

STATE LEVEL PREPARATORY
SCIENCE - 2023

PART - A
PHYSICS

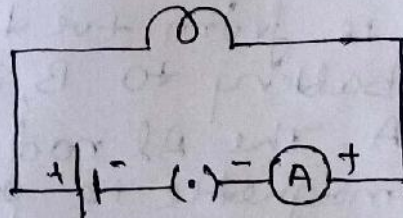
I MCQ

- 1) B) Electric motor
- 2) D) Silicon
- 3) C) increases heavily rate of
- 4) The flow of electric charges is called electric current.

$$I = \frac{Q}{t}$$

5) Electromagnetic Induction
(EMI)

6)



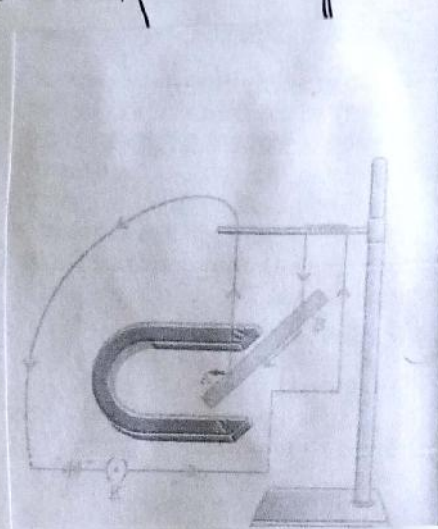
- 7) a) Myopia
Concave lens
- 1) Elongation of the eyeball.
- 2) Excessive curvature of the lens.
- 8) a) It should have high calorific value
- b) It should be economical
- c) It should be ecofriendly
- d) It should be easy to store & transport.

8)

(10)

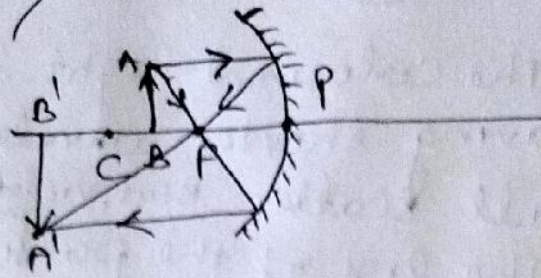
- 1) It leads to air pollution
- 2) It leads to global warming
- 3) It leads to greenhouse effect.
- 4) It causes diseases related to respiratory i.e. asthma

9)



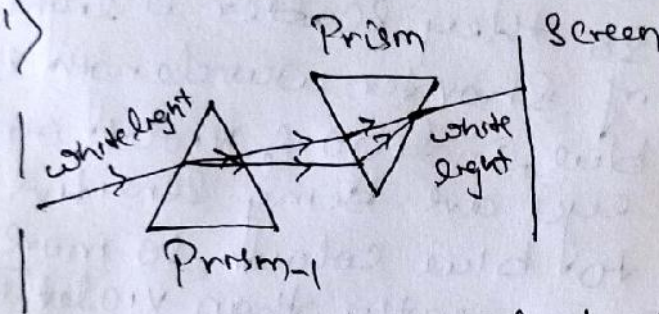
1) when switch on the current flows through Al rod i.e. from +ve terminal of battery to B, from B to A. The Al rod will get magnetised i.e. around Al rod magnetic field is produced. Now Al rod acts like a magnet, but already a permanent magnet i.e. horseshoe magnet is there. B/w 2 magnets either there will be force of attraction or force of repulsion. Due to this Al rod will get displaced in one direction. This shows that whenever a current conductor is placed in a magnetic field it experiences mechanical force.

10)



Position: Image is formed beyond centre of curvature
Nature: Image is real & inverted.

11)



He kept two identical prisms close to each other. One erect & the other in an inverted position as shown in the figure. The light gets dispersed when it passed through the first prism. The second prism receives all the seven coloured rays from the first prism & recombines them into the original white light. So this observation shows that W. light is made of seven colours.

11) (22)

The coloured light having shorter wavelength will scatter. Blue, violet & indigo.

The size of the particle will small.

Our eyes are more sensitive to blue colour.

The air molecules in the atmosphere have small size so they scatter a light of shorter wavelength i.e. blue, indigo & violet. Our eyes are being sensitive to blue colour, so more prominently than violet. Thus the colour of the sky appears blue.

