



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



**PRE BOARD EXAMINATION 2024-25**  
**SCIENCE (086)**

Class: X  
Date: 16 /11/2024  
Name:

Duration: 3 Hr  
Max. Marks: 80  
Exam RNo.

General Instructions:

1. All questions would be compulsory. However, an internal choice of approximately 33% would be provided. 50% marks are to be allotted to competency-based questions.
2. Section A would have 16 simple/complex MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.
3. Section B would have 6 Short Answer (SA) type questions carrying 02 marks each.
4. Section C would have 7 Short Answer (SA) type questions carrying 03 marks each.
5. Section D would have 3 Long Answer (LA) type questions carrying 05 marks each.
6. Section E would have 3 source based/case based/passage based/integrated units of assessment (04 marks each) with sub-parts of the values of 1/2/3 marks.

SECTION-A

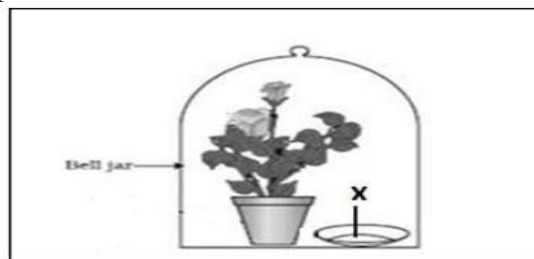
Question 1 to 16 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.

- 1 Pentane has the molecular formula  $C_5H_{12}$ . It has 1
  - (a) 5 covalent bonds
  - (b) 12 covalent bonds
  - (c) 16 covalent bonds
  - (d) 17 covalent bonds
- 2 Generally, when certain metals react with an acid they release gas. 1
  - (a) Nitrogen
  - (b) Oxygen
  - (c) Hydrogen
  - (d) Argon
- 3 Milkiness of lime water disappear when excess  $CO_2$  is passed due to the formation of- 1
  - (a) Calcium hydroxide
  - (b) Calcium chloride
  - (c) Calcium bicarbonate
  - (d) Calcium carbonate
- 4 Oxidation is a process which involves 1
  - (a) addition of oxygen
  - (b) addition of hydrogen
  - (c) removal of oxygen
  - (d) removal of nitrogen
- 5 Which property of metals is used for making bells? 1
  - (a) Sonorousness
  - (b) Malleability
  - (c) Ductility
  - (d) Conductivity

- 6 Which of the following pairs will give displacement reactions? 1
- (a)  $\text{FeSO}_4$  solution and Copper metal  
 (b)  $\text{AgNO}_3$  solution and Copper metal  
 (c)  $\text{CuSO}_4$  solution and Silver metal  
 (d)  $\text{NaCl}$  solution and Copper metal
- 7 Which of the following non-metal is lustrous? 1
- (a) Iodine  
 (b) Oxygen  
 (c) Nitrogen  
 (d) chlorine

- 8 Observe the experimental setup shown below. Name the chemical indicated as 'X' that can absorb the gas which is evolved as a by-product of respiration. 1

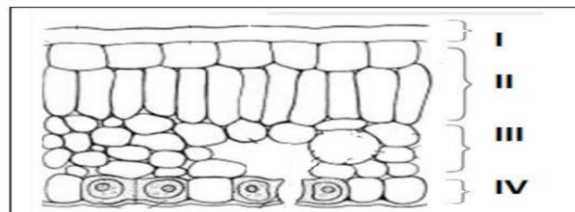
- (a)  $\text{NaOH}$   
 (b)  $\text{KOH}$   
 (c)  $\text{Ca}(\text{OH})_2$   
 (d)  $\text{K}_2\text{CO}_3$



- 9 A sportsman, after a long break of his routine exercise, suffered muscular cramps during a heavy exercise session. This happened due to: 1
- (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.

