

STATE LEVEL SCIENCE  
PREPARATORY EXAMINATION  
2024 KEY ANSWERS

PART - A PHYSICS

I

- 1) A) violet.
- 2) C) Figure R

II

- 3) a) Twinkling of stars  
b) Apparent position of stars.

4) Bcz red colour will not scatter and it has more wavelength.

5) A solar device which converts solar energy directly into electrical energy.

III

6) Diagram - biogas plant.

7) a) Current will be induced in the coil when there is a relative motion b/w coil & a bar magnet.

b) Rate of change of magnetic field is directly proportional to induced current.

8) The lens prescribed is convex lens. He is suffering from hypermetropia.

$$P = +3D$$

$$f = \frac{1}{P}$$

$$f = ?$$

$$f = \frac{1}{3}$$

$$f = +0.33m$$

iv) a) A device which converts electrical energy into mechanical energy.

Fleming's left hand rule

"Hold your left hand such that thumb, fore finger and middle finger are mutually perpendicular to each other.

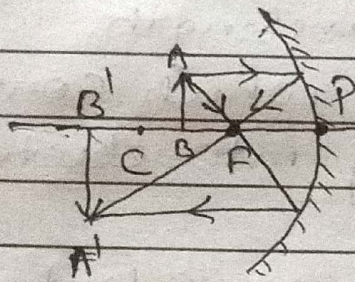
Thumb: Indicates the direction of force

Fore finger: Indicates the direction of magnetic field

Middle finger: Indicates the direction of current.

b) It reverses the direction of current.

10)



Position: Image is formed beyond C

Nature: Image is real & inverted

11)

$$V_1 = 3V$$

$$V_2 = 6V$$

$$V_3 = 9V$$

$$I = 3A$$

$$\text{Total voltage} = V_1 + V_2 + V_3$$

$$V = 3 + 6 + 9 = 18V$$

$$I = 3A$$

$$V = 18V$$

$$R = ?$$

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

$$R = \frac{18}{3}$$

$$R = 6\Omega$$

v) 12a) Ohm's law: At constant temp current is directly proportional to P.d across it.

$$I = 0.5$$

$$V = 1.5$$

$$R = ?$$

$$R = \frac{V}{I} = \frac{1.5}{0.5} = \frac{15}{5} = 3\Omega$$

∴ Resistance of nichrome wire =  $3\Omega$

- b)
- 1) If one appliance fails to work, other also affected.
  - 2) Each appliance will not get full voltage
  - 3) Current will be same at each appliance
  - 4) Total circuit resistance will be high.

(OR)

a) i) Good conductor - Silver  
 Insulator - Ebonite.  
 Silver is good conductor because it has high conductivity & low resistivity  
 Ebonite is an insulator because it has high resistivity.

ii) Nichrome! - Because it has high resistivity and low conductivity  
 It will not oxidise easily at high temp.

b) As the thickness of tungsten wire increases, resistance decreases & hence current increases, Ammeter shows more reading. So  $I$  will be  $\approx 2 \times 5 = 10 \text{ A}$

$$A \propto \frac{1}{R}$$

- 13) a) i) medium A is optically denser, because it has ~~more~~ refractive index.  
 ii) speed of light is more in medium B because speed is inversely proportional to refractive index.

$$n \propto \frac{1}{\text{speed}}$$

b)  $m = \frac{v}{u} = \pm$  v & +ve means real image  
 It is convex lens.

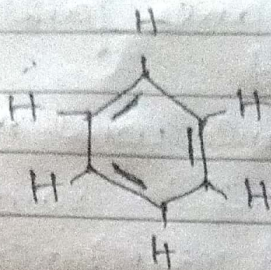
Image is formed at  $2F_2$ , image is real & inverted  
 Image size is same as object size.

ARUNS  
 MAX

## PART B - CHEMISTRY

vi) 14) c)  $\text{CaO}$

15)  $\text{O}$



16) "The properties of elements are periodic function of their atomic number".

17) Soln X:  $\text{Mg(OH)}_2$  - Red litmus changes to blue, bec  $\text{Mg(OH)}_2$  is a base.

Soln Y: Acetic acid - Blue litmus changes to red, bec acetic acid is an acid.

18) Smaller atomic size: Cl, bec as we move across the period atomic size decreases.

Larger atomic size: Na, bec as we move across the period atomic size decreases.

