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 **45 questions.** All questions are **compulsory.**

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

iii. **Section A** – questions number **1 to 3** are case based questions

iv. **Section B** – questions number **4 to 23** are multiple choice questions

v. **Section C** – questions number **24 to 31** are very short answer

vi. **Section D** – questions number **32 to 39** are short answer

vii. **Section E** – questions number **40 to 45** 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.

Three metal samples of magnesium, aluminium and iron were taken and rubbed with sand paper. These samples were then put separately in test tubes containing dilute hydrochloric acid. Thermometers were also suspended in each test tube so that their bulbs dipped in the acid. The rate of formation of bubbles was observed. The above activity was repeated with dilute nitric acid and the observations were recorded. Answer the following questions:

(1) When activity was done with dilute hydrochloric acid, then in which one of the test tubes was the rate of formation of bubbles the fastest and the thermometer showed the highest temperature?

[1 Marks]

(2) Which metal did not react with dilute hydrochloric acid? Give reason.

[1 Marks]

(3)

Why is hydrogen gas not evolved when a metal reacts with dilute nitric acid? Name the ultimate products formed in the reaction

[2 Marks]

(4)

Name the type of reaction on the basis of which reactivity of metals is decided. You have two metals X and Y. How would you decide which is more reactive than the other?

[2 Marks]

Question 2.

Kidneys are vital organs for survival. Several factors like infections, injury or restricted blood flow to kidneys reduce the activity of kidneys. This leads to accumulation of poisonous wastes in the body, which can even lead to death. In case of kidney failure, an artificial kidney can be used. An artificial kidney is a device to remove waste products from the blood through dialysis.

(1) In human excretory system name the organ which stores urine. Is this organ under hormonal control or nervous control?

[1 Marks]

(2)

(i) Name the artery that brings oxygenated blood to the kidney.

(ii) Name the cluster the thin-walled blood capillaries present in the Bowian's capsule.

[1 Marks]

(3)

List two major steps involved in the formation of urine and state in brief their functions.

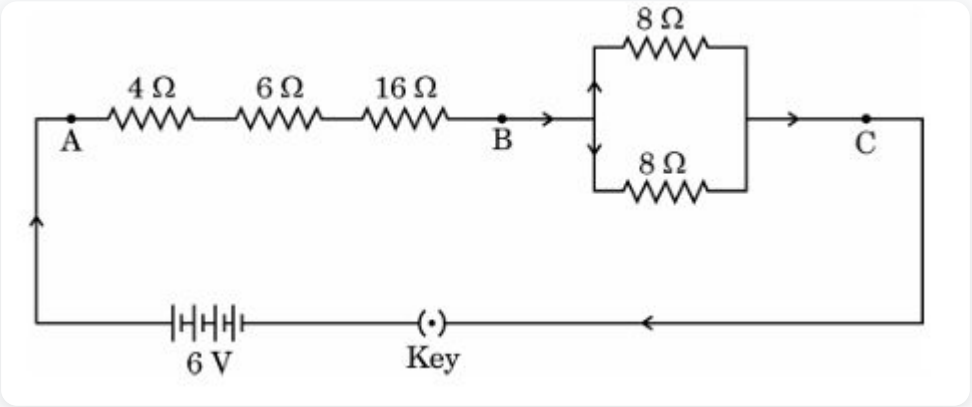
[2 Marks]

(4)

In which part of the nephron does selective reabsorption take place ? List the factors which the amount of water reabsorbed depends on.

[2 Marks]

Question 3. Study the following circuit: On the basis of this circuit, answer the following questions:



(1) Find the value of total resistance between the points A and B.

[1 Marks]

(2)

Find the resistance between the points B and C.

[1 Marks]

(3)

Calculate the current drawn from the battery, when the key is closed.

[2 Marks]

(4)

In the above circuit, the 16 Ω resistor or the parallel combination of two resistors of 8Ω , which one of the two will have more potential difference across its two ends ? Justify your answer.

[2 Marks]

Section B

Question 4.

$Zn + 2CH_3COOH \rightarrow (CH_3COO)_2 Zn + H_2$. The above reaction is a:

[1 Marks]

(A) Double displacement reaction

(B) Displacement reaction

(C) Combination reaction

(D) Decomposition reaction

Question 5.

An aqueous solution of a salt turns blue litmus to red. The salt could be the one obtained by the reaction of:

[1 Marks]

(A) CH_3COOH and NaOH

(B) H_2SO_4 and KOH

(C) HCl and NH_4OH

(D) HNO_3 and NaOH

Question 6. Four solutions, namely glucose, alcohol, hydrochloric acid and sulphuric acid filled in four separate beakers are connected one by one in an electric circuit with a bulb. The solutions in which the bulb will glow when current is passed are:

[1 Marks]

(A) Glucose and alcohol

(B) Alcohol and hydrochloric acid

(C) Glucose and sulphuric acid

(D) Hydrochloric acid and sulphuric acid

Question 7.

