BK BIRLA CENTRE FOR EDUCATION
SARALA BIRLA GROUP OF SCHOOLS
SENIOR SECONDARY CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL

INDIAN PUBLIC SCHOOLS' CONFERENCE

MARKING SCHEME PRE-BOARD -1 (2023-24)

SCIENCE (086)

Class: X   **Duration: 3 Hrs**
Date: 13/12/'23   **Max. Marks: 80**

_____

SECTION-A

1. (d) P and S
2. (b) sodium
3. (d) Metal ions gain electrons to become neutral metal atoms
4. (d) only Q and R
5. (b) only baking soda
6. (c) ketone
7. (c) Antacid
8. (c) Pisum sativum
9. (c) only 1, 2 and 4
10. (a) Cilia
11. (b) It is covered by epiglottis.
12. (c) Adrenaline
13. (b) 3:1
14. (c) Acetylcholine
15. Enlarged and erect image can be formed by concave mirror only. So, option (b) is the correct
16. (c) iris

Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, and R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

17. (a) Both A and R are true, and R is the correct explanation of A.
18. (c)Assertion (A) is false but reason (R) is true.
19. a. Both A and R are true, and R is the correct explanation of A..
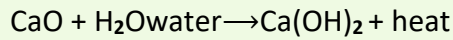20. d. A is false but R is true.

21. Solution:-

(i) The name of the substance used for whitewashing is calcium oxide and its formula is CaO.

(ii) It's reaction with water is-

$$CaO + H_2O \text{water} \longrightarrow Ca(OH)_2 + heat$$

22.

Given : $n_{water} = \frac{4}{3} n_{glass} = \frac{3}{2} v_{glass} = 2 \times 10^8$ m/s $n_{air} = 1$

Speed of light in a medium $v_{medium} = \frac{c}{n}$

where c and n are the speed of light in vacuum and refractive index of medium respectively.

(a) : $v_{glass} = \dfrac{c}{n_{glass}}$

$\therefore 2 \times 10^8 = \dfrac{c}{(3/2)} \implies c = 3 \times 10^8$ m/s

(b) : $v_{water} = \dfrac{c}{n_{water}}$

$\therefore v_{water} = \dfrac{3 \times 10^8}{(4/3)} = 2.26 \times 10^8$ m/s

23. We know that, R= ρl/A = 4 Ω.
Now, R'= ρl'/A'= ρl/2/2A
R'=ρl/4A=R4 = 1 Ω.   2

OR

    In the following experiment:
Whenever a current carrying conductor is placed in a magnetic field then the conductor will experience a magnetic force. This happens because the current in the conductor has its own magnetic field and there is also a magnetic field present. So both the field will interact and will result in repulsion or attraction of the conductor wire toward the magnets.
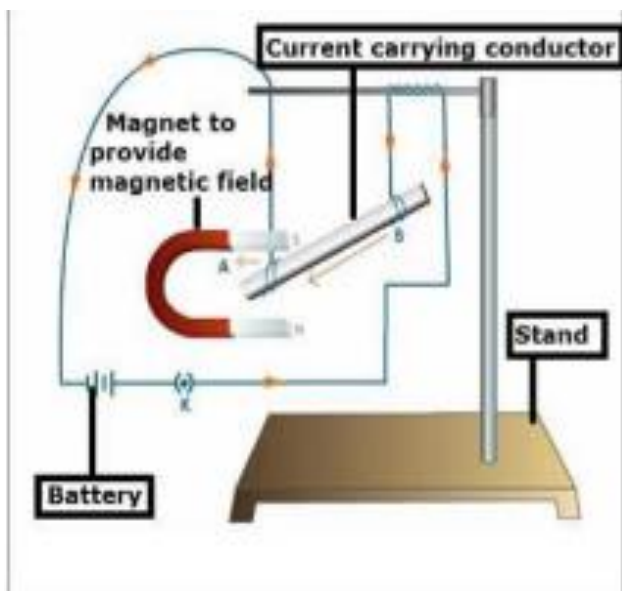
24. A synapse is a gap between two neurons.
    At the synapse, the electrical signals are converted into chemicals or neurotransmitters that can easily cross the gap and pass on to the next neuron where they again get converted into electrical signals.   1+1

25. They degrade the wastes. Decomposers break down the remains of organisms and replenish the soil with its components.   1+1

26. The purpose of making urine is to filter out waste products (urea or uric acid) from the blood. And eliminate from our body. urinary bladder and urethra.   1+1

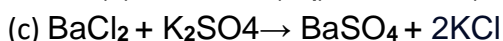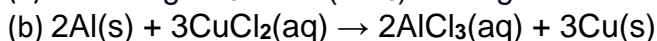<div align="center">OR</div>

