

Topic: **Applications Of Trigonometry****Chapter Flowchart**

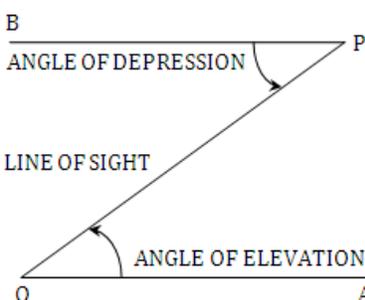
The Chapter Flowcharts give you the gist of the chapter flow in a single glance.

The height or length of an object or the distance between two distant objects can be determined with the help of trigonometric ratios.

The line of sight is the line drawn from the eye of an observer to the point in the object viewed by the observer.

**Angle of elevation**

The angle of elevation of an object viewed, is the angle formed by the line of sight with the horizontal when it is above the horizontal level, i.e., the case when we raise our head to look at the object.

**Angle of depression**

The angle of depression of an object viewed, is the angle formed by the line of sight with the horizontal when it is below the horizontal level, i.e., the case when we lower our head to look at the object.

Values of trigonometric ratios of standard angles

	0°	30°	45°	60°	90°
$\sin \theta$	0	$1/2$	$1/\sqrt{2}$	$\sqrt{3}/2$	1
$\cos \theta$	1	$\sqrt{3}/2$	$1/\sqrt{2}$	$1/2$	0
$\tan \theta$	0	$1/\sqrt{3}$	1	$\sqrt{3}$	Not defined
$\cot \theta$	Not defined	$\sqrt{3}$	1	$1/\sqrt{3}$	0
$\sec \theta$	1	$2/\sqrt{3}$	$\sqrt{2}$	2	Not defined
$\operatorname{cosec} \theta$	Not defined	2	$\sqrt{2}$	$2/\sqrt{3}$	1

Revision Question Bank

Subjective Type Questions

- A spherical balloon of radius r subtends an angle θ at the eye of an observer. If the angle of elevation of its centre is ϕ , find the height of the centre of the balloon.
- The angle of elevation of a cloud from a point h metres above the surface of a lake is θ and the angle of depression of its reflection in the lake is ϕ .
Prove that the height of the cloud above the lake is $h \left(\frac{\tan \phi + \tan \theta}{\tan \phi - \tan \theta} \right)$.
- The shadow of a tower standing on a level ground is found to be 40 m longer when the Sun's altitude is 30° than when it is 60° . Find the height of the tower.
- A 1.5 m tall boy is standing at some distance from a 30 m tall building. The angle of elevation from his eyes to the top of the building increases from 30° to 60° as he walks towards the building. Find the distance he walked towards the building.
- The angle of elevation of the top of a tower from two points distant "s" and "t" from its foot are complementary. Prove that the height of the tower is \sqrt{st} .
- A vertical tower stands on a horizontal plane and is surmounted by a vertical flag staff of height h . At a point on the plane, the angles of elevation of the bottom and the top of the flag staff are α and β , respectively. Prove that the height of the tower is $\left(\frac{h \tan \alpha}{\tan \beta - \tan \alpha} \right)$.
- The angle of elevation of a jet plane from a point A on the ground is 60° . After a flight of 15 seconds, the angle of elevation changes to 30° . If the jet plane is flying at a constant height of $1500\sqrt{3}$ m find the speed of the jet plane.
- The angle of elevation of a cliff from a fixed point is θ . After going up a distance of k metres towards the top of the cliff at an angle of ϕ , it is found that the angle of elevation is α . Show that the height of the cliff is $\frac{k \cos \phi - \sin \phi \cot \alpha}{\cot \theta - \cot \alpha}$ metres.
- Two hoardings on cleanliness are put on two poles of equal heights standing opposite to each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° , respectively. Find the height of the poles and the distances of the point from the poles.
- A person standing on the bank of a river observes that the angle of elevation of the top of a building of an organisation working for conservation of wild life, standing on the opposite bank is 60° . When he moves 40 metres away from the bank, he finds the angle of elevation to be 30° . Find the height of the building and the width of the river.
(a) Why do we need to conserve wild life ?
(b) Suggest some steps that can be taken to conserve wild life.

