

**2024
SCIENCE**

Total marks : 80

Time : 3 hours

General instructions:

- i) Approximately 15 minutes is allotted to read the question paper and revise the answers.
- ii) The question paper consists of 23 questions in 4 Sections. Marks allocated to every question are indicated against it.
- iii) All questions are compulsory in 1 and 2 marks questions (Section A and B).
- iv) Internal choice is given in 3 and 5 marks questions (Section C and D). A student has to attempt only one of the alternatives in such questions.
- v) General choice is given in 5 marks questions. A student has to attempt only 4 questions from this Section-D.
- vi) Alternate questions for the visually impaired students are provided in some questions. **Only the visually impaired students have to attempt such alternate questions.**
- vii) Write the correct question number in your answer sheet to indicate the option being attempted.

N.B: Check to ensure that all pages of the question paper are complete as indicated on the top left side.

SECTION - A**1. Choose the correct answer from the given alternatives:**

- (i) The given reaction is an example of 1
$$\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$$

(a) combination reaction	(b) double displacement reaction
(c) decomposition reaction	(d) displacement reaction
- (ii) Butanol is a four-carbon compound with the functional group 1

(a) -CHO	(b) -COOH
(c) -COO-	(d) -OH
- (iii) What is the name of the compound- $\text{CH}_3\text{CH}_2\text{COOH}$? 1

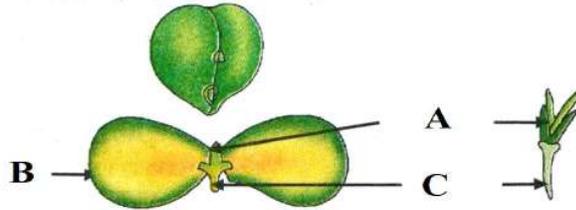
(a) Ethanal	(b) Propanoic acid
(c) Ethanoic acid	(d) Propanol
- (iv) Which part of the human alimentary canal receives bile from the liver? 1

(a) Stomach	(b) Small intestine
(c) Large intestine	(d) Oesophagus
- (v) At synapse, chemical signal is transmitted from 1

(a) dendritic end of one neuron to axonal end of another neuron
(b) axon to cell body of same neuron
(c) cell body to axonal end of same neuron
(d) axonal end of one neuron to dendritic end of another neuron

(vi) In the given figure, the parts A, B & C are sequentially

1



- (a) cotyledon, plumule & radicle (b) plumule, radicle & cotyledon
(c) plumule, cotyledon & radicle (d) radicle, cotyledon & plumule

(vii) In human females, an event that marks the onset of reproductive phase is

1

- (a) growth of body (b) changes in the hair pattern
(c) change in voice (d) menstruation

(viii) In human males, all the chromosomes are paired perfectly except one. These unpaired chromosomes are

1

- (i) large chromosomes (ii) small chromosomes
(iii) y chromosomes (iv) x chromosomes
(a) both (i) and (ii) (b) both (i) and (iii)
(c) both (iii) and (iv) (d) both (ii) and (iv)

(ix) In peas, a pure tall plant (TT) is crossed with a short plant (tt). The ratio of pure tall plants to short plants in F_2 is

1

- (a) 1:3 (b) 3:1
(c) 1:1 (d) 2:1

(x) The human eye forms the image of an object at the

1

- (a) retina (b) iris
(c) pupil (d) cornea

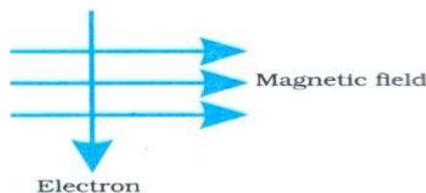
(xi) The apparent flattening of the sun's disc at sunset is due to the phenomenon of

1

- (a) reflection (b) refraction
(c) dispersion (d) tyndall effect

(xii) An electron enters a magnetic field at right angle to it as shown in the figure. The direction of force acting on the electron will be

1



- (a) to the right (b) to the left
(c) into the page (d) out of page

(xiii) What is the shape of the magnetic field lines at the centre of a circular loop?

1

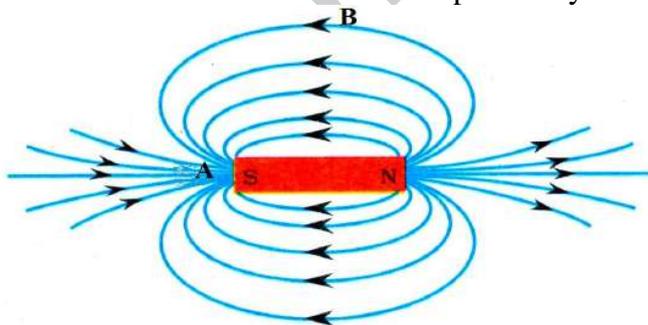
- (a) Curve (b) Parabola
(c) Straight (d) Circular

- (xiv) In a food chain, the third trophic level is always occupied by 1
- (a) producers (b) herbivores
 (c) decomposers (d) carnivores
- (xv) Disposable plastic plates should not be used because they are made of 1
- (a) light weight materials (b) non-biodegradable materials
 (c) bio-degradable materials (d) non-toxic materials