18)

(OR)

Li - 2, 1

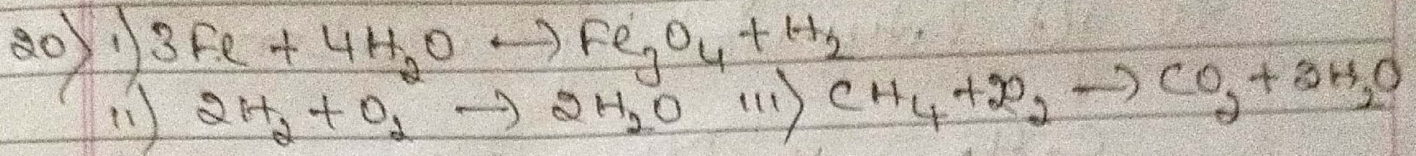
Na - 2, 8, 1

K - 2, 8, 8, 1

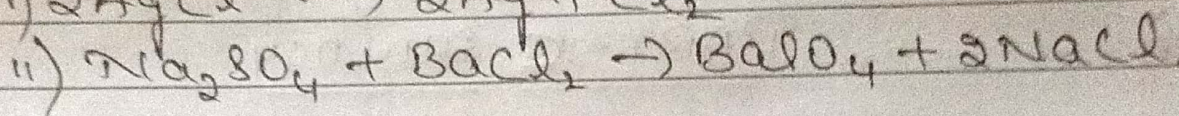
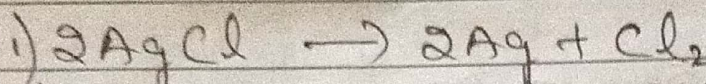
As we move down the group no. of valence electrons remains same, but no. of shells increases, so valence electrons are far from nucleus & hence electrons are set free. So metallic property increases as we move down the group.

19) a) Electrolyte -  $\text{CuSO}_4$  soln

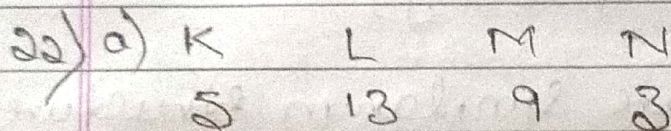
b) etching, painting, galvanising, electroplating, anodising, greasing, making alloys.



(OR)

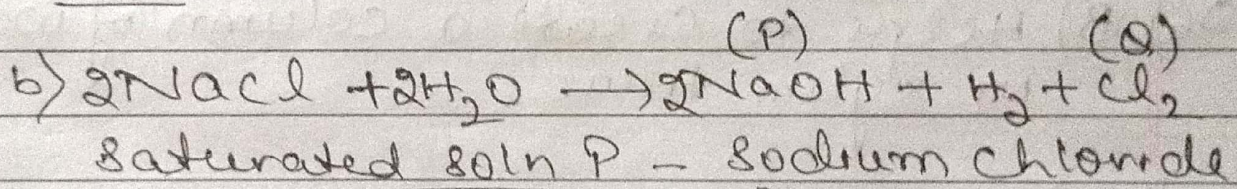


21) Diagram - action of steam on metal:

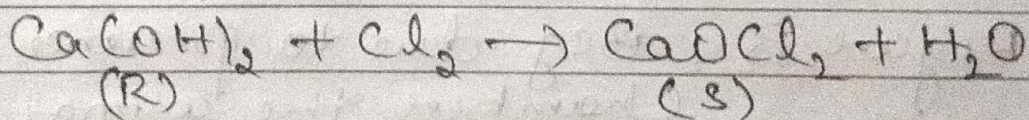


Soln N has maximum  $\text{H}^+$  ions

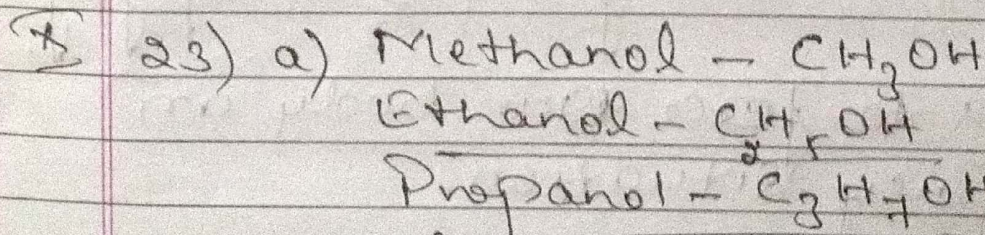
Soln L has maximum  $\text{OH}^-$  ions.



Gas Q  $\rightarrow$  Chlorine.