Answers

1. $h = r \sin \phi \operatorname{cosec} \frac{\theta}{2}$ 3. Height of the tower is $20\sqrt{3}$ m 4. Distance walked by the boy is $19\sqrt{3}$ m

7. 720 km/h 8. Height of the pole $20\sqrt{3}$ m & the distance of the point from first pole is 20m & that of the second pole is 60m.

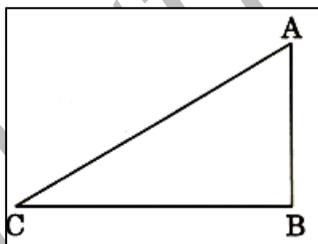
10. Height of building $g = 34.64$ m. width of the river = 20m

(a) Wildlife is a part of our environment & conservation of each of its element is important for ecological balance.

(b) Ban on hunting, providing them healthy environment.

Previous Years Questions Bank

- Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° , respectively. Find the height of the poles and the distances of the point from the poles.
[CBSE Board, 2015-16]
- The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° . If the tower is 50 m high, find the height of the building.
[CBSE Board, 2015-16]
- A man standing on the deck of a ship, which is 10m above water level, observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of hill as 30° . Find the distance of the hill from the ship and the height of the hill.
[CBSE Board, 2015-16]
- From a point on the ground, the angle of elevation of the top of a tower is observed to be 60° . From a point 40 m vertically above the first point of observation, the angle of elevation of the top of the tower is 30° . Find the height of the tower and its horizontal distance from the point of observation.
[CBSE Board, 2015-16]
- In Figure, a tower AB is 20 m high and BC, its shadow on the ground, is $20\sqrt{3}$ m long. Find the Sun's altitude.
[CBSE Board, 2014-15]



- A fire is reported in a building. There are two fire stations on either side of the building and in the same straight line with it. The elevation of the building from the stations A and B are 30° and 60° respectively. Which fire station is closer to the building?
[CBSE Board, 2014-15]
- The horizontal distance between two towers is 60 m. The angle of elevation of the top of the taller tower as seen from the top of the shorter one is 30° . If the height of the taller tower is 150 m, then find the height of the shorter tower.
[CBSE Board, 2014-15]
- The horizontal distance between two trees of different heights is 60 m. If the angle of elevation of the top of the first tree when seen from the bottom of the second tree is 30° , find the height of the first tree. If height of second tree is $60\sqrt{3}$ m, then find the angle of elevation of the top of second tree when seen from the bottom of first tree.
[CBSE Board, 2014-15]

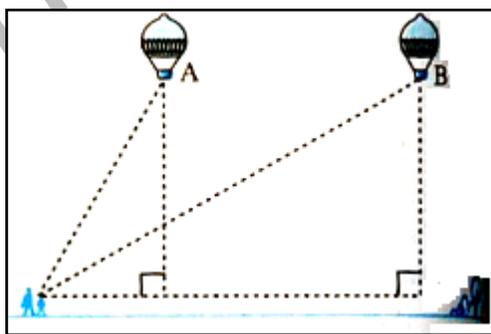
9. A ladder makes an angle of 60° with the ground when placed against a wall. If the foot of ladder is 2 m away from the wall, then find the length of the ladder. **[CBSE Board, 2014-15]**
10. The angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m. **[CBSE Board, 2014-15]**
11. If the altitude of the sun is at 60° , then what will be the height of the vertical tower that will cast a shadow of length 40m? **[CBSE Board, 2014-15]**
12. A hoarding 1.46 m tall, stands on the top of a pole, which shows the need for abolition of child labour in the society. From a point on the ground, the angle of elevation of the top of the hoarding is 60° and from the same point the angle of elevation of the top of the pole is 45° . Find the height of the pole (use $\sqrt{3} = 1.73$). What value does the hoarding promote? **[CBSE Board, 2014-15]**
13. The angle of elevation of a cloud from a point 60 meter above a lake is 30° and the angle of depression of the reflection of cloud in the lake is 60° . Find the height of the cloud? **[CBSE Board, 2015,16]**
14. The angle of depression of a car parked on the road from the top of a 150 m high tower is 30° . Find distance of the car from the tower (in meters). **[CBSE Board, 2013-14]**
15. The angle of elevation of an aeroplane from a point on the ground is 60° . After a flight of 30 seconds the angle of elevation becomes 30° . If the aeroplane is flying at a constant height of $3000\sqrt{3}$ m, find the speed of the aeroplane. **[CBSE Board, 2014,15]**
16. The angle of elevation of the top of a tower at a distance of 120 m from a point A on the ground is 45° . If the angle of elevation of the top of a flagstaff fixed at the top of the tower, at A is 60° , then find the height of the flagstaff. [Use $\sqrt{3} = 1.73$] **[CBSE Board, 2013-14]**
17. The height of a man is 175 cm. If the length of his shadow is $175\sqrt{3}$ then the angle of elevation of sun is ? **[CBSE Board, 2011-12]**
18. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making angle 60° with the ground. The distance between the tree to the point where the top touches the ground is 16m. Find the height of the tree. **[CBSE Board, 2012,16]**
19. From the top of a hill the angles of depression of two consecutive kilometer stones due each are found to be 30° and 45° respectively. Find the height of the hill. **[CBSE Board, 2011-12]**

