PARISHRAM PUBLICATIONS

Std.: X (English) | Science And Technology - I | Marks: 40

Date: 20-Dec-2019 | Parishram Academy | Time: 2 hrs

Chapter: All

Q.1 A) Multiple Choice Questions **(5)**

1) What is the weight of an object with 10 kg mass?

a. 10 N b. 9.8 N c. 98 N d. 0.98 N

Ans. Option c.

2) An electric fuse works on the ..... .

a. chemical effect of current
b. magnetic effect of current
c. lighting effect of current
d. heating effect of current.

Ans. Option d.

3) Second Law of Refraction is also known as:

a. Dalton law
b. Snells law
c. Law of conservation of matter
d. None of the above

Ans. Option b.

4) …… are the most ductile metals.

a. Gold and Silver b. Silver and Sodium
c. Gold and Aluminum d. Platinum and Aluminum

Ans. Option a.

5) Chemical equation can be made more informative by …… .

a. By indicating the physical states of reactants and products.
b. By indicating the heat changes taking places in the equation.
c. By indicating the condition under which the reaction takes place.
d. All of the above.

Ans. Option d.

(B) Solve the following question **(5)**

1) Find the odd one out.

Methanamine, Butanol, Ethanal, Teflon

Ans. **Teflon** - It is the only polymer while others are unit molecules

2) Find co-related terms

$\sqrt{\frac{GM}{R+h}}$: critical velocity of a satellite at height h from surface of planet : : ..... : escape velocity

on the surface of planet

Ans. $\sqrt{\frac{GM}{R+h}}$: critical velocity of a satellite at height h from surface of planet : : $\sqrt{\frac{2GM}{R}}$: escape velocity on the surface of planet

3) Match the pair.

I	II	III
i. -OH	a. Ketone	1. Butanoic acid
ii. -CO-	b. Alcohol	2. Butan - 2 - one
	c. Aldehyde group	3. Butanol

Ans.

i. -OH	Alcohol	Butanol
ii. -CO-	Ketone	Butan - 2 - one

4) State true or false.

Density of water is minimum at 4ºC.

Ans. Density of water is maximum at 4ºC.- **False**

5) Name the following

A metal which does not react with water but reacts with steam.

Ans. Aluminium

Q.2 A) Give scientific reason. (Any two) **(4)**

1) Simple microscope is used for watch repairs.

Ans.
i. When an object is placed within the focal length of convex lens, one gets a magnified and erect image of the object.
ii. Thus, the watch repairer can see the minute parts of the watch more clearly with the help of simple microscope than the naked eye, without any strain on the eye.
iii. A magnification of about 20 times is obtained by simple microscope.
Hence, simple microscope is used for watch repairs.

2) Lemon or tamarind is used for cleaning copper vessels turned greenish.

Ans.
i. Copper undergoes oxidation in air to form black copper oxide. This copper oxide reacts with carbon dioxide in air and gains a green coat of copper carbonate.
ii. Thus copper gets tarnished or corroded due to the formation of green copper carbonate.
iii. Lime juice or tamarind contains weak acid i.e citric acid and tartaric acid.
iv. When these tarnished vessels are rubbed with lime juice or tamarind, the weak acid present in them dissolves the green copper carbonate and makes it shiny again.

3) Carbon atom does not form C^{4+} cation.

Ans. i. If carbon attains the configuration of noble gas helium (He) by losing one after another all the four valence electrons, the net positive charge on the carbon atom goes on increasing due to the loss of every electrons.

ii. Therefore to lose the next electron more energy is required, which makes the task more difficult.
iii. Moreover, the C4+ cation that would ultimately form in this process becomes unstable in spite of its noble gas configuration, because it has a small size with high net charge.
iv. Therefore carbon atom does not take this route to attain a noble gas configuration.

(B) Solve the following questions. (Any three) **(6)**

1) Write short note on Mass and Weight

Ans.
i. Mass is the amount of matter present in the object. The SI unit of mass is kg. Mass is a scalar quantity.
ii. Its value is same everywhere. Its value does not change even when we go to another planet.Higher the mass, higher is the inertia.
iii. The weight of an object is defined as the force with which the earth attracts the object.
iv. The force (F) on an object of mass m on the surface of the earth can be written using equation.
Weight, W= F = m.g.

2) Distinguish between

Differentiate between Rarer medium and Denser medium

Ans.

