10TH CLASS
PRE-FINAL EXAMINATIONS (2021-2022)
PHYSICAL SCIENCE
PRINCIPLES OF EVALUTIONS

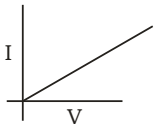
SECTION – I (12x1/2=6M)

1. 5
2. B
3. Bleaching powder
4. A – Q, B - R
5. C
6. D
7. B
8. D
9. D
10. Bauxite
11. C
12. BF_3

Each ½ Mark

SECTION – II (8x1=8M)

13.



--------1 M

14. Refractive index of the prism, $n = \frac{Sin\left(\frac{A+D}{2}\right)}{Sin\frac{A}{2}}$

n= Refractive index of the prism, A= Angle of prism, D= Angle of minimum deviation --------1 M

15. Benzene --------1 M

16.

n	l	m_l	m_s
3	0	0	+ ½

--------1 M

17. Electrolytic and Distillation processes --------1 M

18. i) Lenses are used in telescopes and microscopes
ii) Lenses are used in binoculars, cinema projectors and cameras
iii) Lenses are used in correction of eye defects
(Write any two applications) --------1 M

19. i) **Anomalous pair of electrons :** Certain elements of highest atomic weights precede those with lower atomic weights.
ii) **Dissimilar elements placed together:** elements with dissimilar properties were placed in same group as sub-group A and sub-group B.
(Write any one point) --------1 M

20. The tendency of atoms to achieve eight electrons in their outermost shell is known as Octet rule --------1 M

SECTION – III (8x2=16M)

21. Thermite process is the reaction of metal oxides with Aluminium produces molten metal --------1 M
Applications in daily life: i) To join cracked machine parts ii) To join railings of railway track --------1 M

22. Total internal reflection is the main reason for brilliance of diamonds. --------1 M
The critical angle of a diamond is very low (24.4^0).So if a light ray enters a diamond it is very likely to undergo total internal reflection which makes the diamond shine --------1 M

23. Acid solution, Beaker, Graphite rods, Bulb, 230V AC plug, Connecting Wires --------2 M

24. In parallel connection, if any electric appliance is not working, remaining are don't get off. --------1 M
In series connection, if any electric appliance is not working, remaining are get off. --------1 M

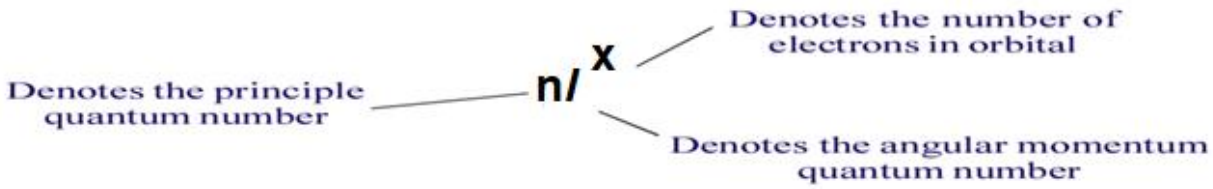
25. a) Myopia --------1 M
b) $f = \frac{100}{P} = \frac{100}{-2} = -50\ cm$ --------1 M

26. Given m_1= 50g T_1=20^0C
m_2= 50g T_2=40^0C
--------1 M

Final temperature of mixture, $T = \frac{m1T1+m2T2}{m1+m2} = \frac{50X20+50X40}{50+50} = \frac{1000+2000}{100} = \frac{3000}{100} = 30^0$C --------1 M

27. The shorthand notation of electronic configuration is nl^x. --------1 M

This gives the information as follows



Useful of $n/^x$ method:

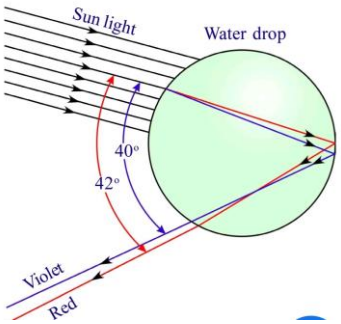
i. To write the electronic configuration of an atom.

ii. To find the position of electrons around the nucleus in an atom. --------1 M

28 In ionic compounds the ions are bounded by strong electrostatic force of attractions. But covalent compounds the atoms are bounded by weak forces. So covalent compounds have low melting points. --------2 M

SECTION – IV (5x4=20M)

29. i) The rainbow are due to dispersion of the sunlight by millions of tiny water droplets.



ii) Let us consider the case of an individual water drop.

iii) The rays of sunlight enter the drop near its top surface.At this first refraction, the white light is dispersed into its spectrum of colours, violet being deviated the most and red the least.

iv) Reaching the opposite side of the drop, each colour is reflected back into the drop because of total internal reflection.

v) At the second refraction the angle between red and violet rays further increases when compared to the angle between those at first refraction.

vi) The angle between the incoming and outgoing rays can be anything between 0^0 and about 42^0 .

vii) We observe bright rainbow when the angle between incoming and outgoing rays is near the maximum angle of 42^0 .