SECTION - B

Answer the following questions in about 20-30 words:

2. If we take hydrochloric acid (HCl) and acetic acid (CH₃COOH) of the same concentration of 1 molar; HCl is found to be a strong acid and CH₃COOH is found to be a weak acid. Give reason. 2
3. Why does calcium start floating when added to water? Write the reaction of calcium with water. 2
4. Write the formula and draw the structure of benzene. 2
5. How are lungs designed to maximize area for exchange of gases in human beings? 2
6. What is chemotropism? Give one example. 2
7. Magnetic field lines around a bar magnet are shown in the figure. Lanu makes a statement that; magnetic field at point A is stronger than at point B. State whether the statement is correct. Explain why? 2

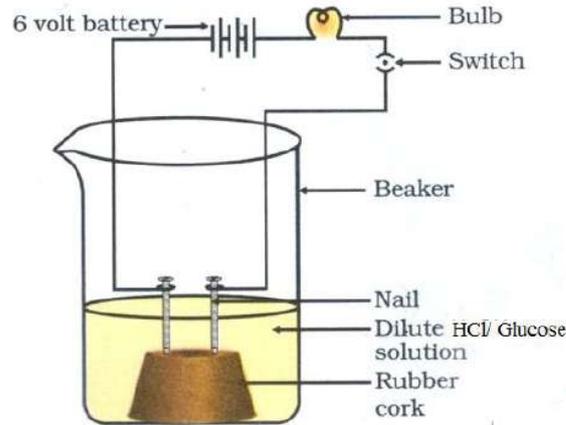


SECTION - C

Answer the following questions in about 40-60 words:

8. a. Balance the following chemical equations:
- (i) $\text{Fe} + \text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + \text{H}_2$
 (ii) $\text{Pb}(\text{NO}_3)_2 \rightarrow 2\text{PbO} + \text{NO}_2 + \text{O}_2$
 (iii) $\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$ 3×1=3
- Or**
- b. What is oxidation-reduction reaction? Give one example. (2+1=3)

9. In the following experiment, what will happen if we add?



- (i) HCl solution in the beaker and switch on the current.
 (ii) Glucose ($C_6H_{12}O_6$) solution in the beaker and switch on the current.
 (iii) What conclusion can be drawn from the above experiment? **3×1=3**

Alternate question for the visually impaired students:

What is chlor-alkali process? Name two products formed by this process. **(1+2=3)**

10. a. Draw the electron dot structure of a molecule with single, double and triple covalent bond.

Or **3×1=3**

- b. Draw the structural isomers of pentane (C_5H_{12}).

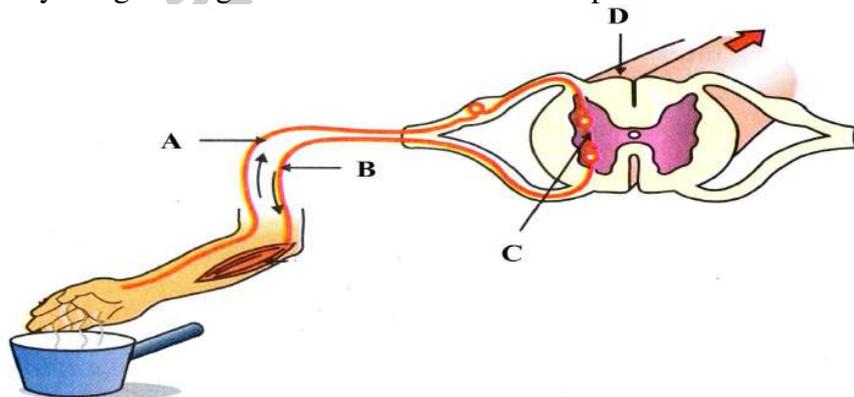
Alternate question for the visually impaired students:

Explain three chemical properties of carbon compounds. **(3×1=3)**

11. a. Draw the structure of a neuron and label any four parts.

Or **1+4×½=3**

- b. Identify the given figure and label the indicated parts.

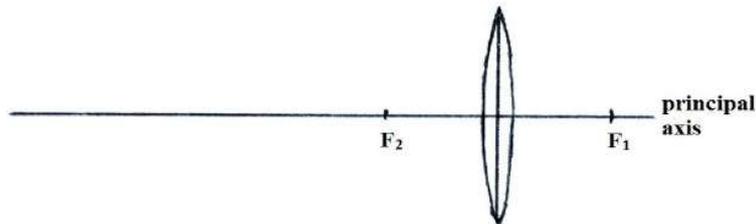


Alternate question for the visually impaired students:

Compare and contrast the nervous and hormonal mechanism for control and co-ordination in animals. **(3)**

12. How do Mendel's experiments show that traits may be dominant or recessive? What will be the F_1 progeny if a tall plant with round seeds is crossed with short plant with wrinkled seeds? **2+1=3**

13. a. The image below shows a thin lens of focal length 5m.
 (i) What is the kind of lens shown in the figure below?
 (ii) If a real inverted image is to be formed by this lens at a distance of 7m from the optical centre, then show with calculation where should the object be placed?



