

# Ld. Bentinck School

## PRE-BOARD EXAMINATION, SESSION (2023-24)

Subject: Science (086)

Marks: 80

Time: 03 Hr, 00 Mins

Student Name: .....

Class -X

### General Instructions:

- i. This question paper consists of 39 questions in 5 sections. (d) Both (B) and (C)
  - 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. Which among the following is (are) double displacement reaction(s)?

- (i)  $\text{Pb} + \text{CuCl} \rightarrow \text{PbCl}_2 + \text{Cu}$                       (ii)  $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$   
(iii)  $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$                               (iv)  $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$   
(a) (i) and(iv)                      (b) (ii)only                      (c) (i) and(ii)                      (d) (iii) and(iv)

2. Which of the following salts does not contain water of crystallisation?

- (a) Blue vitriol                      (b) Baking soda                      (c) Washing soda                      (d) Gypsum

3. At what temperature is gypsum heated to form Plaster of Paris?

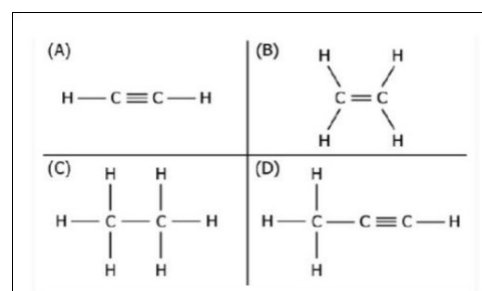
- (a) 35°C                      (b) 70°C                      (c) 80°C                      (d) 100°C

4. The arrangement for Copper, Tin, Lead and Mercury, according to the reactivity series, is:

- a) Tin > Lead > Copper > Mercury                      b) Lead > Copper > Mercury > Tin  
c) Copper > Mercury > Tin > Lead                      d) Mercury > Tin > Lead > Copper

5. The image represents the structure of a few hydrocarbon compounds. Which of these compounds can be classified as alkyne?

- (a) Only (A)                      (b) Only (B)                      (c) Both (A) and (D)



6. Which of the following is the molecular formula of cyclobutene?

- (a) C<sub>4</sub>H<sub>10</sub> (b) C<sub>4</sub>H<sub>6</sub> (c) C<sub>4</sub>H<sub>8</sub> (d) C<sub>4</sub>H<sub>4</sub>

7. Aluminium is used for making cooking utensils. Which of the following properties of aluminium are responsible for the same?

- (i) Good thermal conductivity                      (iv) High melting point  
(ii) Ductility                      (iii) High density  
(a) (i) and (ii)                      (b) (i) and (iii)                      (c) (ii) and (iii)                      (d) (i) and (iv)

8. Generally food is broken and absorbed within the body of organisms. In which of the following organisms it is done outside the body?

- (a) Amoeba                      (b) Mushroom.                      (c) Paramecium                      (d) Lice

9. Receptors are usually located in sense organs. Gustatory receptors are present in -  
(a) Tongue (b) nose (c) eye (d) ear

10. A farmer wants to grow banana plants genetically similar enough to the plants already available in his field. Which one of the following methods would you suggest for this purpose?  
(a) Regeneration. (b) Budding.  
(c) Vegetative propagation. (d) Sexual reproduction

11. Height of a plant is regulated by:  
a) DNA which is directly influenced by growth hormone.  
b) Genes which regulate the proteins directly.  
c) Growth hormones under the influence of the enzymes coded by a gene.  
d) Growth hormones directly under the influence a gene.

12. A sportsman, after a long break of his routine exercise, suffered muscular cramps during a heavy exercise session. This happened due to:  
a) Lack of carbon dioxide and formation of pyruvate. b) Presence of oxygen and formation of ethanol.  
c) Lack of oxygen and formation of lactic acid.  
d) Lack of oxygen and formation of carbon dioxide.

13. An object is placed in front of a convex mirror. Its image is formed :  
a) At a distance equal to the object distance in front of the mirror.  
b) At twice the distance of the object in front of the mirror.  
c) Half the distance of the object in front of the mirror.  
d) Behind the mirror and its position varies according to the object distance.

14. When light enters the atmosphere it strikes on extremely fine particles, which deflect the rays of light in all possible directions, this is due to –  
(a) Reflection of light. (b) Atmospheric refraction.  
(c) Scattering of light (d) Dispersion of light

15. In 1987, an agreement was formulated by the United Nations Environment Programme (UNEP) to freeze the production of “X” to prevent depletion of “Y”. “X” and “Y” respectively referred here are:  
(a) Ozone; CFCs (b) CFCs; rays UV  
(c) CFCs; Ozone (d) UV rays; Diatomic oxygen

16. Which of the following features relates to biodegradable substances?  
a) Broken down by biological processes (b) Remain inert  
c) Persist in environment for long time (d) May harm the ecosystem

**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 (A): The acid must always be added to water with constant stirring.  
Reason (R): Mixing of an acid with water decreases the concentration of H<sup>+</sup> ions per unit volume.