12) a) $R_1 = 2\Omega$
 $R_2 = 4\Omega$
 $R_3 = 4\Omega$
 $V = 6V$

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$\frac{1}{R_p} = \frac{1}{2} + \frac{1}{4} + \frac{1}{4}$$

$$\frac{1}{R_p} = \frac{1 \times 2 + 1 \times 1 + 1 \times 1}{4}$$

$$\frac{1}{R_p} = \frac{4}{4}$$

$$\boxed{R_p = 1\Omega}$$

$$R = 1\Omega$$

$$V = 6V$$

$$I = ?$$

$$I = \frac{V}{R}$$

$$I = \frac{6}{1} = \underline{6A}$$

12) b) $H = 200 \text{ J}$

$t = 1 \text{ sec}$

$R = 8 \Omega$

$V = ?$

$H = I^2 R t$

$I^2 = \frac{H}{R t}$

$I^2 = \frac{200}{8 \times 1}$

$I = \sqrt{25}$

$I = 5 \text{ A}$

$I = 5 \text{ A}$

$V = I R$

$R = 8 \Omega$

$V = 5 \times 8$

$V = ?$

$V = 40 \text{ V}$

13) a) convex

Concave

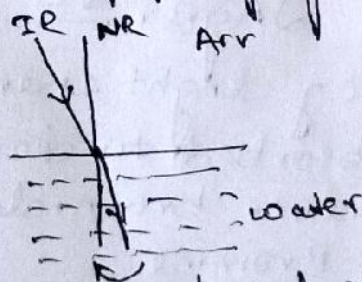
It is thick at the centre & thin at the edges

It is thin at the centre and thick at the edges

2) It is converging lens

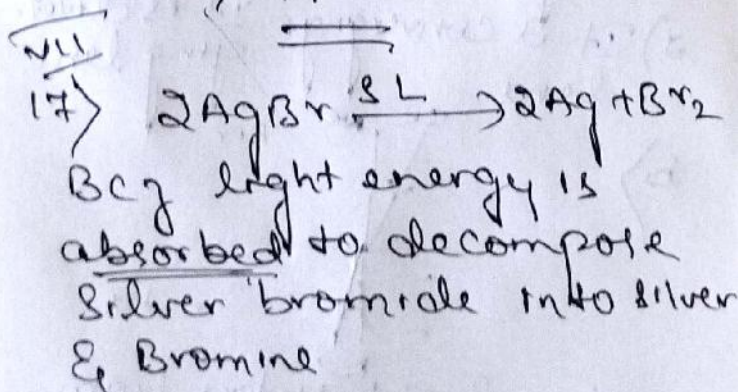
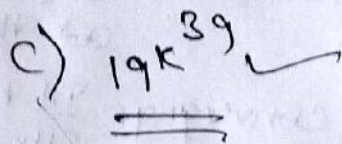
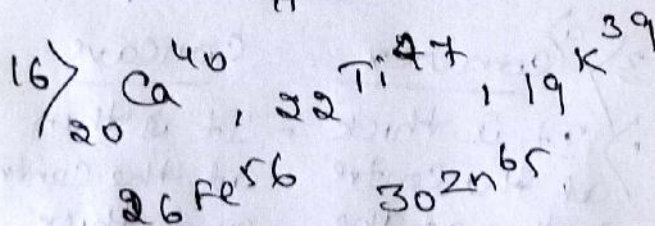
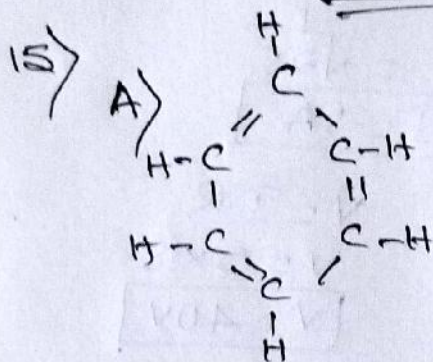
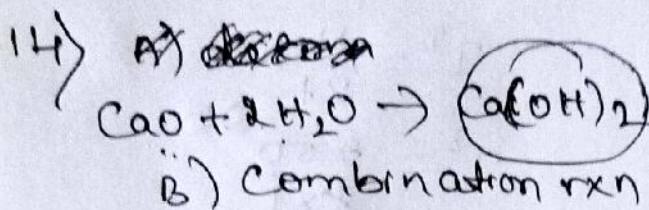
It is diverging lens

b)



When light enters from air (rarer) medium to water (denser medium) the light ray bends towards the normal because the refractive index of air is less than the water, when light enters to water medium its speed decreases due to more refractive index $n = \frac{c}{\text{speed}}$

PART-B
CHEMISTRY



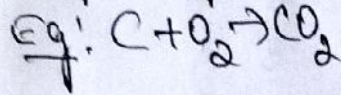
18) 1) This law is applicable upto calcium

2) No space left for new discovering elements.