Rarer medium	Denser medium
i. Speed of light increases in rarer medium	i. Speed of light decreases in denser medium.
ii. When light enters the rarer medium from denser medium it bends away from normal	ii. When light enters the denser medium from rarer medium it bends towards the normal.
iii. Air is rarer than glass and water	iii. Glass is denser than air and water
iv. Angle of incidence $\angle$i is greater than angle of refraction $\angle$r	iv. Angle of incidence $\angle$i is smaller than angle of refraction $\angle$r

3) In Doberiner's triads Li, Na, K, the atomic masses of Lithium and Potassium are 6.9 and 39.1 respectively, then what will be the atomic mass of sodium.

Ans. Atomic mass of sodium $= \frac{\text{Atomic mass of Lithium} + \text{Atomic mass of Potassium}}{2}$

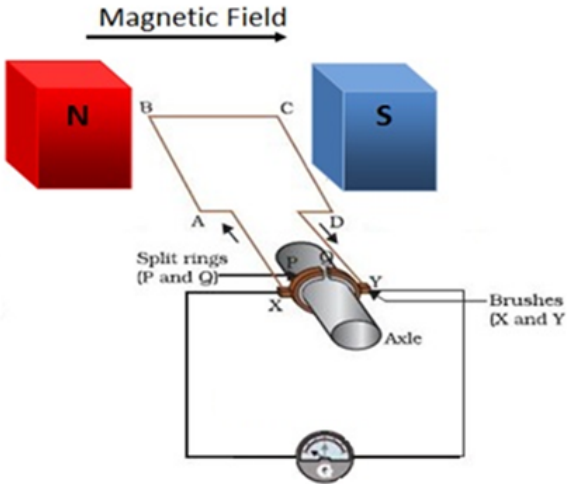
At mass of Na $= \frac{\text{At mass of Li} + \text{At mass of K}}{2}$

$= \frac{6.9 + 39.1}{2}$

$= \frac{46}{2} = 23$

4) Draw and Explain the neat label diagram of DC generator.

Ans.



5) Complete the table

IRNSS	……..	……..
INSAT	Weather study and predict	……..
IRS	……..	Earths observation

Ans.

IRNSS	Navigational satellite	To fix the location in terms of latitude and longitude
INSAT	Weather study and predict	Weather satellite
IRS	Earth observation Satellite	Earths observation

Q.3 Solve the following questions. (Any five) **(15)**

1) Complete the table :

Common name	Structural formula	IUPAC Name
ethylene	.....	.....
.....	HC≡CH	.....
.....	CH_3-COOH	.....

Ans.

Common name	Structural formula	IUPAC Name
ethylene	**CH_2=CH_2**	**Ethene**
acetylene	HC≡CH	**Ethyne**
acetic acid	CH_3-COOH	**Ethanoic acid**

2) Answer the following question with the help of given statement:

When water is heated up to a certain temperature, it expands and when cooled it contracts.

1. What term is used to describe such behaviour of water?

2. What happens when water is cooled at room temperature?

3. What happens when water is heated?

Ans. 1. The term used to describe such special and exceptional behaviour of water is Anomalous Behavior of water.

2. If water is cooled at room temperature, it contracts till 4°C, but if it is cooled below 4°C to 0°C, then it expands instead of contracting.

3. If water at 0°C is heated, it contracts in volume instead of expanding till 4°C.Thus, at 4°C, the volume of water is minimum and then the volume increases as the temperature rises above 4°C.

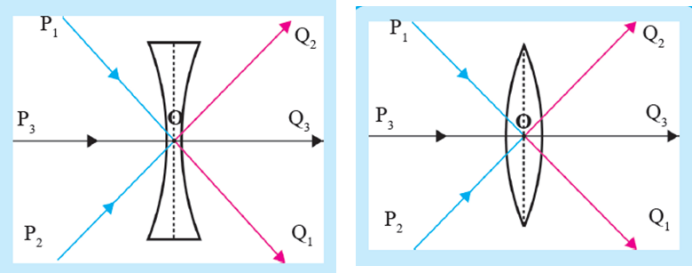
3) What is corrosion ? Do gold ornaments corrode if not why ?

Ans. i. The slow process of decay or destruction of metal due to air, moisture, acids on it is called as corrosion.

ii. Gold is a yellow shining metal and it does not corrode because it is highly un reactive metal that remains unaffected by air, water vapour and other gases in the atmosphere. Gold does not tarnish and retains its luster for years Since it does not corrode gold ornaments look new after years.

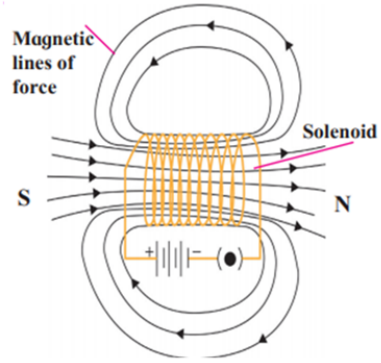
4) Define optical centre of lens and explain with the help of diagram.

