

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) Because 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.

$$P = +3D$$

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

$$f = ?$$

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

$$f = \underline{\underline{+0.33m}}$$

iv) 9) 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.

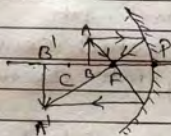
Thumb: Indicates the direction of force

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) $V_1 = 3V$ Total voltage = $V_1 + V_2 + V_3$
 $V_2 = 6V$ $V = 3 + 9 + 6 = 18V$

$V_3 = 9V$

$I = 3A$

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

$I = 3A$

$V = 18V$

$R = ?$

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

$R = 6\Omega$

$R = 6\Omega$

12) a) i) Ohm's law: At constant temp Current is directly proportional P.d across ends.

ii) $I = 0.5$

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

$V = 1.5$

$R = ?$

\therefore Resistance of nichrome wire = 3Ω

- 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 bcz it has high conductivity & low resistivity
 Ebonite is an insulator bcz it has high resistivity.

ii) Nichrome :- Bcz 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 $\approx 2 \times 5 = \underline{10A}$

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

13) a) i) medium A is optically denser, bcz it has ~~more~~ refractive index.

ii) Speed of light is more in medium B bcz speed is inversely proportional to refractive index.

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

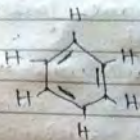
b) $m = \frac{v}{u} = \pm$ v & +ve means real image
 It is convex lens.

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

PART B - CHEMISTRY

vi) 14) c) CaO

15) O



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

17) Soln X: Mg(OH)_2 - Red litmus changes to blue, bcz Mg(OH)_2 is a base.

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

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

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

18) OR

Li - 2, 1

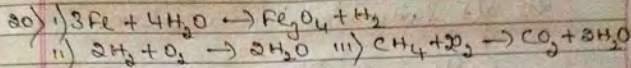
Na - 2, 8, 1

K - 2, 8, 8, 1

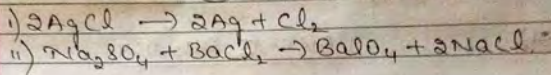
As we move down the group no. of valence electrons remains same, but no. of shells increases, so valence electrons are far from nucleus & hence electrons are set free. So metallic property increases as we move down the group.

19) a) Electrolyte - CuSO_4 soln

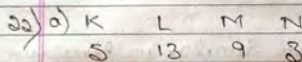
b) coating, painting, galvanising, electroplating,
anodising, greeting, making alloys.



(OR)

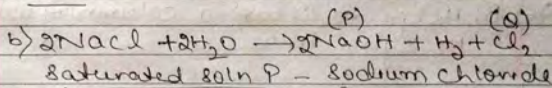


21) Diagram - action of steam on metal:

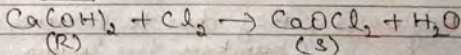


Soln N has maximum H^+ ions

Soln L has maximum OH^- ions.



Gas Q \rightarrow Chlorine.



Basic soln R \rightarrow Calcium hydroxide

Bleaching salt - bleaching powder.

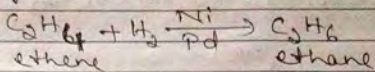
* 23) a) Methanol - CH_3OH

Ethanol - $\text{C}_2\text{H}_5\text{OH}$

Propanol - $\text{C}_3\text{H}_7\text{OH}$

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, Bcg due to presence of 4 chambers the animal get efficient supply of O_2 .

29) Bcg due to change in DNA copying

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

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

32) Diagram - human excretory system.

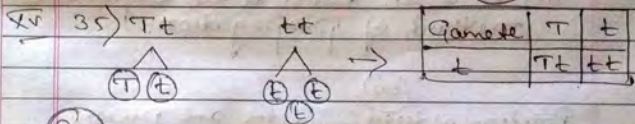
- 33) a) Local people b) Tribal people who live in forest
 c) Forest department
 d) Industrialist.

(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.

(P₁)



(P₂)

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

Dominant trait :- It will get expressed in the next generation.

Recessive trait :- 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) Big due to variety of products & containers.
- | | |
|-------------------------------------------------------------------|----------------------------------------------------------|
| b) <u>Biodegradable</u> | <u>Nonbiodegradable</u> |
| i) It gets converted
Complex - simple
by biological process | - It will not get
converted by biological
process. |
| ii) It causes less
pollution | - It causes more
pollution |
| iii) It remains less
time in the
environment | - It remains more
time in the environ-
ment. |

- 37) i) It helps the farmer to get more yield in short time.
- ii) Farmers get 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 able to understand various things from sense organs.

- Cerebellum: i) It maintain 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 control sneezing, vomiting, salivation, coughing.

PHYSICS

- 9) OR
- a) Hold a current carrying straight conductor in your right hand such that :-
 - Thumb: Indicates the direction of current
 - Four fingers: Indicates the direction of magnetic field.

- b) a) They are closed ^{continuous} ~~connected~~ loop
- b) They never intersect each other.
- c) a) By increasing the magnitude of current
- b) By increasing no. of turns of coil.