Chapter Test

Maximum Marks: 30

Maximum Time: 1 hour

- If altitude of the sun at 60° , then what will be the height of the vertical tower that will cast a shadow of length 40 m? [1]
- A ladder 15 m long just reaches the top of a vertical wall. If the ladder makes an angle of 60° with the wall, then what will be the height of the wall? [2]
- A pole 5 m high is fixed on the top of a tower. The angle of elevation of the top of the pole observed from a point A on the ground is 60° and the angle of depression of point A from the top of the tower is 45° . Find the height of the tower. [3]
- From the top of a light house, the angles of depression of two ships on the opposite sides of it are observed to be 30° and 60° . If the height of the light house is h metres and the line joining the ships passes through the light house, show that the distance between the ships is $4/3h$ metres. [4]
- Two ships are sailing in the sea on either side of a height-house. The angles of depression of two ships as observed from the top of the light-house are 60° and 45° respectively. If the distance between the ships is $200 \left(\frac{\sqrt{3}+1}{\sqrt{3}} \right)$ m, find the height of the light-house. [4]
- An aeroplane flying horizontally at a height of 1.5 km above the ground is observed at a certain point on earth to subtend an angle of 60° . After 15 seconds, its angle of elevation at the same point is observed to be 30° . Calculate the speed of the aeroplane in km/hr. [4]
- The angle of elevation of an aeroplane from a point on the ground is 60° . After a flight of 30 seconds the angle of elevation becomes 30° . If the aeroplane is flying at a constant height of $3000\sqrt{3}$ m, find the speed of the aeroplane
- A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60° . After some time, the angle of elevation reduces to 30° (see fig.). Find the distance travelled by the balloon during the interval.



- The angle of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m.