- 10 In the given transverse section of the leaf identify the layer of cells where maximum photosynthesis occurs. 1

- (a) I, II  
 (b) II, III  
 (c) III, IV  
 (d) I, IV



- 11 There was a cerebellar dysfunction in a patient. Which of the following activities will get disturbed in this patient as a result of this? 1
- (a) Salivation  
 (b) Hunger control  
 (c) Posture and balance  
 (d) Regulation of blood pressure

- 12 A tall pea plant was crossed with a dwarf plant and two types of progenies tall and dwarf are produced in the ratio of 1:1. What are the genotypes of the parents? 1
- (a)  $TT$  and  $tt$   
 (b)  $Tt$  and  $TT$   
 (c)  $Tt$  and  $Tt$   
 (d)  $Tt$  and  $tt$

- 13 Where an object should be placed in front of a convex lens to get a real image of the size of the object? 1
- (a) At the principal focus of the lens  
 (b) At twice the focal length

- (c) At infinity  
(d) Between the optical centre of the lens and its principal focus.
- 14 The human eye can focus on objects at different distances by adjusting the focal length of the eye lens. This is due to; 1  
 (a) Presbyopia.  
 (b) Accommodation.  
 (c) Near-sightedness.  
 (d) Far-sightedness.
- 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: 1  
 (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? 1  
 (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 by 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 functional group present in alcohols is – OH. 1  
 Reason (R): It is the same group as present in water, hence water and alcohol have similar properties.
- 18 Assertion (A): If the lions are removed from a food chain it will not affect the food chain, however if the plants are removed from a food chain it will disturb the ecosystem. 1  
 Reason (R): Plants are producers who can make food using sunlight, while lions are consumers.
- 19 Assertion (A): Amoeba always produces two daughter amoebae while Plasmodium divides into many daughter cells. 1  
 Reason (R): Amoeba undergoes binary fission while Plasmodium undergoes multiple fission.
- 20 Assertion: Linear magnification of a mirror has no unit. 1  
 Reason: The ratio of height of the image to the height of the object is the linear magnification produced by mirror.

### SECTION-B

Question No. 21 to 26 are very short answer questions

- 21 What is the purpose of making urine in the human body? Name the organs that stores and releases the urine. 2
- 22 Why do arteries have thick and elastic walls whereas veins have valves? 2
- 23 Why is respiration considered as an exothermic reaction? Explain. 2
- 24 (a) Write laws of refraction. 2

(b) Light enters from air to glass having refractive index 1.50. What is the speed of light in the glass? The speed of light in vacuum is  $3 \times 10^8 \text{ m s}^{-1}$ .

- 25 Why are coils of electric toasters and electric irons made of an alloy rather than a pure metal? 2

OR

Write factors on what factors does the resistance of a conductor depend? Write the mathematical formula of the above relation.

- 26 Attempt either option A or B 2

A. Bile juice does not have any digestive enzyme but still plays a significant role in the process of digestion. Justify the statement.

OR

B. How does the material like sucrose is transferred into phloem tissue?

### SECTION-C

Question No. 27 to 33 are short answer questions

- 27 (a) In a food chain consisting of snake, insect, grass and frog, assign an appropriate trophic level to frog. 3

(b) What is depicted in the scheme?



(c) Phytoplankton  $\longrightarrow$  Zooplankton  $\longrightarrow$  Fish  $\longrightarrow$  Fish eating Bird.

In this food chain which organisms will have i) Maximum available energy ii) Maximum concentration of pesticides.

- 28 A student dropped few pieces of marble in dilute hydrochloric acid contained in a test tube. 3

The evolved gas was then passed through lime water. What change would be observed in lime water? Write balanced chemical equation for both the change observed?

- 29 (a) Name the main ore of mercury. How is mercury obtained from its ore? 3

(b) Give balanced chemical equation.

(c) What is thermite reaction? How is it used to join the railway tracks or cracked machine parts?

OR

Explain how the following metals are obtained from their compounds by reduction process:

(i) Metal X which is low in reactivity series

(ii) Metal Y which is in the middle of the series Give one example of each type.

- 30 Explain formation of rainbow using suitable diagram. Write the name of all phenomenon use in the formation of rainbow. 3

- 31 How much current will an electric iron draw from a 220 V source if the resistance of its element when hot is 55 ohms? Calculate the wattage of the electric iron when it operates on 220 volts. 3

- 32 Derive the expression of combined resistance of series combination of resistors. 3

33

Sex	Free	Attached
Male	21	4
Female	19	6

On the basis of above data answer the following questions.

a) Which of the two characteristics - 'free ear lobe' or 'attached ear lobe' appears to be

dominant in this case? Why?

b) Is the inheritance of the free ear lobe linked with sex of the individual? Give reason for your answer.

c) In a family of four individuals, the father possessed long ears and the mother possessed short ears. If the parents had pure dominant and recessive traits respectively, then calculate the ratio of genetic makeup of F<sub>2</sub> generation. Show a suitable cross.

