CBSE EXAMINATION PAPER-2024

SCIENCE

(Solved)

Time allowed : 3 hours | Maximum Marks : 90

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **44 questions.** All questions are **compulsory.**

ii. This question paper is divided into **5 sections.**

iii. **Section A** – questions number **1 to 2** are case based questions

iv. **Section B** – questions number **3 to 22** are multiple choice questions

v. **Section C** – questions number **23 to 30** are very short answer

vi. **Section D** – questions number **31 to 38** are short answer

vii. **Section E** – questions number **39 to 44** are long answer

viii. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.

ix. Use of calculator is NOT allowed.

Section A

Question 1. Human digestive system is a tube running from mouth to anus. Its main function is to breakdown complex molecules present in the food which cannot be absorbed as such into smaller molecules. These molecules are absorbed across the walls of the tube and the absorbed food reaches each and every cell of the body where it is utilised for obtaining energy.

(1) Name the glands present in the buccal cavity and write the components of food on which the secretion of these glands act upon.

[1 Marks]

(2)

Two organs have a sphincter muscle at their exit. Name them.

[-1 Marks]

(3)

"Bile juice does not contain any enzyme, yet it has important roles in digestion." Justify the statement.

[2 Marks]

(4)

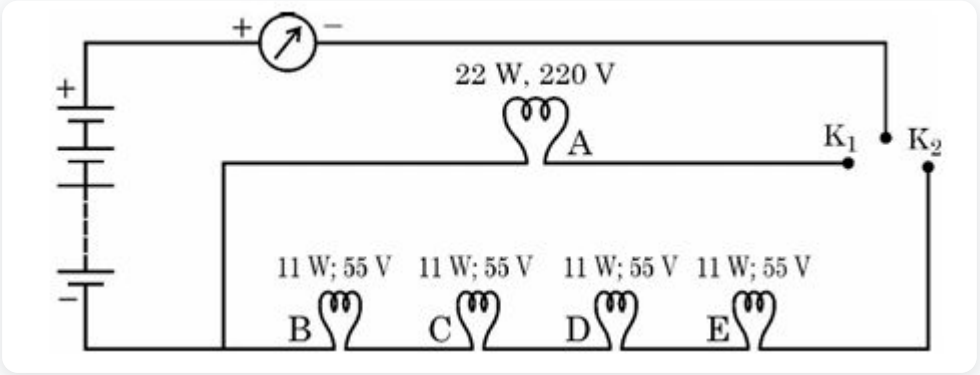
What will happen if:

(i) mucus is not secreted by the gastric glands.

(ii) Villi are absent in the small intestine.

[2 Marks]

Question 2. In a domestic circuit five LED bulbs are arranged as shown. The source voltage is 220 V and the power rating of each bulb is marked in the circuit diagram. Based on the following circuit diagram, answer the following questions:



(1) (a) State what happens when (i) key K_1 is closed. (ii) key K_2 is closed.

[1 Marks]

(2)

Find the current drawn by the bulb B when it glows.

(3)

What would happen to the glow of all the bulbs in the circuit when keys K_1 and K_2 both are closed and the bulb C suddenly get fused? Give reason to justify your answer.

[2 Marks]

(4)

Calculate
(i) the resistance of bulb B, and
(ii) total resistance of the combination of four bulbs B, C, D and E.

[2 Marks]

Section B

Question 3.

Identify the product 'X' obtained in the following chemical reaction:

[1 Marks]

$$CaCO_3 \xrightarrow{\Delta} \text{'X'} + CO_2$$

(A) Quick lime

(B) Gypsum

(C) Lime Stone

(D) Plaster of Paris

Question 4.

Select a pair of natural indicator from the following:

[1 Marks]

(A) Litmus and methyl orange

(B) Methyl orange and Turmeric

(C) Phenolphthalein and methyl orange

(D) Turmeric and Litmus

Question 5.

A chemical compound used in glass, soap and paper industries is

[1 Marks]

(A) Bleaching Powder

(B) Washing Soda

(C) Baking Soda

(D) Common Salt

Question 6.