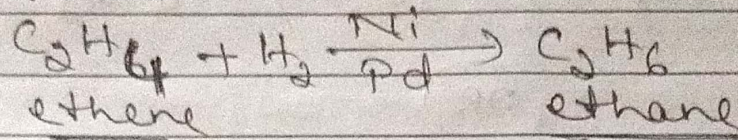


Basic soln R  $\rightarrow$  Calcium hydroxide  
Bleaching salt - bleaching powder.



b)  $C_2H_4$  undergo addition reaction:

A reaction in which addition of hydrogen to unsaturated hydrocarbon in presence of Ni/Pd as a catalyst to get saturated hydrocarbon.



~~24)~~

## PART-B BIOLOGY

xii

24) c) Lactic acid & energy

25) A) Organs that are similar in structure but different in function.

26) B) Helps to create a column of water in xylem tissue.

27) B) 78.

28) Figure B, Bcz due to presence of 4 chambers the animal get efficient supply of  $O_2$ .

29) Bcz due to change in DNA copying

30) It helps to face our body an emergency situation.

31) The process of transfer of pollen grains from anther to stigma.

32) Diagram - human excretory system.

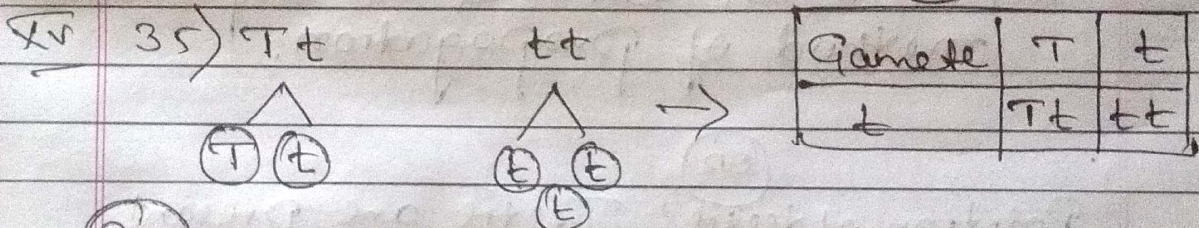
- 33) a) Local people b) Tribal people who live in forest  
 c) Forest department  
 d) Industrialist.

OR

- a) Use of public transport  
 b) Use of more & more solar energy  
 c) Switch off bulbs, fans whenever not in use.  
 d) Using an efficient engine.

34) Diagram - neuron.

R<sub>1</sub>



R<sub>2</sub>

	Gametes	T	t	
T	T	TT	Tt	Phenotypic :- 3:1 Genotypic :- 1:2:1
t	t	Tt	tt	

Dominant traits :- It will get expressed in the next generation

Recessive traits :- It will get suppressed & not expressed in the next generation.

OR

- a) 1) Natural selection 2) Gene flow  
 3) Genetic drift 4) Geographical isolation.  
 b) Bcz it will not include genes.

- 36) a) Beg due to variety of producers & consumers.
- b) Biodegradable                      Nonbiodegradable
- i) It get converts                      - It will not get  
Complex - simple                      Convert by biological  
by biological process                      process.
- ii) It causes less                      - It causes more  
Pollution                      Pollution
- iii) It remain less                      - It remain more  
time in the                      time in the environ-  
environment                      ment.

- 37) i) It helps the farmer to get more yield in short time.
- ii) Farmers gets disease resistant crops.
- iii) It is an easier & less expensive method of propagation.

(or)

Position of testes! - Testes are present outside the body in the scrotum because sperms are produced by the testes only when the temp is less than of our body normal temp.

function of uterus! - Uterus is a bag like structure made of thick three layers of blood vessels which protects the foetus to become baby till the birth of the baby. It nourishes the developing foetus.



38

Cerebrum: i) It is the main thinking part of the brain

- ii) It can maintain all mental abilities
- iii) It is the seat of consciousness, intelligence, memory, reasoning, imagination.
- iv) It controls all voluntary actions.
- v) It can be able to understand various things from sense organs.

Cerebellum: i) It maintains body posture and body balance

- ii) It is responsible for voluntary actions like riding a bicycle, picking up pen etc.

Medulla Oblongata: i) It controls involuntary actions like heart beat, BP, digestion etc.

- ii) It also controls sneezing, vomiting, salivation, coughing.

### PHYSICS

a)

(OR)

a) Hold a current carrying straight conductor in your right hand such that:

Thumb: Indicates the direction of current around conductor.

Four fingers: Indicate the direction of magnetic field.

b) a) They are <sup>continuous</sup> closed ~~connected~~ loop

b) They never intersect each other.

c)

a) By increasing the magnitude of current

b) By increasing no. of turns of coil.

ARUN'S

Adara