19) By oxidation reaction using oxidizing agent.

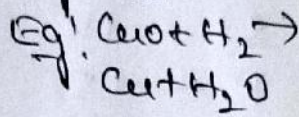
20) Oxidation

The process of gaining of O_2 or removal of hydrogen

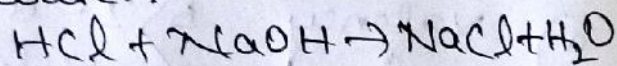


Reduction

The process of gaining of H_2 or removal of O_2 .



21) The reaction b/w acid & base to form salt & water.



Take 3 types of solution



A



B



C

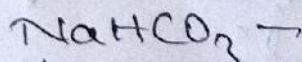
1) Red litmus paper - Dip it in soln A, soln B & soln C. If red litmus change blue in soln B, then it is base.

2) Blue litmus paper - Dip in remaining two. If it changes its colour in A it is acidic soln.

Now there is no change in red/blue litmus in soln C. \therefore soln C is neutral.

OR

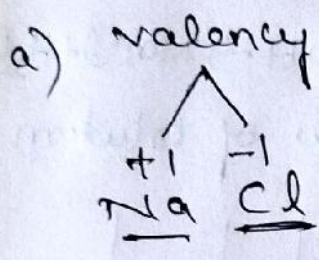
The bases which are soluble in water.



- 1) It is used as an antacid.
- 2) It is used in bakery to make bread & cake spongy & soft.

GP	1	2	13	14	15	16	17	18
Period	Na	Mg	Al	Si	P	S	Cl	Ar

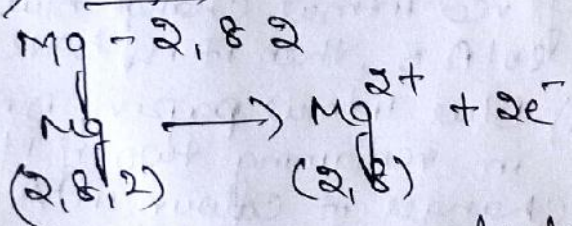
Na - 11	2, 8, 1	+1
Mg - 12	2, 8, 2	
Al - 13	2, 8, 3	
Si - 14	2, 8, 4	
P - 15	2, 8, 5	
S - 16	2, 8, 6	
Cl - 17	2, 8, 7	-1
Ar - 18	2, 8, 8	



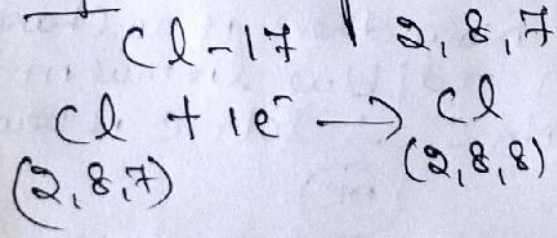
b) It is a completely filled & it is inert gas & it is stable

(23) ~~the~~ Diagram

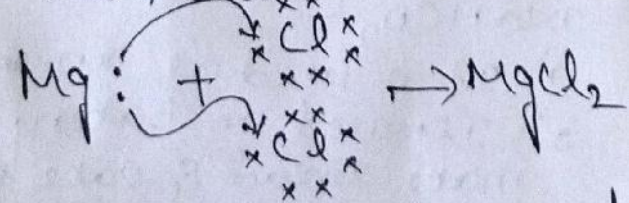
24) Step 1: Metal loses electron



Step 2: NM gains electrons

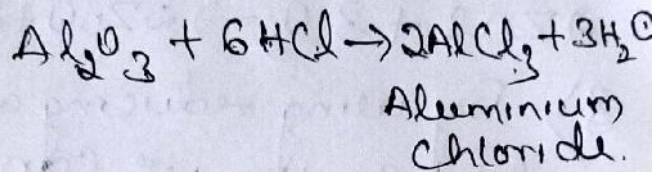
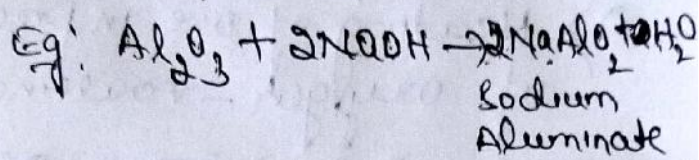


Step 3: Formation of magnesium chloride.

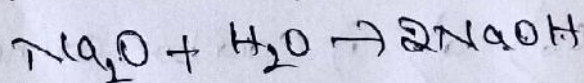


Because this compound is formed due to transfer of electrons from metals to non metals.

24) • Aluminium oxide is an amphoteric oxide because it reacts with both acid & base to form salt & water.