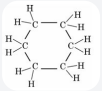
The structural formula of Cyclohexane is

[1 Marks]

(A)



(B)



(C)



(D)



Question 7.

Consider the following Chemical equation: $a\mathrm{Al_2O_3}+b\mathrm{HCl}\rightarrow c\mathrm{AlCl_3}+d\mathrm{H_2O}$ In order to balance this chemical equation, the values of a, b, c and d must be

[1 Marks]

(A) 1, 6, 2 and 3

(B) 1, 6, 3 and 2

(C) 2, 6, 2 and 3

(D) 2, 6, 3 and 2

Question 8.

Which one of the following hydrocarbons is different from the others?

[1 Marks]

(A) C_5H_{12}

(B) C_2H_6

(C) C_7H_{14}

(D) C_4H_{10}

Question 9.

Which one of the following reactions is different from the remaining three?

[1 Marks]

(A) $NaCl+AgNO_3\rightarrow AgCl+NaNO_3$

(B) $ZnCl_2+H_2S\rightarrow ZnS+2HCl$

(C) $KNO_3+H_2SO_4\rightarrow KHSO4+HNO_3$

(D) $CaO+H_2O\rightarrow Ca(OH)_2$

Question 10. Select from the following a plant hormone which promotes cell division.

[1 Marks]

(A) Gibberellins

(B) Auxins

(C) Abscissic Acid

(D) Cytokinins

Question 11.

Part(s) of a flower which attracts insects for pollination is (are)

[1 Marks]

(A) petals and Sepals

(B) anther and Stigma

(C) petals only

(D) sepals only

Question 12. In an experiment to study independent inheritance of two separate traits: shape and colour of seeds, the ratio of the different combinations in F_2 progeny would be

[1 Marks]

(A) 1:3

(B) 9:3:3:1

(C) 1:2:1

(D) 9:1:1:3

Question 13.

Which of the following statement (s) is (are) true about human heart?

(a) Right atrium receives oxygenated blood from lungs through pulmonary artery

(b) Left atrium transfers oxygenated blood to left ventricle which sends it to various parts of the body.

(c) Right atrium receives deoxygenated blood from different parts of the body through vena cava.

(d) Left atrium transfers oxygenated blood to aorta which sends it to different parts of the body.

[1 Marks]

(A) (b) only

(B) (b) and (c)

(C) (a) and (d)

(D) (b) and (d)

Question 14.

A cross between two tall pea plants resulted in offsprings having a few dwarf plants. The gene-combination of the parental plants must be

[1 Marks]

(A) TT and Tt

(B) Tt and tt

(C) Tt and Tt

(D) TT and tt

Question 15.

The Phenomena of light involved in the formation of a rainbow in the sky are

[1 Marks]

(A) Refraction, dispersion and reflection

(B) Dispersion, refraction and internal reflection

(C) Dispersion, scattering and reflection

(D) Refraction, dispersion and total internal reflection

Question 16.

In case of four wires of same material, the resistance will be minimum if the diameter and length of the wire respectively are

[1 Marks]

(A) D/4 and 4L

(B) 4D and 2L

(C) D/2 and L/4

(D) 2D and L

Question 17.

A food chain will be more advantageous in terms of energy if it has

[1 Marks]

(A) 2 trophic levels

(B) 5 trophic levels

(C) 4 trophic levels

(D) 3 trophic levels

Question 18.

Consider the following statements about ozone:

(a) Ozone is poisonous gas.

(b) Ozone shields the earth's surface from the infrared radiation from the sun.

(c) Ozone is a product of UV radiations acting on oxygen molecule.

(d) At the lower level of the earth's atmosphere, ozone performs most essential function.

The correct statements are

[1 Marks]

(A) (a) and (b)

(B) (a) and (c)

(C) (b) and (d)

(D) (b) and (c)

Question 19.

Assertion (A): A piece of Zinc metal gets reddish brown coating when kept in copper sulphate solution for some time.

Reason (R): Copper is more reactive metal than Zinc.

[1 Marks]

(A) Both (A) and (R) are true and (R) is the correct explanation of (A).

(B) (A) is true, but (R) is false.

