



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



PRE-BOARD EXAMINATION-1 (2023-24)

SCIENCE (086)

Class: X

Date: 13/12/'23

Duration: 3 Hrs

Max. Marks: 80

Admission No:

Roll No:

General Instructions:

Read the following instructions carefully.

- i. This question paper consists of 39 questions in 5 sections.*
- ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*
- iii. Section A consists of 20 objective type questions carrying 1 mark each.*
- iv. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.*
- v. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.*
- vi. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.*
- vii. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.*

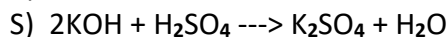
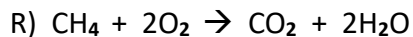
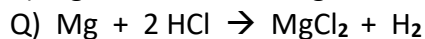
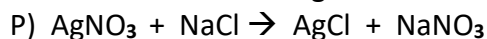
SECTION-A

Select and write the most appropriate option out of the four options given for each of the questions 1 - 20. There is no negative mark for incorrect response.

1. Some types of chemical reactions are listed below.

- decomposition
- combination
- displacement
- double displacement

Which two of the following chemical reactions are of the SAME type?



- (a) P and Q (b) Q and R (c) R and S (d) P and S

2. Metals are lustrous and shine especially when their freshly cut surfaces are exposed. Sanjay cut pieces and compared the lustre of the freshly cut surfaces of the following metals.

Aluminium, sodium, copper, iron.

The freshly cut surface of which of these metals is likely to lose its lustre first on exposure to air?

- (a) aluminium (b) sodium (c) copper (d) iron

3. During purification of a metal by electrolysis, what happens at the negative electrode?
- Metal ions lose electrons to become neutral atoms
 - Neutral metal atoms gain electrons to become ions
 - Neutral metal atoms lose electrons to become ions
 - Metal ions gain electrons to become neutral metal atoms
4. Galvanisation is a process of coating iron articles with a layer of zinc to prevent the iron from rusting. The iron is protected even if the zinc coating is scratched and iron is exposed. Which of the following is true about how zinc prevents the rusting of iron?
- A galvanised iron article does not undergo oxidation.
 - The zinc coating prevents contact of iron with air.
 - Zinc undergoes corrosion more easily than iron.
- (a) only P (b) only Q (c) only P and Q (d) only Q and R
5. Neel has two test tubes containing dilute hydrochloric acid and dilute sodium hydroxide solution, but they are not labelled. Adding which of the following solutions to the test tubes will help him visually identify the acidic and basic solution?
- (a) only vinegar (b) only baking soda (c) only sodium chloride (d) either vinegar or sodium chloride
6. Butanone is a four-carbon compound with the functional group
- (a) carboxylic acid (b) aldehyde (c) ketone (d) alcohol
7. Which one of the following types of medicines is used for treating indigestion?
- (a) Antibiotic (b) Analgesic (c) Antacid (d) Antiseptic
8. Mendel conducted his famous breeding experiments by working on the following:
- (a) *Drosophila* (b) *Escherichia Coli* (c) *Pisum sativum* (d) All of these
9. Which of the following method/s are useful to prevent fertilisation even when ovulation occurs?
- 1) Tubectomy. 2) Copper-T 3) oral pills 4) condom
- (a) only 1 (b) only 2 and 3 (c) only 1, 2 and 4 (d) only 2, 3 and 4
10. Which of the following structures functions by filtering and keeping the mucus and dirt away from our lungs?
- (a) Cilia (b) Bronchioles (c) Hairs in the lungs (d) All of the above
11. Which one of the following statements is false about the trachea?
- Has C-shaped rings
 - It is covered by epiglottis
 - It splits into the right and left lungs
 - None of the above
12. The hormone responsible for the fight-or-flight response during stressful situations is:
- (a) Insulin (b) Thyroxine (c) Adrenaline (d) Estrogen
13. In peas, a pure tall (TT) is crossed with a pure short plant (tt). The ratio of pure tall plants to pure short plants in the F₂ generation is:
- (a) 1:3 (b) 3:1 (c) 1:1 (d) 2:1

14. The chemical neurotransmitter released at the neuromuscular junction for muscle contraction is:

- (a) Serotonin (b) Dopamine (c) Acetylcholine (d) Adrenaline

15. An erect and enlarged image can be formed by

- (a) only a convex mirror (b) only a concave mirror
(c) only a plane mirror (d) both convex and concave mirrors.