Answers

1. $40\sqrt{3}$ m

2. $\frac{15}{2}$ m

3. 6.83 m

4. $\frac{4h}{\sqrt{3}}$ metres

5. 200 m

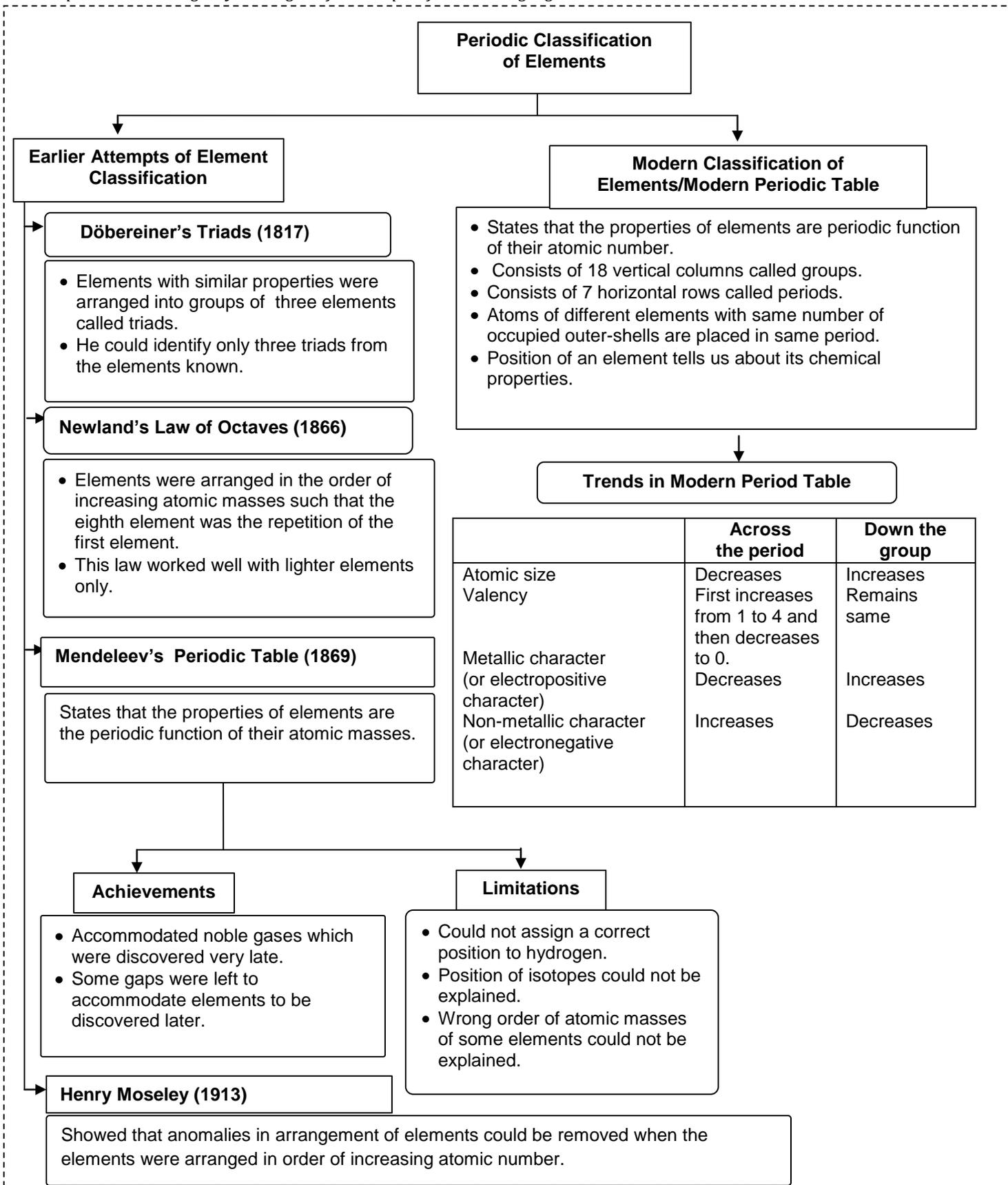
6. 415.68 km/h

8. $85\sqrt{3}$ m

Topic: **Periodic Classification Of Elements**

Chapter Flowchart

The Chapter Flowcharts give you the gist of the chapter flow in a single glance.



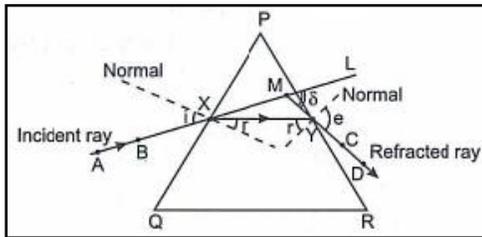
Revision Question Bank

- How could the modern periodic Table remove various anomalies of mendeleev's periodic table?
- Why did Mendeleev leave some gaps in his periodic table ?
- What do understand by the term periodicity ? Are the properties of the elements placed in a same group periodic? Illustrate.
- An atom has electronic configuration 2, 8, 7.
 - What is the atomic number of this element?
 - To which of the following elements would it be chemically similar?
(Atomic numbers are given in parentheses)
N(7) F(9) Ar (18)
- Would you place the two isotopes of chlorine, Cl-35 and Cl-37 in different slots because of their different atomic masses of in the same because the chemical properties are the same? Justify your answer.
- Properties of the elements are given below. Where would you locate the following elements in the periodic table?
 - A soft element store under kerosene.
 - An element with variable (more than one) valency stored under water.
 - An elements which tetravalent and forms the basis of organic chemistry.
 - An elements which is an inert gas with atomic number 2.
 - An element whose thin oxide layer is used to make other elements corrosion resistance by the process of "anodizing".
- An element placed in 2nd Group and 3rd period of the periodic Table, burns in presence of oxygen to form a basic oxide?
 - Identify the element. (b) Write the electronic configuration.
 - Write the balanced equation when it burns in the in the presence of air.
 - Write the balanced equation when this oxide is dissolved in water.
 - Draw the electron dot structure for the formation of this oxide.
- How be tendency to lose electrons change as you go
 - from left to right across a period? (ii) down a group?
 - An element X (2, 8, 2) combines separately with $(\text{NO}_3)^-$, $(\text{SO}_4)^-$, and $(\text{PO}_4)^{3-}$ radicals. Write the formulae of the three compounds so formed. To which group of the periodic table does the element 'X' belong? Will it form covalent or ionic compound? Why?
- Compare the radii of two species X and Y. Give reasons for your answer
 - X has 12 protons and 12 electrons (b) Y has 12 protons and 10 electrons