(C) (A) is false, but (R) is true.

(D) Both (A) and (R) are true and (R) is not correct explanation of (A).

Question 20.

Assertion (A): Offsprings produced by asexual reproduction are genetically similar to the parents.

Reason (R): Asexual reproduction involves a single parent.

[1 Marks]

(A) Both A and R are true and R is the correct explanation of A.

(B) A is true, but R is false.

(C) A is false, but R is true.

(D) Both A and R are true, but R is NOT the correct explanation of A

Question 21.

Assertion (A): Red light signals are used to stop the vehicles on the road.

Reason (R): Red coloured light is scattered the most so as to be visible from a large distance.

[1 Marks]

(A) Both A and R are true and R is the correct explanation of A

(B) Both A and R are true, but R is NOT the correct explanation of A.

(C) A is false, but R is true.

(D) A is true, but R is false.

Question 22.

Assertion (A): The waste we generate daily may be biodegradable or non-biodegradable.

Reason (R): The waste generated, if not disposed off properly may cause serious environmental problems.

[1 Marks]

(A) A is false, but R is true.

(B) Both A and R are true, but R is NOT the correct explanation of A

(C) A is true, but R is false.

(D) Both A and R are true and R is the correct explanation of A

Section C

Question 23. When magnesium ribbon is burnt in air, an ash of white colour is produced. Write the chemical equation for the reaction giving the chemical name of the ash produced. State the type of chemical reaction giving justification for your answer.

[2 Marks]

Question 24. Where are auxins synthesized? How do they promote phototropism?

[2 Marks]

Question 25. List any two pairs of visible contrasting characters of garden pea plants used by Mendel for his experiments stating the dominant and recessive characters in each pair.

[2 Marks]

Question 26. In human beings, the probability of getting a male or a female child is 50%. Explain with the help of a flow diagram only.

[2 Marks]

Question 27. When do we say that a particular person is suffering from hypermetropia? List two causes of this defect. Name the type of lens used to correct this defect.

[2 Marks]

Question 28.

Draw a labelled diagram to show the pattern of magnetic field lines produced due to a current carrying straight conductor. Mark on it the direction of current in the conductor and the direction of magnetic field lines.

[2 Marks]

Question 29.

Name the device used to magnetise a piece of magnetic material. Draw a labelled diagram to show the arrangement used for the magnetisation of a cylinder made of soft iron.

[2 Marks]

Question 30. What are decomposers? List two consequences of their absence in an ecosystem.

[2 Marks]

Section D

Question 31.

State reasons for the following:

(a) Zinc oxide is an amphoteric oxide.

(b) Sodium metal is stored in a bottle filled with kerosene oil.

(c) In the reactions of nitric acid with metals, generally hydrogen gas is not evolved.

[3 Marks]

Question 32.

(a) State, giving reason, the reduction process to obtain the following metals from their compounds:

(i) Mercury, (ii) Copper, and (iii) Sodium.

[3 Marks]

Question 33. We water the soil but it reaches the topmost leaves of the plants. Explain in brief the process involved.

[3 Marks]

Question 34. Name and explain the phenomenon of light due to which the path of a beam of light becomes visible when it enters a smoke-filled room through a small hole. Also, state the dependence of the colour of the light we receive on the size of the particle of the medium through which the beam of light passes.

[3 Marks]

Question 35. Explain in brief the function of an electric fuse in a domestic circuit. An electric heater of current rating 3 kW; 220 V is to be operated in an electric circuit of rating 5 A. What is likely to happen when the heater is switched ON? Justify your answer with necessary calculations.

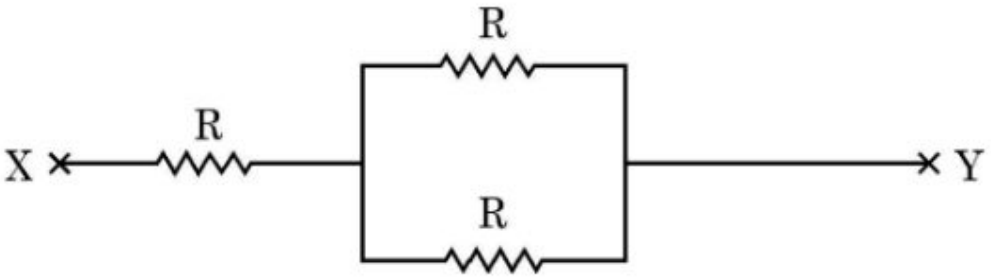
[3 Marks]

Question 36.