Because sodium oxide is soluble in water to form base.

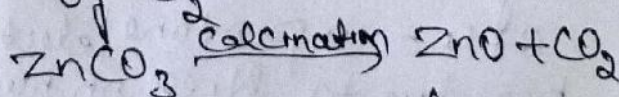


25) Zinc carbonate

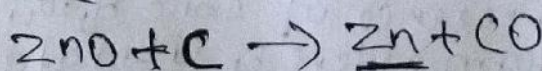
Steps ZnCO_3

1) Conc of ore: Removing of gangue from ore

2) ore is heated in absence of O_2



3) By using reducing agent ZnO is reduced to Zn which is not 100% pure - crude metal.



Zinc Sulphide

Zinc blende - ZnS

Steps

1) Conc of ore; Removal of gangue

2) Heating of ore in presence of oxygen - roasting

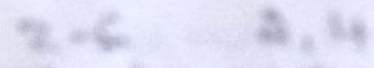


3) By using reducing agent like carbon we can reduce ZnO \rightarrow Zn



The Zn is not imp. pure - crude metal

4) a) i) Carbon cannot lose electrons

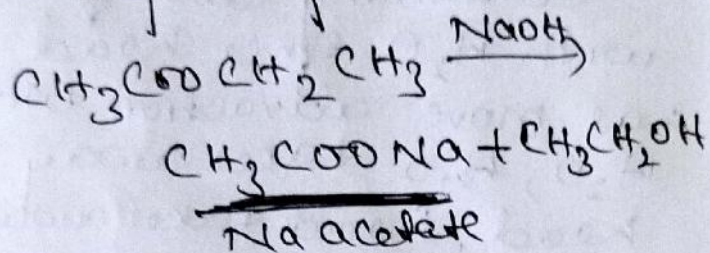


The try of the carbon atom is too weak to have that will not nuclear force work by nucleus by valence electron so it cannot lose its electron. It cannot gain its electron by nucleus cannot hold $2, 14 = 10$ protons/electrons by due to force on nucleus it cannot gain its electron.

ii) By this way the carbon and oxygen is used in presence of conc H_2SO_4 to form carbonic acid. It is a weak acid & it is formed by CO_2 with H_2O & H_2SO_4 change

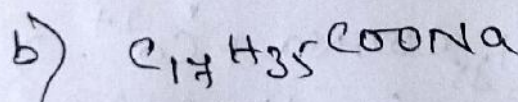
Soap can be obtained by a process called saponification.

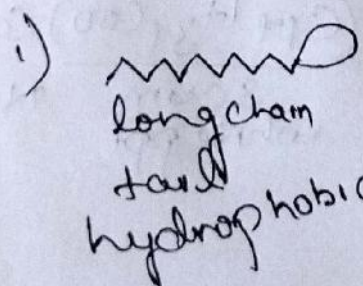
The opposite reaction to esterification is called saponification.



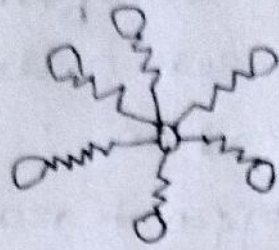
(or)

- a) 1) It gives large amount of heat on combustion
- 2) It has high calorific value
- 3) Its combustion can be controlled



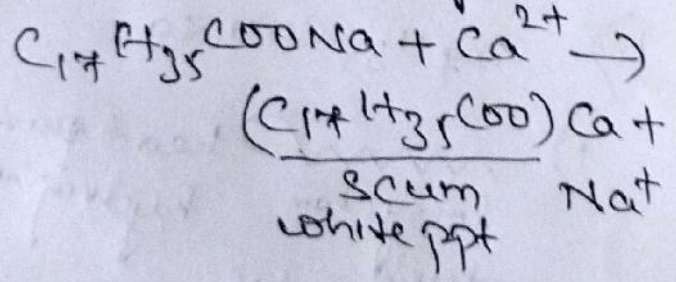
1)  head part hydrophilic
long chain hydrophobic
tail

2) Soap molecules are arranged in one pattern such a way that all tails gets attached to each other & all heads face outward called micelle when we rub the soap on clothes



3) Again when micelle containing cloth flushed with H_2O . Since head has more attraction with H_2O , H_2O takes away head, head takes away tail, tail takes away finally the dirt.

Soaps donot work in hard water because hard water contains Calcium & magnesium ions so soap forms scum with Ca^{2+} & Mg^{2+} ion.



PART - C
BIOLOGY

27)

c) Dendrite → Cell body →
Axon → Nerve ending

28) A) DDT, BHC, insecticides

29) Because it undergoes
asexual type of reproduction.