5. In the given figure showing path of ray of light through a glass prism, the angle YML represents :

- (a) angle of prism
- (b) angle of deviation
- (c) angle of incidence
- (d) angle of refraction

[CBSE Board 2014-15]



6. The angle of deviation D suffered by a ray of light passing through a prism is the angle

- (a) subtended by emergent ray from the incident ray.
- (b) subtended by emergent ray from the refracted ray.
- (c) subtended by refracted ray from incident ray.
- (d) subtended by incident ray from refracted ray or refracted ray from emergent ray.

[CBSE Board 2012-13]

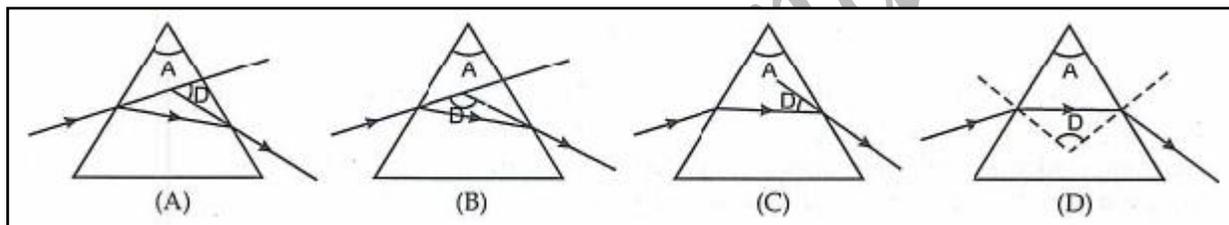
7. While performing an experiment on tracing the path of light rays passing through a glass prism, a student observes that the light gets dispersed into various colour components. Which one of the constituent colours of white light will experience the greatest deviation ?

[CBSE Board 2011-13]

- (a) Orange
- (b) Violet
- (c) Red
- (d) Green

8. A student performed an experiment to draw light ray path through a prism. Correct depiction of angle of deviation suffered by light ray is shown in which of the following figure :

[CBSE Board 2013, 2014]



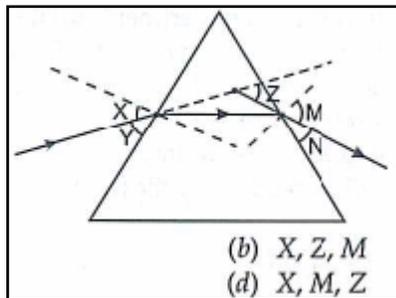
- (a) A
- (b) B
- (c) C
- (d) D

9. In refraction through a glass prism :

[CBSE Board 2013-14]

- (a) the emergent ray is parallel to the incident ray.
- (b) the emergent ray is perpendicular to the incident ray.
- (c) the emergent ray is along the same straight line as the incident ray.
- (d) the emergent ray suffers a deviation from the direction of incident ray.