16. The muscular diaphragm that controls the size of the pupil is

- (a) cornea (b) ciliary muscles (c) iris (d) retina

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. **Assertion:** Carbon is the only element that can form large number of compounds.

Reason: Carbon is tetravalent and shows the property of catenation.

18. **Assertion:** The magnitude of the magnetic field at a point on the axis of a current carrying solenoid is inversely proportional to the current flowing through the solenoid.

Reason: The magnitude of the magnetic field at a point on the axis of a current carrying solenoid is directly proportional to the number of turns per unit length of a solenoid.

19. **Assertion:** A nerve impulse is an electrochemical event.

Reason: In a nerve impulse there are changes in the resting potential which spreads the nerve fibre.

20. **Assertion:** Variations always provide a survival advantage to an organism.

Reason: Variations can be caused due to incorrect DNA copying.

SECTION B

Question No. 21 to 26 are very short answer questions

21. A solution of a substance 'X' is used for whitewashing.

2

- (a) Name the substance 'X' and write its formula.
(b) Write the reaction of the substance 'X' named in (i) above with water.

22. The absolute refractive index of glass and water are $\frac{3}{2}$ and $\frac{4}{3}$, respectively. If the speed of light in glass is 2×10^8 m/s, calculate the speed of light in :

2

- (a) vacuum
(b) water

23. A wire of given material having length l and area of cross-section A has a resistance of 4Ω . What would be the resistance of another wire of the same material having length $l/2$ and area of cross-section $2A$? 2

OR

Explain with the help of suitable diagram, force experienced by a current carrying conductor in external magnetic field?

24. What happens at the synapse between two neurons? 2
25. Why bacteria and fungi are called decomposers? List some advantages of decomposers in environment. 2
26. What is the purpose of making urine in the human body? Name the organs that stores and releases the urine.

OR

- Why do arteries have thick and elastic walls whereas veins have valves? 2

SECTION C

Question No. 27 to 33 are short answer questions

27. Write the balanced chemical equations for the following reaction. 3

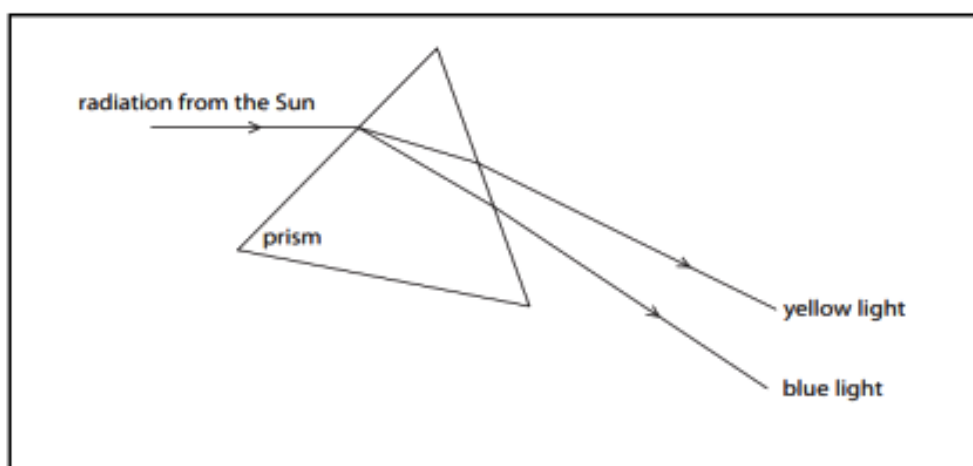
- (a) Zinc + Silver nitrate \rightarrow Zinc nitrate + Silver.
(b) Aluminium + Copper chloride \rightarrow Aluminium chloride + Copper.
(c) Barium chloride + Potassium sulphate \rightarrow Barium sulphate + Potassium chloride.