#### SECTION-D

Question No. 34 to 36 are long answer questions.

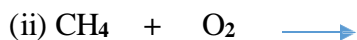
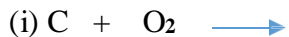
34 Attempt either option A or B.

A.(a) Draw the electron dot structure for H<sub>2</sub>S and F<sub>2</sub>.

2

(b) Complete the following reactions:

3



**OR**

B. (i) Explain esterification reaction with suitable chemical equation.

2

(ii) Define Saponification reaction with suitable example

1

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

2

35 Attempt either option A or B.

A.(i) Why is it not possible to reconstruct the whole organism from a fragment in complex multicellular organisms?

2

(ii) Sexual maturation of reproductive tissues and organs are necessary link for reproduction. Elucidate.

3

**OR**

B.(i) How are variations useful for species if there is drastic alteration in the niches?

2

(ii) Explain how the uterus and placenta provide necessary conditions for proper growth and development of the embryo after implantation?

3

36 Attempt either option A or B.

A(i) An electric bulb is connected to a 220 V generator. If the current drawn by the bulb is 0.50 A, find its power.

2

(ii) An electric refrigerator rated 400 W operates 8 hours a day. Calculate the energy per day in kWh.

2

(iii) State the difference between kilowatt and kilowatt hour.

1

**OR**

B.(i) State and explain Ohm's law. Define resistance and give its SI unit. What is meant by 1 ohm resistance?

3

(ii) Draw V-I graph for a conductor and list its two important features.

2

#### SECTION – E

Question No. 37 to 39 are case-based/data –based questions.

37 Read the following and answer the questions:

There are many substances which are used to detect the solutions as acidic or basic. They are called Acid-Base indicators. Depending upon the property of the indicator, we have different groups of Acid-Base indicators. Some indicators show different colors in acidic or basic medium and some indicators give different odors in acidic and basic medium. These indicators are either extracted from the plants or synthesized in the laboratory or industry.

- (a) Explain olfactory indicator with suitable example. 2
- (b) Write one natural and one synthetic indicator. 2

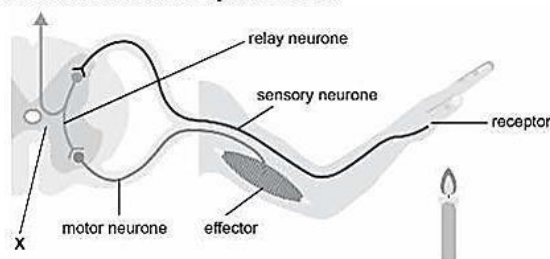
OR

- (b) What is  $P_H$  indicator? Give the range of  $P_H$  values of acidic solution. 2

38 Attempt either subpart A or B.

- A. Write the correct sequence of the flow of information in the reflex arc? 2

The figure shows a reflex arc formed in response to heat.



OR

- B. Why are reflex arcs evolved in animals? 1
- C. What is labelled as 'X' in the figure? 1
- D. Which signals will get disrupted in case of a spinal cord injury? 1

39 The spherical mirror forms different types of images when the object is placed at different locations. When the image is formed on screen, the image is real and when the image does not form on screen, the image is virtual. When the two reflected rays meet actually, the image is real and when they appear to meet, the image is virtual. A concave mirror always forms a real and inverted image for different positions of the object. But if the object is placed between the focus and pole. The image formed is virtual and erect. A convex mirror always forms a virtual, erect and diminished image. A concave mirror is used as doctor's head mirror to focus light on body parts like eyes, ears, nose etc., to be examined because it can form erect and magnified image of the object. The convex mirror is used as a rear view mirrors in automobiles because it can form a small and erect image of an object.

- (a) An object is placed at the centre of curvature of a concave mirror, where will be the image formed? 1
- (b) Write position and size of the image formed, when the object is placed at the focus of convex mirror. 1
- (c) Explain the working of convex mirror as rear view mirror of vehicles. 2

OR

- (c) Dentists use which type of mirror and why.

-----ALL THE BEST -----