Ans.



The point inside a lens on the principal axis, through which light rays pass without changing their path is called the optical centre of a lens. In the dig 'O' is the optical centre of the lens.

5) Observe the diagram and answer the questions :



i. What is the direction of the magnetic filed in the given diagram ?
ii. What does parallel magnetic lines of force inside the solenoid means ?
iii. Define : Solenoid.

Ans. i. The direction of the magnetic field is from North pole to South pole.

ii. The parallel magnetic lines of force inside the solenoid means the intensity of the magnetic field within the solenoid is uniform everywhere, i.e. the magnetic field in a solenoid is uniform.

iii. When a copper wire with a resistive coating is wound in a chain of loops (like a spring), it is called solenoid.

6) Write down the electronic configuration of the following elements from the given atomic numbers. Answer the following question with explanation.

a. $_{3}Li$, $_{14}Si$, $_{2}He$, $_{11}Na$, $_{15}P$
Which of these elements belong to be period 3?

b. $_{1}H$, $_{7}N$, $_{20}Ca$, $_{16}S$, $_{4}Be$, $_{18}Ar$
Which of these elements belong to the second group?

c. $_{7}N$, $_{6}C$, $_{8}O$, $_{5}B$, $_{13}A1$
Which is the most electronegative element among these?

Ans.

	Element	**Electronic configuration**
i.	$_{3}Li$	2, 1
	$_{14}Si$	2, 8, 4
	$_{2}He$	2
	$_{11}Na$	2, 8, 1
	$_{15}P$	2, 8, 5

The elements $_{14}Si$, $_{11}Na$ and $_{15}P$ belong to period 3

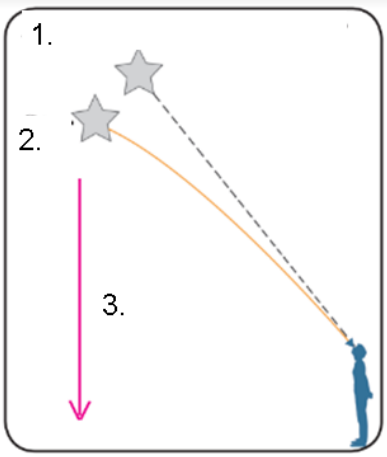
	Element	**Electronic configuration**
ii.	$_{1}H$	1
	$_{7}N$	2, 5
	$_{20}Ca$	2, 8, 8, 2
	$_{16}S$	2, 8, 6
	$_{4}Be$	2, 2
	$_{18}Ar$	2, 8, 8

The elements $_{20}Ca$ and $_{4}Be$ belong to second group as they have two valence electrons.

	Element	**Electronic configuration**
iii.	$_{7}N$	2, 5
	$_{6}C$	2,4
	$_{8}O$	2, 6
	$_{5}B$	2, 3
	$_{13}Al$	2, 8, 3

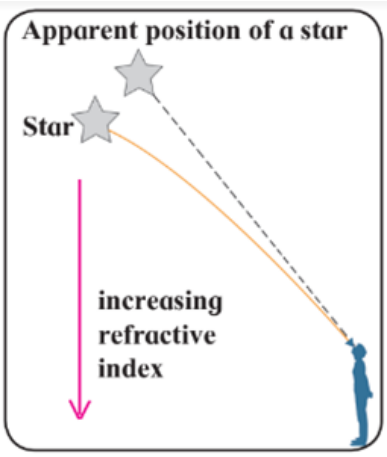
The most electronegative element is $_{8}O$.

7) Complete the diagram and fill in the blanks.
(**atmospheric air, Refractive index, brightness, twinkling, changing air density, apparent position, position**)



The ..... of star keeps changing a bit because of the motion of ..... temperature. The ..... of air keeps changing continuously. Because of this change the ..... and ..... of the star keep changing and star appears to be .....

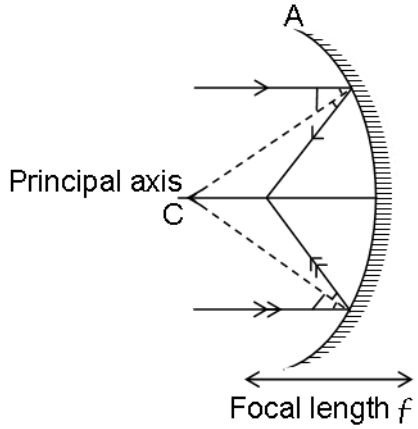
Ans.