18. Assertion: Probability of survival of an organism produced through sexual reproduction is more than that of organism produced through asexual mode.  
Reason: Variations provide advantages to individuals for survival.

19. Assertion: A compass needle is placed near a current carrying wire. The deflection of the compass needle decreases when the magnitude of the current in the wire is increased.  
Reason: The strength of a magnetic field at a point near the conductor increases on increasing the current.

20. Assertion (A): An ecosystem consists of biotic components and abiotic components.  
Reason (R): Biotic and abiotic components play important roles for the sustenance of life and work independently in all ecosystems.

## **Section- B**

**Question No. 21 to 26 are very short answer questions: [Each question of 2 Marks]**

21. Draw the structures of two isomers of butane.

22. Give the name of the enzyme present in the fluid in our mouth cavity.

State the gland which produces it. What would happen to the digestion process if this gland stops secreting this enzyme?

23. 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?

24. The refractive indices of three media are given below:

Medium	Refractive Index
A	1.6
B	1.8
C	1.5

A ray of light is travelling from A to B and another ray is travelling from B to C.

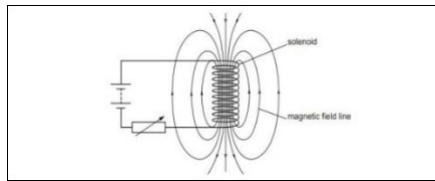
(a) In which of the two cases the refracted ray bends towards the normal?

(b) In which case does the speed of light increase in the second medium? Give reasons for your answer.

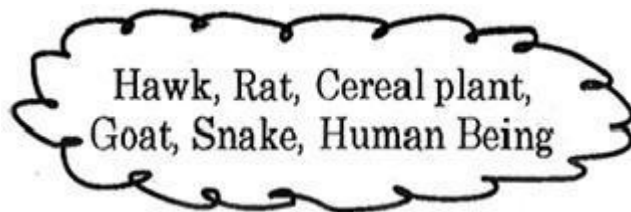
25. A piece of wire of resistance R is cut into three equal parts. These parts are then connected in parallel. If the equivalent resistance of this parallel combination is  $R_1$ , what is the value of the ratio  $R_1:R$ ?

OR

Refer to the image below and state how the magnetic field pattern indicates regions where the magnetic field is stronger outside the magnet? What happens to the magnetic field when the current in the circuit is reversed?



26.



(a) From the following groups of organisms, create a food chain which is the most advantageous for human being in terms of energy.

(b) State the possible disadvantage if the cereal plant is growing in soil rich in pesticides.

**Section-C**

**Question No. 27 to 33 are short answer questions: [Each question of 3 Marks]**

27. Raman took five solutions A, B, C, D and E and tested with universal indicator showed pH as 4, 1, 11, 7 and 9 respectively. Which solution is - A. Neutral

B. Strongly alkaline C. Strongly

acidic D. Weakly acidic E.

Weakly alkaline?

Arrange the pH in increasing order of hydrogen ion concentration.

28. An alkali metal **A** gives a compound **B** (molecular mass = 40) on reacting with water. The compound **B** gives a soluble compound **C** on treatment with Aluminium oxide. Identify A, B, C and give the reaction involved.

**Or**

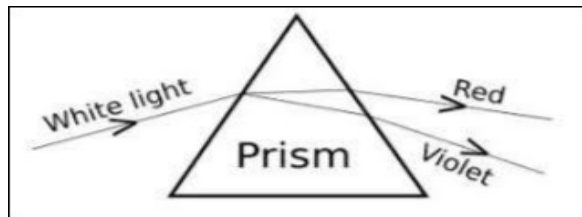
Translate the following statements into chemical equations and balance them:

- A. Lead nitrate is strongly heated
- B. Aluminium granules are mixed with dilute sulphuric acid.
- C. Calcium carbonate is mixed with dilute hydrochloric acid.

29. We are advised to take iodised salt in our diet by doctors. Justify its importance in our body.

30. What is the probability of a girl or a boy being born in a family? Justify your answer.

31. A student observes the below phenomenon in the lab as a white light passes through a prism. Among many other colours, he observed the position of the two colours: Red and Violet.



- (a) What is the phenomenon called?
  - (b) What is the reason for the violet light to bend more than the red light?
  - (c) Draw a ray diagram to show the path of light when two identical glass prisms are arranged together in an inverted position with respect to each other and a narrow beam of white light is allowed to fall obliquely on one of the focus of the first prism.
- 32 (i) State the law that explains the heating effect of current with respect to the measurable properties in an electrical circuit.
- (ii) List the factors on which the resistance of a conductor depends.
33. Ananya responded to the question: Why do electrical appliances with metallic bodies are connected to the mains through a three pin plug, whereas an electric bulb can be connected with a two pin plug? She wrote: Three pin connections reduce heating of connecting wires.
- (i) Is her answer correct or incorrect? Justify.
  - (ii) What is the function of a fuse in a domestic circuit?