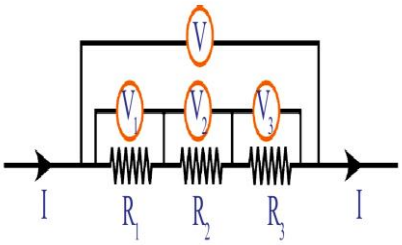
(Write any four relevant points 4x1=4 M)

(OR)

In series connection of resistors there is only one path for the flow of current in the circuit. .Hence, the current in the circuit is equal to I

According to Ohms law

$V_1=IR_1$; $V_2=IR_2$; $V_3=IR_3$



Let R be the equivalent resistance of the combination of resistors in series.

Also $V=IR_{eq}$

$V= V_1+V_2+V_3$

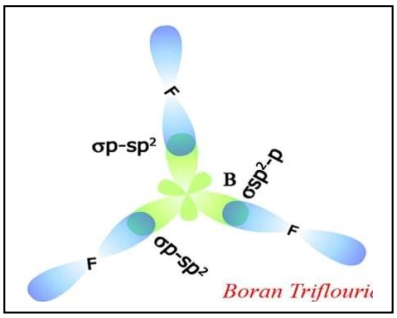
$IR_{eq}=IR_1+IR_2+IR_3$

$IR_{eq}=I (R_1+R_2+R_3)$

$R_{eq}=R_1+ R_2+ R_3$

The sum of individual resistances is equal to their equivalent resistance when the resistors are connected in series. --------4 M

30. **Formation of BF_3:-**



a) B(z=5) has electronic configuration $1s^2\ 2s^2\ 2p^1_x$

b) The excited electronic configuration of B is $1s^2\ 2s^1\ 2p^1_x 2p^1_y$

c) As it forms three identical B-F bonds in BF_3

d) It is suggested that excited B atom undergoes hybridization.

e) There is an intermixing of 2s, $2p_x$, $2p_y$ orbitals and their redistribution into three identical orbitals called sp^2 hybrid orbitals

f) For three sp^2 orbitals to get separated to have minimum repulsion the angle between any two orbitals is 120^0 at the central atom.

g) Now three fluorine atoms overlap their $2p_z$ orbitals containing unpaired electrons. [F (z=9) $1s^2 2s^2 2p^2_x 2p^2_y 2p^1_z$] the three sp^2 orbitals of B that contain unpaired electrons to form three σsp^2-p bonds.

---------Write any six relevant points (3M) and Diagram (1M)

(OR)

The lowest-energy orbitals are filled first. --------1 M

Two general rules help us to predict electronic configurations.

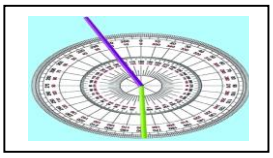
1. Electrons are assigned to orbitals in order of increasing value of (n+*l*).

2. For sub-shells with the same value of (n+*l*), electrons are assigned first to the sub-shell with lower 'n'. ----1M
Ex: In Scandium(Z=21), first twenty electrons can be accommodated in 1s,2s,2p,3s,3p and 4s orbitals.
The last electron can enter into either 3d or 4p orbital

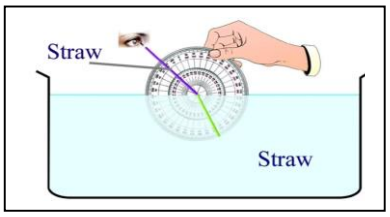
Orbital	**(n+*l*) value**
3d	3+2=5
4p	4+1=5

Both orbitals have (n+*l*) value. But 3d orbital is least "n" value. So last electron enter into 3d orbital. ------2M

31. i) Take a Plastic Pro circle arrange two straws at the centre of the pro circle in such a way that they can be rotated freely about the centre of the pro circle as shown in the fig.