(a) State Ohm's law. Write the formula for the equivalent resistance R_p of the parallel combination of three resistors of values R_1, R_2, and R_3. (b) Find the resistance of the following network of resistors.

(b) Find the resistance of the following network of resistors:

[3 Marks]



Question 37.

(a) List two constituents of the Central Nervous System (CNS). How are these components protected from injuries?

(b) Write two limitations of the use of electrical impulses.

[3 Marks]

Question 38.

State giving reason the reduction process to obtain the following metals from their compounds:
(i) Sliver
(ii) Copper and
(iii) Iron

[3 Marks]

Section E

Question 39.

(i) Five solutions A, B, C, D and E when tested with pH paper showed pH as 4, 1, 13, 7 and 10 respectively. Which solution is:

(1) Strongly acidic (2) Strongly alkaline (3) Weakly acidic (4) Neutral and (5) Weakly alkaline? Arrange the solutions in increasing order of H^+ ion concentration.

(ii) Write the name and formula of (1) an acidic salt and (2) a basic salt giving the name of the parent acid and parent base used to form the salt in each case.

[5 Marks]

Question 40.

Name and state in brief the process which is used to prepare sodium hydroxide from sodium chloride. In this process along with the main product two gases 'X' and 'Y' are also given off at the two electrodes. Name 'X' and 'Y' specifying the name of their respective electrode at which each gas is

obtained. One of these gases when reacts with dry calcium hydroxide produces a compound 'Z' which is widely used in water treatment plants and textile industries. Name 'Z' and write chemical equation for the reaction involved in its formation.

[5 Marks]

Question 41.

(i) What are spores? On which structures are they formed? How do they overcome unfavourable conditions? Name the organism which multiplies with the help of these structures.

(ii) Give two reasons why some plants are grown by the method of vegetative propagation. List two methods used to grow plants vegetatively.

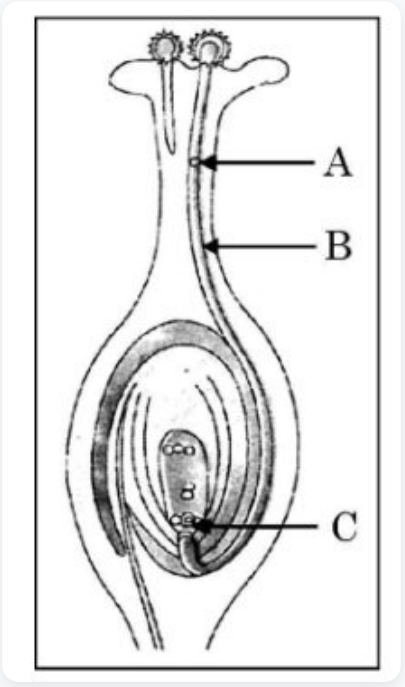
[5 Marks]

Question 42.

(i) Study the diagram given below and name the parts marked as A, B and C. What happens when B reaches C in the ovary? Mention its significance.

(ii) Write the post fertilisation changes that occur in a flower.

[5 Marks]



Question 43.

(i) Draw a ray diagram to show the path of the refracted ray in each of the following cases:

A ray of light incident on a concave lens
(1) parallel to its principal axis, and
(2) is directed towards its principal focus.

(ii) A 4 cm tall object is placed perpendicular to the principal axis of convex lens of focal length 24 cm. The distance of object from the lens is 16 cm. Find the position and size of image formed.

[5 Marks]

Question 44.

Draw a ray diagram to show the path of the reflected ray in each of the following cases:

A ray of light incident on a convex mirror
(1) parallel to its principal axis, and
(2) is directed towards its principal focus

[5 Marks]