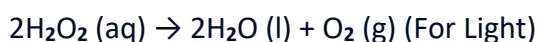Why do arteries have thick and elastic walls whereas veins have valves?   2
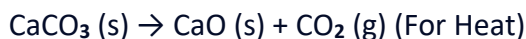
<div align="center">SECTION C</div>

<div align="center">**Question No. 27 to 33 are short answer questions**</div>

27. Write the balanced chemical equations for the following reaction.   3
    (a) $Zn + 2AgNO_3 \rightarrow Zn(NO_3)_2 + 2Ag$
    (b) $2Al(s) + 3CuCl_2(aq) \rightarrow 2AlCl_3(aq) + 3Cu(s)$
    (c) $BaCl_2 + K_2SO4 \rightarrow BaSO_4 + 2KCl$

<div align="center">OR</div>

$CaCO_3 (s) \rightarrow CaO (s) + CO_2 (g)$ (For Heat)
$2H_2O_2 (aq) \rightarrow 2H_2O (l) + O_2 (g)$ (For Light)
$2H_2O (l) \rightarrow 2H_2 (g) + O_2 (g)$ (For Electricity).

28. (a)

:Ö.   3

    (b)

Metals	Non-Metals
Metals react with Oxygen to **form basic oxides** .	Non- Metals react with Oxygen to **form acidic or neutral oxides** .
Most metals **displace Hydrogen** from dilute acids.	Non-metals **do not react** with dilute acids.
Only a few metals **combine with Hydrogen** to **form Ionic Hydrides.** . (Eg: Na, Ca)	Non-Metals **combine with Hydrogen** to **form Covalent hydrides** .
Most metals **displace Hydrogen from water/steam** to form Metal Hydroxides.	Usually, non-metals **do not react with water/steam** .
Metals react with Cl to **form Ionic Chlorides**	Non-metals react with Cl to **form Covalent Chlorides**

29. Dispersion - The splitting of white light into seven colours on passing through a prism. Velocity is directly proportional to wavelength given constant frequency. So yellow will have greater wavelength than blue as the velocity of yellow light is greater than blue.

30. Explain the following: 3
 (a) In a series arrangement, the current decreases as the voltage divides in each circuit component, resulting in heat loss and malfunctioning of the electrical appliances. 1+1+1
 (b) Resistance (R) of a wire is inversely proportional to its area of the cross-section (A)
 (c) Copper and aluminium wires are generally used for electricity transmission as they have low resistivity.

31. The field lines inside the solenoid are in the form of parallel straight lines along the axis of solenoid. Thus the solenoid behaves like a bar magnet. One end of solenoid behaves as a magnetic North pole while the other end behaves as the South Pole. We can determine the magnetic poles formed in a solenoid clock rule. We can determine the north and the south poles of the solenoid by bringing a north pole of a magnet near to anyone end of the solenoid. If the magnet is attracted it is unlike pole (south) and if it is repelled it is like pole (north).

. 1+1+1.
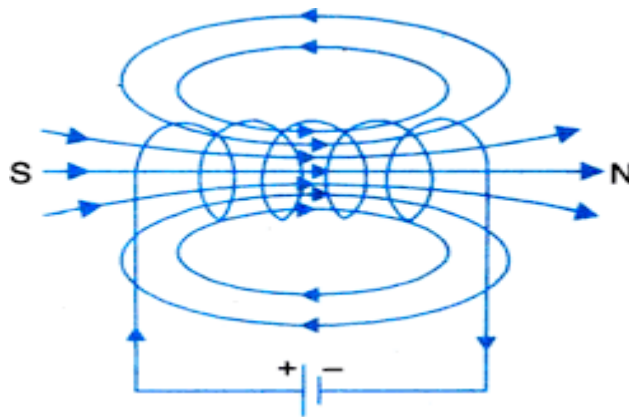
32. a) 10000J because only 10 % of energy is available for the next trophic level.   1
    b) No, since the loss of energy at each step is so great that very little usable energy
       will remain after 4 trophic levels.   1.

