expression and express the result in decimal number.*

    (i) $10010^{10} \times 10010^{111}$

    (ii) $(1010^{1110} \times 1010^{10} \times 10^{11} \times 10^{101})/(1010)^{111} \times (10)^{110}$

Q4.   *Encode the following message in binary using ASCII standard.*

     "**AmEriCaN StanDaRd cODe 1963**"

Q5.   A string "ABC" is encoded as 00000041 00000042 00000043 using UTF-32. How will you code symbol ¥ whose character code is 00A5.

Q6.   Draw a labeled block diagram of a computer and explain the function of all its units.

Q7.   Why do you need primary and secondary memory?

Q8.   Compare ASCII and ISCII standards of encoding.

Q9.   What is radix in a number system?

Q10   Differentiate between code point and code space in a number system.

---------END-----------

1. Grandmother has been portrayed as a strong lady and an affectionate grandmother. Write a brief character sketch of the grandmother in the light of above statement?

2. How was grandmother's life in the city different from her life in the village?

3. Describe the three phases of the author's relationship with his grandmother before he went abroad for further studies?

4. What does the word 'cardboard' denote in the poem? Why has this word been used?

5. What has the camera captured?

6. What has not changed over the years? Does this suggest something to you?

7. The poet's mother laughed at the snapshot. What did this laugh indicate?

8. What is the meaning of the line "Both wry with the laboured ease or loss"

9. What does "this circumstance" refer to?

10. The three stanzas depict three different phases. What are they?

11. You are Harish of No. 10, Kailash Ganj and Patna. Draft an advertisement to be published in the daily. 'The Hindustan Times', under classified columns to dispose off your car as you are going abroad.

12. You have recently started a Centre for Personality Development for school children. Draft an advertisement to be published in a local daily about it, giving all relevant details.

13. You are Manisha. You have started hobby classes for children of 6 to 12 years. Prepare a suitable advertisement giving all the required details. (50 words)

14. You are Mohan of Raja ki Mandi, Agra. You want a dance teacher for your younger sister. Write an advertisement to be published in the classified columns of a local daily.

15. You propose to sell your flat as you are going abroad. Draft an advertisement to be published in the classified columns of 'The Times of India', New Delhi. Invent necessary details.

16. Recent rains have caused havoc in some parts of our country. You are Surya, a member of the social service organization, Seva Ashram, Bangalore. Draft a poster requesting people to help the rain and flood affected families physically and economically.

17.   A 'Check Vehicular Pollution' campaign is being organised in your city. Draft a poster to be used in the campaign.

18.   Water is precious and each one of us must stop wastage. Prepare a poster in not more than 50 words, for creating that awareness.

19.   Draft a poster announcing a 'Book Week' being organized by the Cultural Society, Ahmadabad.

20.   Your school is planning a campaign in support of eye donation to mobilise the students and society. Design a poster to be displayed in different areas of the locality surrounding your school highlighting the need for eye donation and eye banks.

21.   Draft a debate against the motion "The government is not protecting primary school children for contamination of midday meals given in schools." 150-200 words.

22.   Your school is organizing an inter house debate competition on the topic "National security cannot be considered as an excuse for damaging the environment." Write your views in favour of or against the motion in about 150-200 words.

23.   Write your opinion in the form of a debate on the topic "Corporal punishment in school promotes well disciplined students". Your answer should be in about 150-200 words.

24.   "Our Good Earth", an environmental awareness magazine has launched a marathon 'Clean Your City' campaign. As an active participant write a speech to be read out in the morning assembly urging students to participate in the campaign in 150-200 words.

25.   The policy of reservation of seats for admission to the professional courses is good for the deprived sections of society. Write a debate in 150-200 words either for or against the motion.

26.   The recent rise in incidents of violent behaviour of students is a matter of concern for all. The problem can be curbed if students learn how to manage anger. Write a speech on the topic "Violent Behaviour of Students is a Matter of Concern" in 150-200 words to be delivered in the school morning assembly.

27.   You are Raj / Rani, the Head Boy/Head Girl of DM Public School, Patna. You have to deliver a speech in your school assembly on the 'World Peace Day' on the topic, 'Let's Practise Non-Violence'. Write the speech in 150-200 words pointing out the recent acts of terrorism that claimed innocent lives, and highlighting the value of non-violence which is the need of the hour.

***