The metals which are found in both free state as well as combined state are:

[1 Marks]

(A) Gold and silver

(B) Gold and platinum

(C) Copper and silver

(D) Platinum and silver

Question 8.

The number of single and double bonds present in a molecule of benzene (C_6H_6) respectively, are:

[1 Marks]

(A) 3 and 3

(B) 6 and 6

(C) 9 and 3

(D) 3 and 9

Question 9. In human beings, when the process of digestion is completed, the (i) proteins, (ii) carbohydrates, and (iii) fats are respectively finally converted into:

[1 Marks]

(A) (i) Amino acids, (ii) glucose and (iii) fatty acids

(B) (i) Amino acids, (ii) glucose, (iii) fatty acids and glycerol

(C) (i) Glucose, (ii) fatty acids and glycerol, (iii) amino acids

(D) (i) Sugars, (ii) amino acids, (iii) fatty acids and glycerol

Question 10. A plant growth inhibitor hormone which causes wilting of leaves is called:

[1 Marks]

(A) Abscisic acid

(B) Cytokinin

(C) Gibberellin

(D) Auxin

Question 11. The plants that can be raised by the method of vegetative propagation are:

[1 Marks]

(A) Sugarcane, roses, grapes

(B) Banana, orange, mustard

(C) Sugarcane, mustard, potato

(D) Papaya, mustard, potato

Question 12. The part of seed which is a source of food during germination of seed is:

[1 Marks]

(A) Cotyledon

(B) Radicle

(C) Plumule

(D) Embryo

Question 13. A zygote is formed by the fusion of a male gamete and a female gamete. The number of chromosomes in the zygote of a human is:

[1 Marks]

(A) 23

(B) 44

(C) 92

(D) 46

Question 14.

Absolute refractive index of glass and water is 3/2 and 4/3 respectively. If the speed of light in glass is 2×10^8 m/s, the speed of light in water is:

[1 Marks]

(A) $4/9 \times 10^8$ m/s

(B) $9/16 \times 10^8$ m/s

(C) $3/7 \times 10^8$ m/s

(D) $2/5 \times 10^8$ m/s

Question 15. When a beam of white light passes through a region having very fine dust particles, the colour of light mainly scattered in that region is:

[1 Marks]

(A) Orange

(B) Yellow

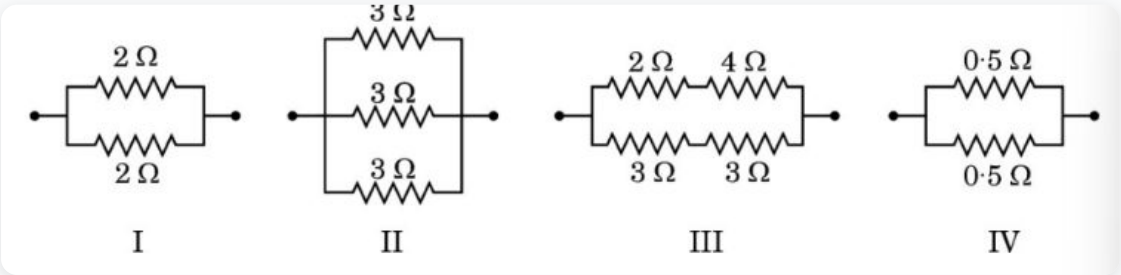
(C) Blue

(D) Red

Question 16.

Consider the following combinations of resistors: The combinations having equivalent resistance 1 is/are:

[1 Marks]



(A) I and IV

(B) Only IV

(C) I, II and III

(D) I and II

Question 17.

An electric iron of resistance 20 Ω draws a current of 5 A. The heat developed in the iron in 30 seconds is:

[1 Marks]

(A) 15000 J

(B) 1500 J

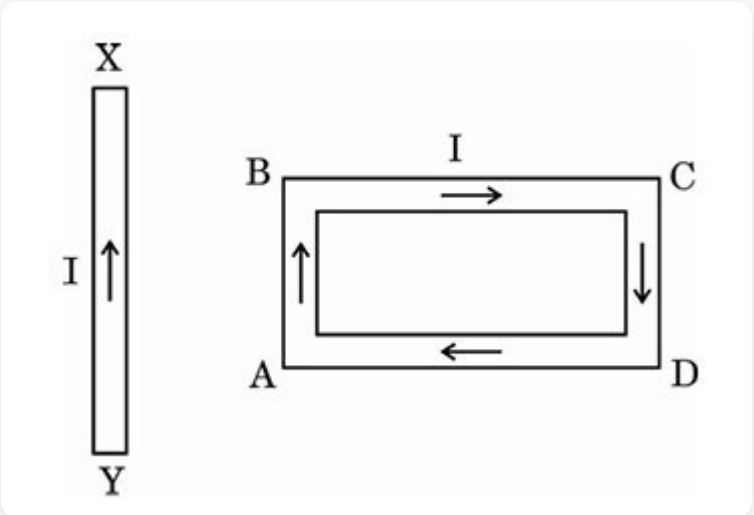
(C) 3000 J

(D) 6000 J

Question 18.