10. Consider the trace of light through a prism as shown in the adjoining figure. The angle of incidence, the angle of emergence and the angle of deviation respectively have been represented



[CBSE Board 2013,2014]

- (a) Y,N, Z
- (b) X,Z,M
- (c) X,N,Z
- (d) X,M,Z

Answers

1.	A	2.	B	3.	A	4.	A	5.	B
6.	A	7.	B	8.	A	9.	D	10.	D

Previous Years Question Bank

1. "Elements towards the right of every period are non-metals." [CBSE Board, 2016-17]
(a) Comment upon the gradation of frequency to gain electrons as we move from left to right in a period. Justify the answer with reason.
(b) Out of N and F, which atom do you think will be more electronegative and why?
2. Define atomic size of an element. [CBSE Board, 2016-17]
Atomic radii of some elements like C, Li, N, O, B and Be are 77, 152, 74, 66, 88 and 111 pm respectively. Rearrange them in decreasing order of their atomic radii.
Name the elements which have largest and the smallest size respectively.
Give reason for the change in atomic radius as you move from left to right in a period.
3. Name the following [CBSE Board, 2016-17]
(a) Alkali metal in the third period (b) The family of elements to which bromine belongs.
4. (a) Predict the type of bond formed between the pairs of elements having atomic numbers 8 and 16
(b) Why do atoms combine? [CBSE Board, 2016-17]
5. (a) The atomic number of an element X is 15. Identify its position in the periodic table
(b) Draw the electron dot structure of ethane. [CBSE Board, 2016-17]
6. (a) How and why does chemical reactivity change in a period? [CBSE Board, 2016-17]
(b) Mention two factors by which Mendeleev's periodic table was guided.
(c) Mention two limitations of Newlands Law of octave.
7. Na, Mg, Al, Si, P, S, Cl and Ar are the elements of third period. [CBSE Board, 2016-17]
(i) Which one of them is an inert gas? Why?
(ii) Which one of them has the valency 4? What kind of bond does it form ionic or covalent?
(iii) Which of them are electropositive? Pick any two elements.
8. The atomic number of X is 13. [CBSE Board, 2016-17]
(i) Identify its position in terms of group and period in the modern periodic table.
(ii) Compare its atomic size with the first member of the same period.
(iii) State whether its oxide is acidic or basic in nature?
9. When does the outermost shell of an element said to be complete. Name any three such elements which have completely filled outermost shells. Write their common name and justify the completion of outermost shell. [CBSE Board, 2016-17]
10. An element is a main constituent of paper, diamond and clothes etc. It forms covalent bonds with itself and other elements.
(i) Identify the element. Write its atomic number.
(ii) How will be the electron distribution in its various shells?
(iii) How it will attain noble gas configuration?
11. An element X has atomic number 9 and element Y has atomic number 17. [CBSE Board, 2016-17]
(i) In which period each will be placed?
(ii) Which one of them will have larger atomic radius and why?
(iii) Would they be chemically similar? Support your answer with reason.
12. (a) How could Modern Periodic table remove various anomalies of Mendeleev's Periodic table?
(b) How does valency vary from left to right in a period? Give reasons. [CBSE Board, 2016-17]
13. The elements Li, Na and K, each having one valence electron, are in period 2, 3 and 4 respectively of Modern Periodic Table. [CBSE Board, 2016-17]
(a) In which group of the periodic table should they be?