Or

3

- b. An object 4cm in size is placed at 25cm in front of a concave mirror of focal length 15cm. At what distance from the mirror should a screen be placed in order to obtain a sharp image? Find the nature and size of the image.

Alternate question for the visually impaired students:

- (i) State the difference between Pole and Centre of curvature of a spherical mirror.
 (ii) In which type of mirror does the centre of curvature lie behind the mirror? **(2+1=3)**

14. Define power of accommodation. How does it help us to see nearby and far away objects? **1+2=3**

15. a. The potential difference between terminals of an electric heater is 60V when it draws a current of 4A from the source. What current will the heater draw if the potential difference is increased to 120V?

Or

3

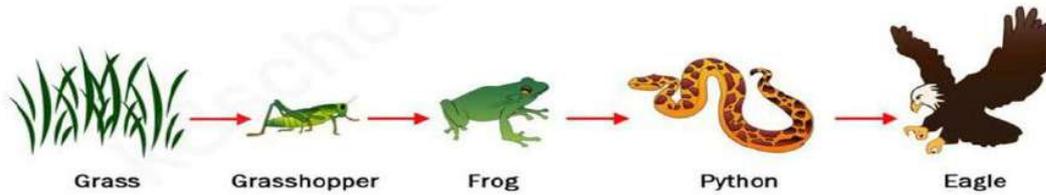
- b. Show with calculation how can three resistors of resistances 2Ω , 3Ω and 6Ω be connected to give a total resistance of (i) 4Ω and (ii) 1Ω ?

Alternate question for the visually impaired students:

State Ohm's Law and express it mathematically. **(2+1=3)**

16. (i) Will current flow more easily through a thick wire of same material when connected to same source? Explain.
 (ii) Why does the cord of an electric heater not glow while heating element does? **1+2=3**

17. What precautions should be taken to avoid the overloading of domestic circuit?
Give three points. 3
18. Study the food chain given below and answer the questions that follow:



- (i) 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.
- (ii) Is it possible to have two more trophic levels in this food chain? Justify your answer. 2+1=3

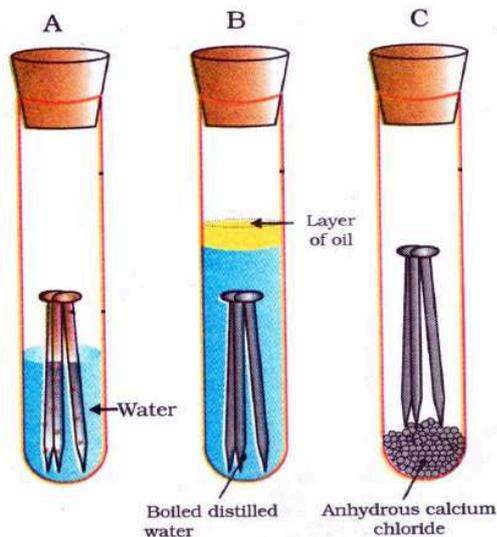
Alternate question for the visually impaired students:

What is ozone? Explain how it is formed. (1+2=3)

SECTION - D

Answer any 4 questions from the following questions (19 to 23) in about 70-100 words:

19. Abulie conducted an experiment to investigate the condition under which iron rust. He took three test tubes and placed clean iron nails in each of them, as shown in the figure.
- In test tube A, he put water.
 - In test tube B, he put boiled distilled water and a layer of oil.
 - In test tube C, he put anhydrous calcium chloride.



- (i) In which of the following test tubes, the rusting of iron nails took place. Give reason.
- (ii) In which of the test tubes, the rusting of iron nails did not take place. Give reason. 2+3=5

Alternate question for the visually impaired students:

Explain five ways to prevent rusting of iron. (5×1=5)

20. Explain the human excretory system with a neat labelled diagram. 3+2=5

Alternate question for the visually impaired students:

Name the components of the excretory system in human beings. Give one function of each. (5)

21. Describe the various pathways involved in breaking down of glucose molecule. 5

22. a. Draw a labelled diagram of the longitudinal section of a flower and explain the male and female reproductive parts.

Or 2+3=5

b. Draw and explain the female reproductive system in humans.

Alternate question for the visually impaired students:

Explain any two mode of reproduction by a single cell organism. (2½+2½=5)

23. a. Draw a ray diagram of an image formation by a concave mirror, when object is placed : (i) beyond C (ii) between P and F.

Write the nature and position of the image formed in both the cases.

Or 1½+1½+2=5

b. Draw a ray diagram of an image formation by a convex lens, when the object is placed : (i) between F₁ and 2F₁ (ii) between F₁ and optical centre.

Write the nature and position of the image formed in both the cases.

Alternate question for the visually impaired students:

(i) A lemon appears larger when immersed in a glass of water. Explain why.

(ii) How does light ray bent as it goes from rarer to denser medium?

(iii) As light enters through a glass slab, the emergent ray is parallel to incident ray. Why?

(iv) What is refraction of light? (1+1+2+1=5)