30) a) social problem
b) Economical problem
c) environmental problem

31) Because 'reflex' does not
require any energy.

XIII

32) Yes, the statement
is right. Because thinking
requires some time.

eg: when we touch a hot
object immediately
we will withdraw our
hand this is because of
reflex action by spinal
cord.

If we think or if brain
control this it will take
some time to response
by that time our body
part may get damaged
or injured.

Algae, aquatic birds,
large fish, small fish

i) Flow of energy in the
increasing order.

Aquatic birds → large fishes → small
fish → Algae

ii) Flow of harmful
substances in increasing
order.

Algae → small fishes → large
fish → Aquatic birds

XIV

(84) It consists of Duodenum
jejunum & ileum.

1) Food from stomach enters
to small intestine i.e. to
duodenum.

2) This duodenum is connected
to gall bladder of liver
& pancreas.

3) The bile juice from liver
enters to duodenum &
digests fat in the food.

4) The pancreatic juice
from pancreas will
digest fat by enzyme
called pancreatic lipase,
proteins by trypsin &
carbohydrates by pancrea-
tic amylase.

5) There is a small finger like projection in small intestine called villi which increase the area of absorption of digested food & carry digested food to blood.

∴ the small intestine is the complete site for digestion.

(2)

Nose: 1) It ~~is~~ is the passage for exchange of gas.

2) It will filter the air by the hairs present inside it. i.e. it removes foreign particles.

Alveoli: 1) It the functional unit of lungs

2) It is very delicate & surrounded by blood vessels.

3) It helps in exchange of gases & it is like a balloon like structure

4) In this structure both O_2 & CO_2 will get exchanged which helps in respiration.

3) i) Thyroid gland

It secretes a hormone called thyroxine.

It regulates metabolism of carbohydrates, fats & proteins.

ii) Adrenal gland

Adrenaline

It helps the body to face emergency situation & controls heart beat, BP & respiration

iii) Testes

Testosterone

i) It produces sperm & responsible for secondary sexual character in male

(or)

The movement of part of plants in response to gravity of earth.

Negativotropism - shoot

i) Auxin: i) It helps in elongation of cells

ii) It helps in bending of stem towards sun light.

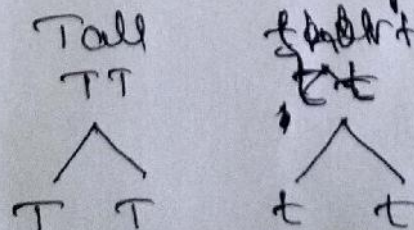
ii) Cytokinin

- a) It helps in cell division
- b) It helps in rapid cell division of fruits & seeds
- c) It helps in opening of stomata during day time.

iii) Abscissic acid

- a) It causes wilting of leaves
- b) It helps in closing of stomata during night time.

(36) Mendel selected tall plant (TT) & dwarf (tt) pea plants. When a tall pea plant is crossed with a short pea plant, all the F_1 progeny are tall. The trait expressing itself in the progeny is called dominant one. This is called as law of dominant

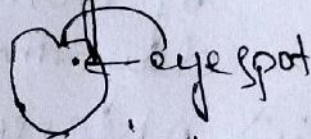


F₁ generation

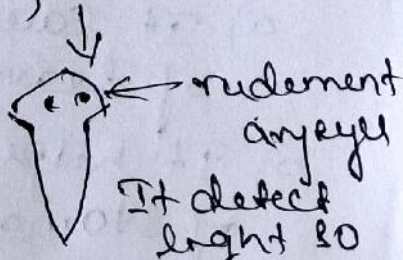
Gametes	t	t
T	Tt Tall	Tt Tall
T	Tt Tall	Tt Tall

Tall - dominant.

Stage 1: Euglena



It is not prominent.



that even it can use its eye to get protect from danger

Bird eye - Compound eye

it can see many objects

Human eye

BinoCular vision.

It can see near as well as far object.

37)

Fragmentation

1) Occur through mitosis & not specialised cells are involved

2) It occurs in lower organisms

3) All broken parts develop into new organisms

Eg: Algae, flatworms

Because due to DNA copying

Regeneration

Specialised cells are involved

It occurs in higher organisms

All broken parts do not develop into a new organism

Eg: Sea stars, mammal, variation in

b) when egg is ^{not} fertilised the egg becomes vanish in the uterus. The 3 layers of blood vessels of uterus will rupture due to this the blood will bleed through vagina which is called as menstrual cycle.

The function of 3 layers of blood vessel of uterus is to protect fetus. But when there is no fertilization these blood vessel will rupture.