### **Section-D**

**Question No. 34 to 36 are long answer questions.**

34. State what happens when: A. Gypsum is heated at 373K

B. Blue crystals of copper sulphate are heated.

C. Excess of carbon dioxide gas is passed through lime water. D. Zinc granules are heated with sodium hydroxide solution.

E. Aqueous solution of barium chloride and copper sulphate are mixed together.

35. Given below are certain situations. Analyze and describe its possible impact on a person: a) Testes of a male boy are not able to descend into scrotum during his embryonic development. b) Vas deferens of a man is plugged.

c) Prostate and seminal vesicles are not functional. d) Egg is not fertilized in a human female.

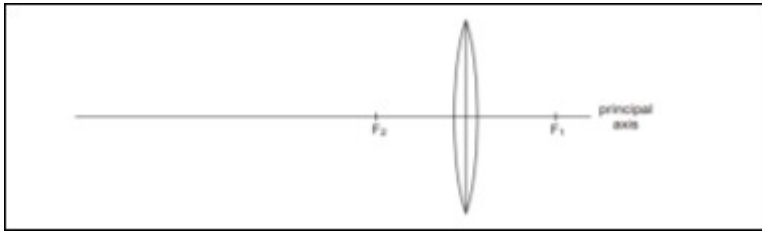
e) Placenta does not attach to the uterus optimally.

OR,

a) A doctor has advised Sameer to reduce sugar intake in his diet and do regular exercise after checking his blood test reports. Which disease do you think Sameer is suffering from? Name the hormone responsible for this disease and the organ producing the hormone.

b) Which hormone is present in the areas of rapid cell division in a plant and which hormone inhibits the growth?

36.



The above image shows a thin lens of focal length 5m.

- What is the kind of lens shown in the above figure?
- If a real inverted image is to be formed by this lens at a distance of 7m from the pole, then show with calculation where should the object be placed?
- Draw a neatly labelled diagram of the image formation mentioned in (ii)

OR,

A 10 cm long pencil is placed 5 cm in front of a concave mirror having a radius of curvature of 40 cm.

- Determine the position of the image formed by this mirror.
- What is the size of the image?
- Draw a ray diagram to show the formation of the image as mentioned in the part (i)

### **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. The table given below shows six organic compounds A, B, C, D, E and F having different molecular formula.

Organic Compound	Molecular Formula
A	$C_7H_{16}$
B	$C_8H_{16}$
C	$C_4H_6$
D	$C_6H_{10}$
E	$C_5H_{10}$
F	$C_9H_{20}$

- Which compound belongs to same homologous series?
- Which is the member of the same homologous series as E?
- Answer any one of the following
  - A and F are saturated hydrocarbons while all others are unsaturated hydrocarbons. Justify.

Or

- What type of compound is B and F?

38. The most obvious outcome of the reproductive process is the generation of individuals of similar design, but in sexual reproduction they may not be exactly alike. The resemblances as well as differences are marked. The rules of heredity determine the process by which traits and characteristics are reliably inherited. Many experiments have been done to study the rules of inheritance.

- Why an offspring of a human being is not a true copy of his parents in sexual reproduction?
- While performing experiments on inheritance in plants, what is the difference between  $F_1$  and  $F_2$  generation?
- Why do we say that variations are useful for the survival of a species over time?

(c) Study Mendel's cross between two plants with a pair of contrasting characters.

RRYY

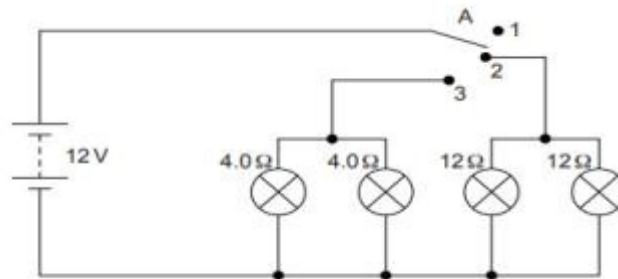
Round Yellow

Wrinkled Green

x  
rryy

He observed 4 types of combinations in F<sub>2</sub> generation. Which of these were new combinations? Why do new features which are not present in the parents, appear in F<sub>2</sub> generation?

39.



Vinita and Ahmed demonstrated a circuit that operates the two headlights and the two sidelights of a car, in their school exhibition. Based on their demonstrated circuit, answer the following questions.

- (i) State what happens when switch A is connected to a) Position 2  
b) Position 3
- (ii) Find the potential difference across each lamp when lit.
- (iii) Calculate the current
  - a) in each 12 Ω lamp when lit.
  - b) In each 4 Ω lamp when lit.

OR

- (iv) Show with calculations, which type of lamp, 4.0 Ω or 12 Ω, has the higher power.

\*\*\*\*\*