33. Human excretory system includes organs that facilitate the removal of nitrogenous wastes from the body. The main excretory organs include kidney, ureter, urinary bladder and urethra. Kidneys filter the blood and urine is the filtrate obtained. The kidneys are bean-shaped and are located in the abdominal cavity. The right kidney is slightly lower in the body than the left kidney. Ureters are tubes carrying urine to sac like structure called urinary bladder. Urethra is the opening which excretes urine out of body.
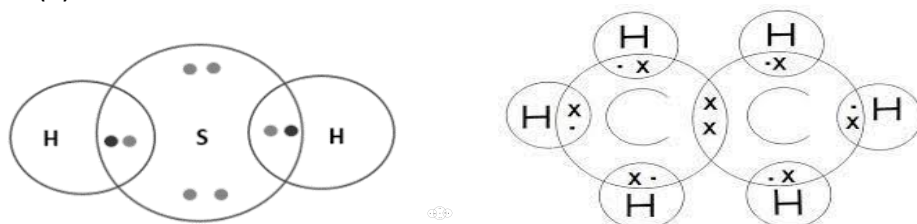
dia 1+label 1+exp 1=3
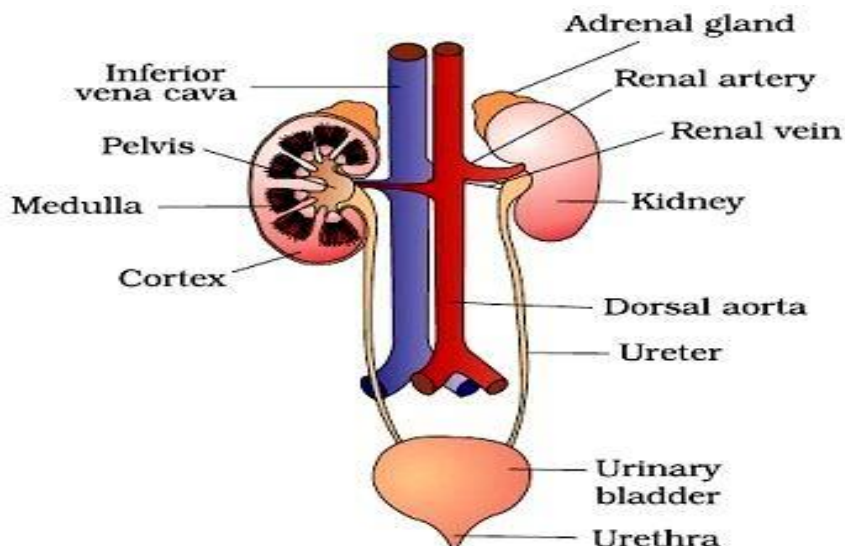
34. (a)

(b) Addition of hydrogen to an unsaturated carbon compound is called hydrogenation reaction In industry, hydrogenation reaction is used for preparing vegetable ghee from vegetable oils. Food industry, petrochemical industry and the pharmaceutical manufacturing industry.

OR

(a) A homologous series is a series of carbon compounds that have different numbers of carbon atoms but contain the same functional group. For example, methane, ethane, propane, butane, etc. are all part of the alkane homologous series.

(b) The reaction of carboxylic acid with alcohol forms an ester. This process of formation of ester is called esterification.
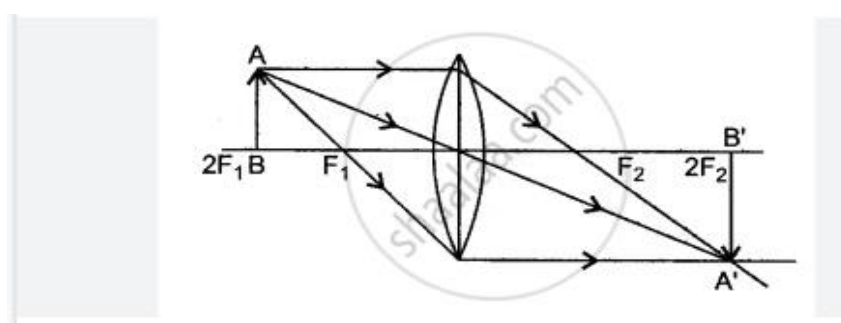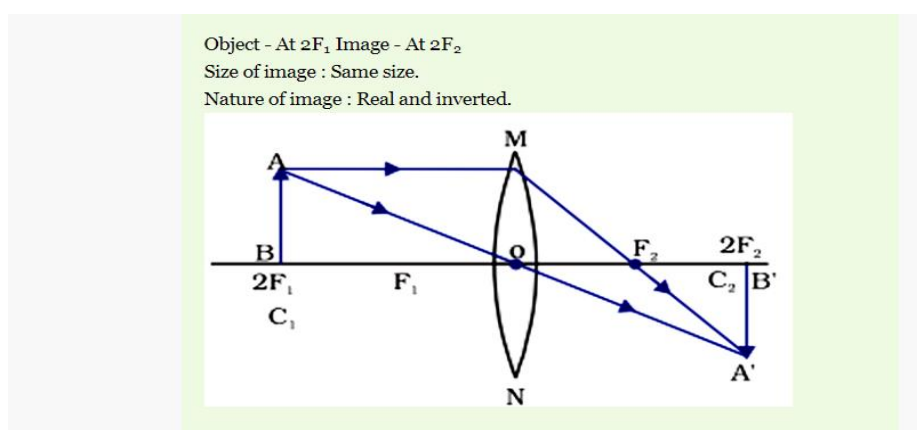
$$CH_3COOH + CH_3CH_2OH \rightarrow CH_3COOCH_2CH_3 + H_2O.$$

35.   5

(a) convex lens

(b) .