OR

Write one equation each for decomposition reactions where energy is supplied in the form of heat, light or electricity.

28. (a) Write the electron-dot structures for oxygen. 3
(b) Differentiate between metal and non-metal on the basis of their chemical properties.

29. 3

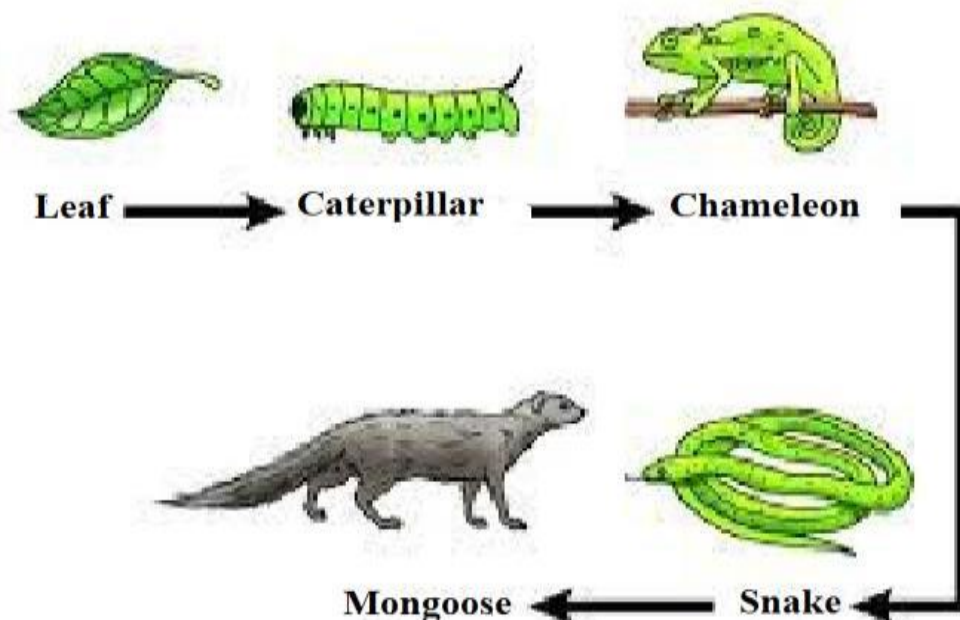


State the phenomena observed in the above diagram. Explain with reference to the diagram, which of the two lights mentioned above will have the higher wavelength? How will you use two identical prisms so that a narrow beam of white light incident on one prism emerges out of the second prism as white light?

30. Explain the following: 3
- (a) Why is the series arrangement not used for domestic circuits?
(b) How does the resistance of a wire vary with its area of cross-section?
(c) Why copper and aluminium wires are usually employed for electricity transmission?

31. How does a solenoid behave like a magnet? Draw the pattern of magnetic field lines around a solenoid. Can you determine the north and south poles of a current-carrying solenoid with the help of a bar magnet? Explain. 3

32. Study the food chain given below and answer the questions that follow: 3



(a) If the amount of energy available at the third trophic level is 100 joules, then how much energy will be available at the producer level? Justify your answer.

(b) Is it possible to have 2 more trophic levels in this food chain just before the fourth trophic level? Justify your answer.

33. Explain human excretory system with a neat labelled diagram. 3

SECTION D

Question No. 34 to 36 are long answer questions.

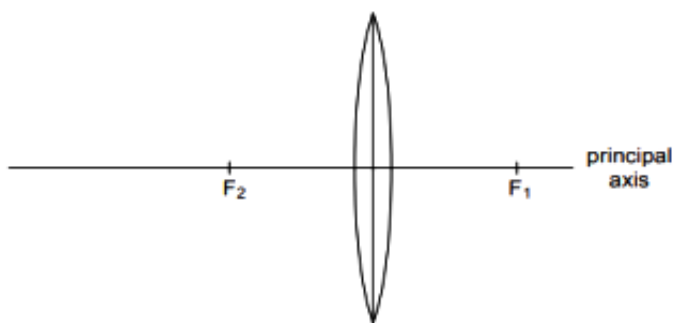
34. (a) Draw the electron dot structures for:
(i) H_2S (ii) Ethane 5

(b) What is hydrogenation? What is its industrial application?