ii) Adjust one of the straws to make an angle 10^0.



iii) Immerse half of the pro circle vertically into the water, filled in a transparent vessel.
vi) While dipping, verify that the straw at 10^0 is inside the water.
vi) From the top of the vessel try to view the straw which is inside the water as shown in fig.
vii) Then adjust the other straw which is outside the water until both straws appear to be in a single straight line.
viii) Then take the pro circle out of the water and observe the two straws on it. You will find that they are not in a single straight line.
ix) Measure the angle between the normal and second straw. Note the value in the able.

i	r	sin i	Sin r	Sin i/sin r

x) Do the same for various angles. Find the corresponding angles of refraction and note them in the table.
xi) You will observe that in the above activity, 'r' is greater than 'i' in all cases when light ray travels from denser medium to rarer medium.

(Aim--------1 M, Materials--------1 M, Procedure --------2 M)

(OR)

Aim: The rate of evaporation of liquid depends on its surface area and vapour already present in surrounding air

Apparatus: Two dishes of different surface area and water

Procedure (1): 1) Take two dishes of different surface area
2) Pour equal amounts of water in the both dishes
3) Keep aside for 2 to 3 hours
4) Observe them after sometime. Dish with more surface area has less quantity of water than the dish having less surface area

-----2M

Conclusion: This shows evaporation increases with increasing of surface area

Procedure (2): 1) Take two dishes of equal surface area containing water
2) This experiment should be conducted on more humidity day and less humidity day
3) We may observe that evaporation is less on more humidity day due to more vapour in the air

----2M

Conclusion: Hence the rate of evaporation depends upon vapour already present in surrounding air

32. a) Basic --------1 M
b) Milk of magnesia --------1 M
c) Strong acid --------1 M
d) Above 7 to 14 --------1 M

(OR)

a) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$ --------1 M
b) 3^{rd} period and 17 group --------1 M
c) Halogen family --------1 M
d) 1 --------1 M

33.

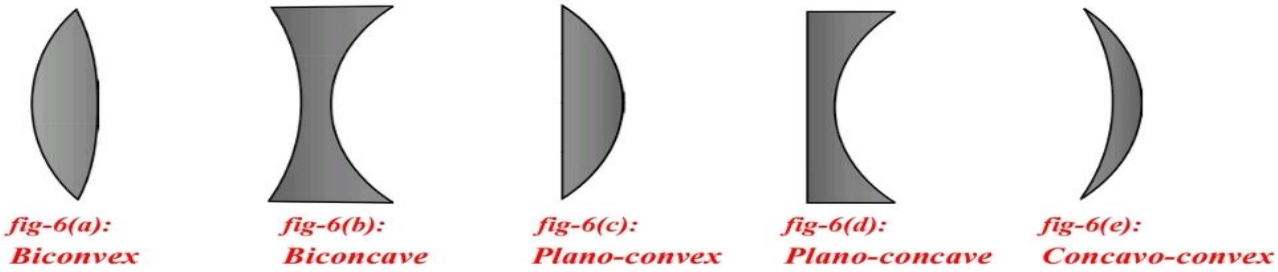


fig-6(a): Biconvex *fig-6(b): Biconcave* *fig-6(c): Plano-convex* *fig-6(d): Plano-concave* *fig-6(e): Concavo-convex*

-------Draw any four lenses(4M)

(OR)

Reverberatory furnace ---------1M

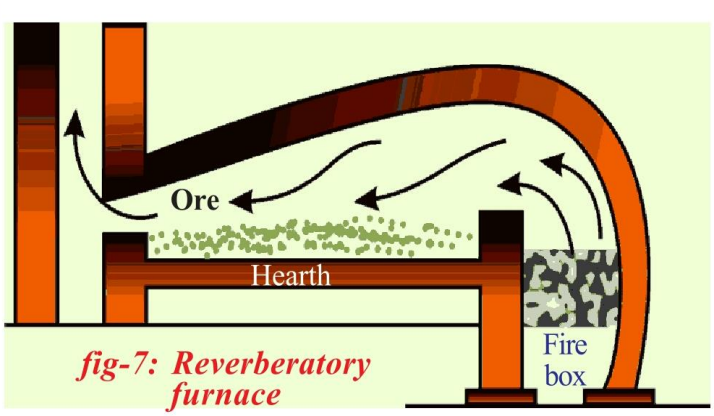


fig-7: Reverberatory furnace

Diagram and parts -------3M