- (b) Which one of them has the largest atomic radius? Give reason to justify your answer.
- (c) Will these elements show metallic or non-metallic behaviour? Justify.
14. (a) State Newland's law of Octaves. **[CBSE Board, 2016-17]**
(b) Three elements X, Y and Z constitute a Dobereiner's triad. If the atomic masses of X and Z are 32 and 128 respectively, predict the atomic mass of Y.
(c) What property do all elements in the same column of the periodic table as fluorine have in common?
15. Calcium is an element with atomic number 20. Stating reason, answer each of the following questions: **[CBSE Board, 2016-17]**
(i) Is calcium a metal or non-metal?
(ii) Will its atomic radius be larger or smaller than that of potassium with atomic number 19?
(iii) Write the formula of its oxide.
16. An element 'M' with electronic configuration (2, 8, 2) combines separately with $(\text{NO}_3)^-$, $(\text{SO}_4)^{2-}$ and $(\text{PO}_4)^{3-}$ radicals. Write the formula of the three compounds so formed. To which group and period of the Modern Periodic Table does the element 'M' belong? Will 'M' form covalent or ionic compounds? Give reason to justify your answer. **[CBSE Board, 2016-17]**
17. Lithium, sodium and potassium are placed in the same group on the basis of similar properties. List three similar properties of these elements. **[CBSE Board 2014-15]**
18. As we move across a period in the periodic table, what is the gradation in the following properties?
(a) Atomic Number (b) Atomic Size (c) Electronegativity **[CBSE Board 2014-15]**
19. (a) Name metals among first five elements of the Modern Periodic Table. **[CBSE Board 2014-15]**
(b) Write their chemical symbols. (c) Write the formula of their oxides.
20. The atomic number of K and Ca is 19 and 20 respectively and they belong to the same period.
(a) Which among them would have smaller atomic size?
(b) Which one would be more electropositive? (c) To which group would each of them belong?
21. Two elements X and Y have atomic number 12 and 17 respectively. **[CBSE Board 2014-15]**
(a) Write the electronic configuration of both.
(b) Which type of bond will they form?
(c) Write the formula of the compound formed by their combination (in terms of X and Y).
22. Why are elements H, Li, Na and K placed in group 1? **[CBSE Board 2014-15]**
23. Given below are some elements of the modern periodic table. Atomic number of the element is given in the parentheses: A(4), B(9), C(14), D(19)E(20)
(a) Select the element that has one electron in the outermost shell. Also write the electronic configuration of this element.
(b) Which two elements amongst these belong to the same group? Give reason for your answer.
(c) Which two elements amongst these belong to the same period? Which one of the two has bigger atomic radius? **[CBSE Board 2014-15]**
24. Taking the example of an element of atomic number 16, explain how the electronic configuration of the atom of an element relates to its position in the modern periodic table and how valency of an element is calculated on the basis of its atomic number. **[CBSE Board 2014-15]**
25. Explain why the size of the atom increases down the group of periodic table? **[CBSE Board 2014-15]**
26. Name two elements which show the same type of chemical property as calcium. Give reason for the selection of elements along with any one chemical property. **[CBSE Board 2014-15]**
27. H, Li, Na and K are the elements of same group of Modern Periodic Table,
(a) Arrange them in increasing order of their atomic size
(b) How many valence electrons would each have ?

(c) How many shells are present in each?

(d) Which amongst them is most electropositive?

[CBSE Board 2014–15]

28. Why do Li, Na and K show resemblance on the basis of Dobereiner's law of triads?

[CBSE Board 2014–15]

29. Giving reasons, explain the following:

Group 15	Group 15
A	C
–	D
–	–
B	E

(a) Element A is a non – metal.

(b) Element D is more electronegative than E.

(c) Which type of ion, cation or anion will be formed by element C?

[CBSE Board 2014–15]

30. Atomic number of a few elements are given below: 10, 20, 7, 14

[CBSE Board 2014–15]

(a) Identify the elements.

(b) Identify the Group number of these elements in the Periodic Table.

(c) Identify the Periods of these elements in the Periodic Table.

(d) What would be the electronic configuration for each of these elements?

(e) Determine the valency of these elements.

31. The position of three elements A, B and C in die periodic table is shown below:

Giving reasons explain :

Group → Period ↓	I	I	III	IV	V	VI	VII	VIII
1								
2							C	
3	A	B						

(a) Element A is a metal.

(b) Element B has larger atomic size than the element C

(c) Element C has a valency of one.

[CBSE Board 2014–15]

32. Explain how the tendency to form electronegative ions change on moving down a group in the periodic table?

[CBSE Board 2014–15]

33. "The atomic number of Li is 3." On the basis of this information answer die questions that follow:

(a) Write the electronic configuration of Li.

(b) To which group Li belongs.

(c) Find the valency of Li.

(d) Identify the type of ion it will form.

(e) Write down the formula of one of the compounds formed by it.

[CBSE Board 2014–15]

34. List any two properties of the elements belonging to the first group of the modern periodic table.

[CBSE Board, 2013-14]

35. The electrons in the atoms of four elements A, B, C and D are distribtee in three shells having 1, 3, 5 and 7 electrons in the outermost shell respectively. State the period in which these elements can be placed it the modern periodic table. Write the electronic configuration of the atoms of A and D and the molecular formula of the compound formed when A and D combine.