OR

(a) What is an homologous series? Explain with an example.

(b) Explain esterification reaction with suitable chemical equation.



- (a) What is the kind of lens shown in the above figure?
- (b) Draw well labelled ray diagrams for image formation by above mentioned lens when.
 - (i) Object is at $2F_1$
 - (ii) Object between F_1 and $2F_1$

OR

An object 5.0 cm in length is placed at a distance of 20 cm in front of a convex mirror of radius of curvature 30 cm.

- (a) Find the position of the image,
 - (b) Nature and size of image
 - (c) Draw a ray diagram to show the formation of the image as mentioned in the part (i).
36. (a) Draw neat labelled diagram of human female reproductive system. 5
- (b) How many eggs are produced every month by either of the ovaries in a human female?
 - (c) In which part of the human female reproductive system does the fertilization takes place?
 - (d) What happens in case the eggs released by the ovary are not fertilized?

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.

37. Answer the following questions on the basis of the above paragraph:

On heating gypsum at 373 K, it loses water molecules and becomes calcium sulphate hemihydrate ($\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$). This is called Plaster of Paris. Plaster of Paris is a white powder and on mixing with water, it changes to gypsum once again giving a hard solid mass.

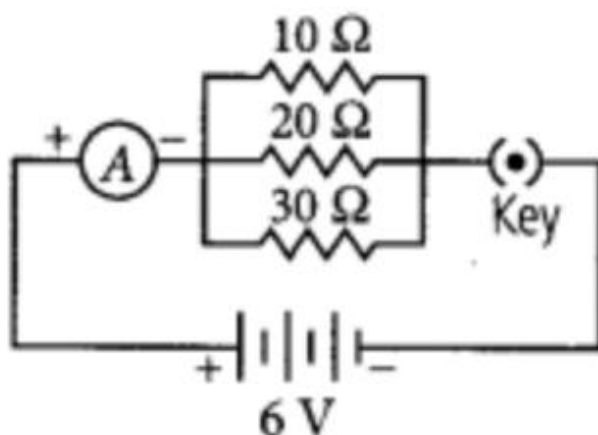
Water of crystallisation is the fixed number of water molecules present in one formula unit of a salt. Five water molecules are present in one formula unit of copper sulphate. Chemical formula for hydrated copper sulphate is $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$. Now you would be able to answer the question whether the molecule of $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ is wet. (2+2)

- (a) What is the chemical name and molecular formula of POP?
- (b) Write the equation of formation of plaster of paris by heating gypsum?

OR

- (b) What are the uses of Plaster of Paris?

38. Divesh and Rohan demonstrated a circuit which is shown below where a circuit consisting of a battery of 3 cells of 2 V each, a combination of three resistors of $10\ \Omega$, $20\ \Omega$ and $30\ \Omega$ connected in parallel, a plug key and an ammeter, all connected in series. Based on their demonstrated circuit answer the following questions:



(1+1+2)

- (a) Current through 10-ohm resistor
- (b) Current through 20-ohm resistor
- (c) Total current in the circuit

OR

- (c) Total effective resistance of the circuit?

39. Read the following case based paragraph and answer the questions:

Pure bred pea plant with Round seeds (dominant characteristic RR) were crossed with pure bred pea plant with wrinkled seeds (recessive characteristic rr) . The F1 generation was self-pollinated to give rise to the F2 generation. In the F1 generation, wrinkled seed trait is recessive trait which was not expressed and their genotype was Rr . After self-pollination, the recessive trait (rr) gets expressed in F2 generation. New genotypes were formed viz. Rr.

Answer the following

(1+1+2)

- (a) What is the expected observation of the F1 generation of plants?
- (b) What is the expected observation of the F2 generation of plants?
- (c) What will be the genotypic ration of F2 offspring, also mention whether it will be homozygous or heterozygous ? 2

OR

- (c) Give reason why Rr seeds are round and rr seeds are wrinkled ?

***** Best of luck*****