Object - At $2F_1$ Image - At $2F_2$
Size of image : Same size.
Nature of image : Real and inverted.

OR

Given: u = −20 cm

f = R/2 = 15 cm

Size of image, h = 5 cm

Let size of image be h′

From mirror formula, $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$

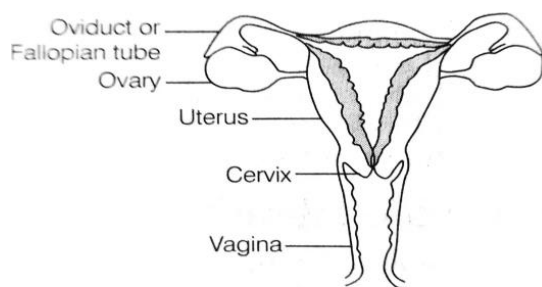$\frac{1}{-20} + \frac{1}{v} = \frac{1}{15}$

$v = \frac{60}{7} = 8.57$ cm

The image is formed 8.57cm behind the mirror. It is virtual and erect.

Magnification, m = −v/u = 8.57/20 = 0.428

Also, m = h′/h = h′/5

From above, h′/5 = 0.428

h′ = 2.14 cm

36 a) human female reproductive system   dia-1+label=2

Female reproductive system

   b) only one egg   1
   c) In fallopian tube or oviduct   1
   d) Menstrual cycle takes place . 1

SECTION E

**Question No. 37 to 39 are case-based/data -based questions with 2 to 3 short sub-parts.
   Internal choice is provided in one of these sub-parts.**
**Q37.** (a) calcium sulphate hemihydrate, ($CaSO_4 . \frac{1}{2} H_2O$)   (2+2)

   (b) Write the equation of formation of plaster of paris by heating gypsum?

$$CaSO_4 . 2H_2O(s) \xrightarrow{120°C} CaSO_4 . \frac{1}{2}H_2O(s) + \frac{3}{2}H_2O(g)$$

Gypsum   Plaster of paris   Water
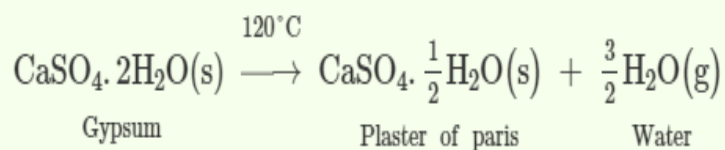
OR

(b) **Uses of plaster of Paris are:**

- Used in making casts and patterns for moulds and statue.
- Used as cement in ornamental casting and for making decorative materials.
- Used as a fire proofing material and for making chalks.
- Used in hospitals for immobilising the affected part in case of bone fracture or strain.
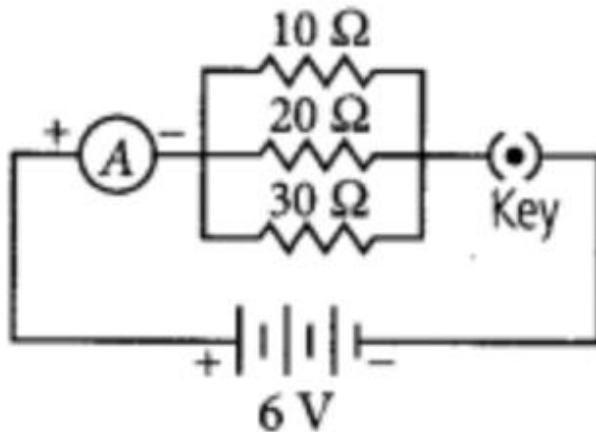
38. (1+1+2)

battery = 2V + 2V + 2V = 6 V
Current through 10 Ω resistance,
I_{10} = V /R = 6/10 = 0.6 A
Current through 20 Ω resistance,
I_{20} = V /R = 6/20 = 0.3 A
Current through 30 Ω resistance,
I_{20} = V /R = 6/30 = 0.2 A
[2 marks]
(b) Total current in the circuit, I = I_{10} + I_{20} + I_{30}
= 0.6 + 0.3 + 0.2 = 1.1 A
[1 mark]
(c) Total resistance of the circuit - As the resistors are connected in parallel,
$1/R_p$ = 1/10 + 1/20 + 1/30
$1/R_p$ = 60/11 = 5.45 Ω
[2 marks]

39. a) In F1 all seeds are round because dominant trait expressed itself.   1
b) In F2 both traits expressed themselves. some were round and some were wrinkled 1
c) Offspring's with 3 types of genotypes were   formed i.e. RR,Rr,rr   2
OR
Rr has dominant trait ,R ,so it is round whereas in rr dominant trait is absent only
recessive traits are present so seeds are wrinkled.

*** Best of luck***