The **apparent position** of star keeps changing a bit because of the motion of **atmospheric air, changing air density**, temperature. The **Refractive index** of air keeps changing continuously. Because of this change the **position** and **brightness** of the star keep changing and star appears to be **twinkling**.

8) With the help of diagram define focus of concave mirror.

Ans. The focus of a concave mirror is a point on the principal axis at which the light rays incident parallel to the Principal axis meet after reflection from the mirror.



Q.4 **Solve the following questions. (Any one)** **(5)**

1) What is centripetal force ? Complete the following expression for a planet revolving around sun in circular motion irrespective of its time of revolution?

For a planet revolving around sun; Let m be the mass of planet which takes time T for one revolution moving with velocity v and r be the radius of the circular path.

Centripetal force will be F = ☐ ... (1)

Speed = ☐

Thus, in one revolution,

Distance covered = ☐ (Perimeter of the orbit)

Time required = T (☐)

$\therefore$ ☐ = $\frac{2\pi r}{T}$

Substituting v in equation ... (1)

$F = \frac{m\left(\frac{2\pi r}{T}\right)^2}{r}$

$\therefore$ F = ☐

Multiplying and dividing by r^2

$F = \frac{4m\pi^2 r}{T^2} \times \frac{r^2}{r^2}$

$\therefore$ F = ☐ ... (2)

From Kepler's third law; ☐ = k (constant)

From (2) & (3); $\boxed{F = \frac{4m\pi^2}{kr^2}}$ ... (3)

Thus, this is expression of centripetal force independent of time taken but depends on radius of the path.

Ans. Centripetal force is defined as a force acting on any object in circular motion which is directed radially towards centre of circular path.

For a planet revolving around sun; Let m be the mass of planet which takes time T for one revolution moving with velocity v and r be the radius of the circular path.

Centripetal force will be F = $\mathbf{\frac{mv^2}{r}}$ ... (1)

Speed = $\mathbf{\frac{distance\ travelled}{time\ taken}}$

Thus, in one revolution,

Distance covered = $2\pi r$ (Perimeter of the orbit)

Time required = T (**period of revolution**)

$\therefore$ **v** = $\frac{2\pi r}{T}$

Substituting v in equation ... (1)

$F = \frac{m\left(\frac{2\pi r}{T}\right)^2}{r} = \frac{4m\pi^2 r^2}{T^2 r}$

$\therefore$ $\mathbf{F = \frac{4m\pi^2 r}{T^2}}$

Multiplying and dividing by r^2

$$F = \frac{4m\pi^2 r}{T^2} \times \frac{r^2}{r^2}$$

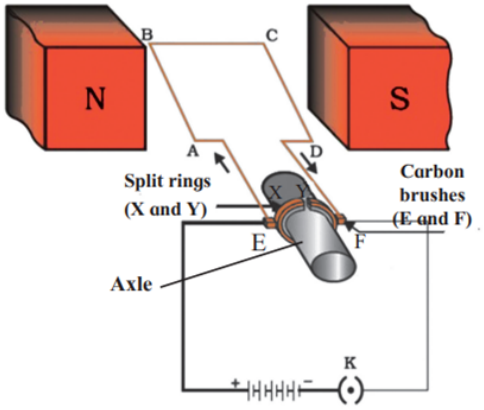
$$\therefore \quad F = \frac{4m\pi^2}{r^2} \times \frac{r^3}{T^2} \quad \text{... (2)}$$

From Kepler's third law; $\frac{T^2}{r^3}$ = k (constant)

From (2) & (3); $\boxed{F = \frac{4m\pi^2}{kr^2}}$ ... (3)

Thus, this is expression of centripetal force independent of time taken but depends on radius of the path.

2) Explain the working of the given diagram.



Ans. Working :

i. When the circuit is completed, the current flows in the branch AB of the loop from A to B through the carbon brushes E and F.

ii. Since the direction of the magnetic field is from north pole to the south pole, according to Fleming's left hand rule, a force is exerted on the branch AB and pushes it down.

iii. The current in the CD branch is in the opposite direction to that in the AB branch, and therefore, a force is exerted on the branch CD in the upward direction.

iv. Thus, the loop and the axle start rotating in an anticlockwise direction.

v. After half rotation, the two halves of the split ring X and Y come in contact with carbon brushes F and E, respectively and the current in a loop starts flowing in the direction DCBA.

vi. Therefore, a force is exerted on the branch DC in the downward direction and on the branch BA in the upward direction, and the loop continues to rotate in the anticlockwise direction.

vii. Thus, the current in the loop is reversed after each half rotation and the loop and the axle continue to rotate in the anticlockwise direction.