[CBSE Board, 2013-14]

36. Study the following table in which positions of six elements A, B, C, D, E and F are shown as they are in the modern periodic table : **[CBSE Board, 2013-14]**

Group →	1	2	3-12	13	14	15	16	17	18
Period ↓									
2	A					B			C
3				D	E				F



On the basis of the above table, answer the following questions :

- (i) Name the element which forms only covalent compounds,
(ii) Name the element which is a metal with valency three,
(iii) Name the element which is a non-metal with valency three
(iv) Out of D and E, which is bigger in size and why ?
(v) Write the common name for the family to which the elements C and F belong.
37. Out of the following elements : He(2); F (9); Cl (17); Ar(18) **[CBSE Board, 2013-14]**
(a) State the group number of each pair.
(b) Name one other element belonging to each of these groups.
38. Out of the following elements H(1); Be(4); Na(11); Mg(12) **[CBSE Board, 2013-14]**
(a) Pair the elements having similar chemical properties. .
(b) State the group number of each pair.
(c) "Name one other element belonging to each of these groups.
39. (a) Who proposed the Modern periodic table? **[CBSE Board, 2013-14]**
(b) What was the basis of arranging the elements in it. (c) State the Modern Periodic Law.
40. Out of Li and K. Which will have stronger metallic character and why? **[CBSE Board, 2013-14]**
41. The atomic number of K and Ca is 19 and 20 respectively and they belong to the same period.
(a) Which amongst them would have smaller atomic size? **[CBSE Board, 2013-14]**
(b) Which one would be more electropositive? (c) To which group each can of them belong?
42. Li(3 –Na(11) and K(19) belong to the same group in the modern periodic table **[CBSE Board, 2013-14]**
(a) Name the period of each (b) Write the electronic configuration of each?
43. Write the number of groups and periods in the long form of periods table? **[CBSE Board, 2013-14]**
44. Lithium is an alkali metal with atomic number 3 and no. of valence electrons is 1. The formula of the hydride of lithium is Li. Boron and carbon are placed in group 13 and 14 respectively with valence electron 3 and 4. Write the formulae of the hydrides of boron and giving reason for your answer.
[CBSE Board, 2013-14]

Chapter Test

Maximum Marks: 30
Maximum Time: 1 hour

1. The electronic configuration of an element is 2, 8, 7. Identify whether it is a metal or a non-metal? Also name the element. [1]
2. Arrange the following metals in decreasing order of their atomic size, Ca, Mg, Ba, Be [1]
3. On what basis was Mendeleev Periodic Table based? [1]
4. Why metals are called electropositive in nature? [1]
5. Why the atomic radius decreases in moving left to right along a period? Give an example. [2]
6. What happens to the electron affinity on moving down a group and moving across the period respectively? [2]
7. How do you think the tendency to lose & gain electrons will change in a group and why? [3]
8. An element A on combining with oxygen produces an oxide A_2O which is basic in nature. Now, answer the following questions: [3]
 - (i) How many electrons must be there in the outermost shell of the element A?
 - (ii) To which group of periodic table it belongs? (iii) Identify whether it is a metal or a non-metal
9. Compare and contrast Mendeleev's Periodic Table with Modern Periodic Table. [3]
10. (a) What is meant by periodicity in properties of elements with reference to the periodic table? [3]
 (b) Why do all the elements of the same group have similar properties? [3]
 (c) How will the tendency to gain electrons change as we go from left to right across a period? Why?
11. (A) How were the positions of cobalt and nickel resolved in the Modern Periodic Table? [5]
 (B) (i) How do you calculate the valency of an element from its electronic configuration?
 (ii) What is the valency of magnesium with atomic number 12 and sulphur with atomic number 16?
12. (I) A metal M forms an oxide having the formula M_2O_3 . It belongs to 3rd period in the modern periodic table. Write the atomic number and valency of the metal.
 (II) (a) What were the two major shortcomings of Mendeleev's periodic table? How have these been removed in the modern periodic table?
 (b) Two elements X and Y have atomic numbers 12 and 16 respectively. Write the electronic configuration for these elements. To which period of the modern periodic table do these two elements belong? What type of bond will be formed between them and why? [5]

Answers

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| 1. Cl, Non-Metal | 2. Ba>Ca>Mg>Be | 6. (i) Decreases (ii) Increases |
| 7. Decrease due to increase in size | 8. (i) 2 (ii) 2 nd (iii) Metal | |
| 10. due to same outer electronic configuration. | 12. (1) (i) 2, 8, 2(ii) 2, 8, 6(2) 3 rd | (3) Ionic bond |