A rectangular loop ABCD carrying a current I is situated near a straight conductor XY, such that the conductor is parallel to the side AB of the loop and is in the plane of the loop. If a steady current I is established in the conductor, the conductor XY will:

[1 Marks]



(A) rotate about its axis.

(B) remain stationary.

(C) move away from the side AB of the loop.

(D) move towards the side AB of the loop.

Question 19. Some wastes are given below: (i) Garden waste (ii) Ballpoint pen refills (iii) Empty medicine bottles made of glass (iv) Peels of fruits and vegetables (v) Old cotton shirt. The non-biodegradable wastes among these are:

[1 Marks]

(A) (ii) and (iii)

(B) (i) and (ii)

(C) (i), (iv) and (v)

(D) (i), (iii) and (iv)

Question 20.

Assertion (A): The extraction of metals from their sulphide ores cannot take place without roasting of the ore. Reason (R): Roasting converts sulphide ores directly into metals.

[1 Marks]

(A) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

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

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

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

Question 21.

Assertion (A): In the human heart ventricles have thicker muscular walls than atria.

Reason (R): Ventricles have to pump the blood into various organs.

[1 Marks]

(A) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

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

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

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

Question 22.

Assertion (A): Magnetic field lines never intersect each other.

Reason (R): If they intersect, then at the point of intersection, the compass needle would point towards two directions, which is not possible.

[1 Marks]

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

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

(C) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

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

Question 23.

Assertion (A): Oxygen is essential for all aerobic forms of life.

Reason (R): Free oxygen atoms combine with molecular oxygen to form ozone.

[1 Marks]

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

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

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

(D) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

Section C

Question 24.

1 gram of solid sodium chloride was taken in a clean and dry test tube and concentrated sulphuric acid was added to it.

(i) Name the gas evolved in the reaction.

(ii) What will be observed when this gas is tested with (I) dry, and (II) wet blue litmus paper? Write your conclusion about the nature (acidic/basic) of this gas.

[2 Marks]

Question 25. Distinguish between a saturated and an unsaturated hydrocarbon by flame test. List the products of the combustion reaction of a saturated hydrocarbon.

[2 Marks]

Question 26. We need to water the soil in plants regularly, but it ultimately reaches the leaves of the plant. Explain how this takes place.

[2 Marks]

Question 27. The survival of a species is promoted through the creation of variations. Illustrate with an example.

[2 Marks]

Question 28. A person suffering from presbyopia needs bifocal lens. If he needs two lenses of power 4·0 dioptre and + 2·0 dioptre, which one of these two lenses is for the correction of distant vision and what is its focal length?

[2 Marks]

Question 29. Two wires A and B of the same material, having the same lengths and diameters 0.2 mm and 0.3 mm respectively, are connected one by one in a circuit. Which one of these two wires will offer more resistance to the flow of current in the circuit? Justify your answer.

[2 Marks]

Question 30.

Some metals react with acids to produce salt and hydrogen gas. Illustrate it with an example. How will you test the presence of this gas ?

[2 Marks]

Question 31.

Name the type of nutrition exhibited by Amoeba. Explain how food is taken in and digested by this organism.

[2 Marks]

Section D

Question 32.

Write the common name and the chemical name of the compound $CaSO_4 \cdot 1/2\ H_2O$. Write the method of its preparation. Give chemical equation for the reaction, when water reacts with $CaSO_4 \cdot 1/2\ H_2O$.

[3 Marks]

Question 33.

Why is the conversion of ethanol to ethanoic acid an oxidation reaction ? Name the oxidising agent used in this conversion. Write chemical equation for this oxidation reaction. How is this reaction different from the reaction in which ethanol burns in the presence of oxygen ?

[3 Marks]

Question 34. Explain with the help of a labelled diagram, the process of reproduction in Hydra by budding. Name the cells used for reproduction in this process.

[3 Marks]

Question 35.

List two differences between dominant traits and recessive traits. What percentage of pea plants in the F_2 generation were with yellow seeds in yellow (YY) and green coloured (yy) seeds?

[3 Marks]

Question 36. Define the term power of accommodation of human eye. What happens to the image distance in the eye when we increase the distance of an object from the eye? Name and explain the role of the part of human eye responsible for it in this case.

[3 Marks]

Question 37.

A student fixes a sheet of white paper on a drawing board. He places a bar magnet in the center of it. He sprinkles some iron filings uniformly around the bar magnet. Then he taps the drawing board gently and observes that the iron filings arrange themselves in a particular pattern.

(a) Why do iron filings arrange in a particular pattern?

(b) What does the crowding of iron filings at the ends of the magnet indicate?

(c) What do the lines, along which the iron filings align, represent?

(d) If the student places a cardboard horizontally in a current carrying solenoid and repeats the above activity, in what pattern would the iron filings arrange? State the conclusion drawn about the magnetic field based on the observed pattern of the lines.

[3 Marks]

Question 38.

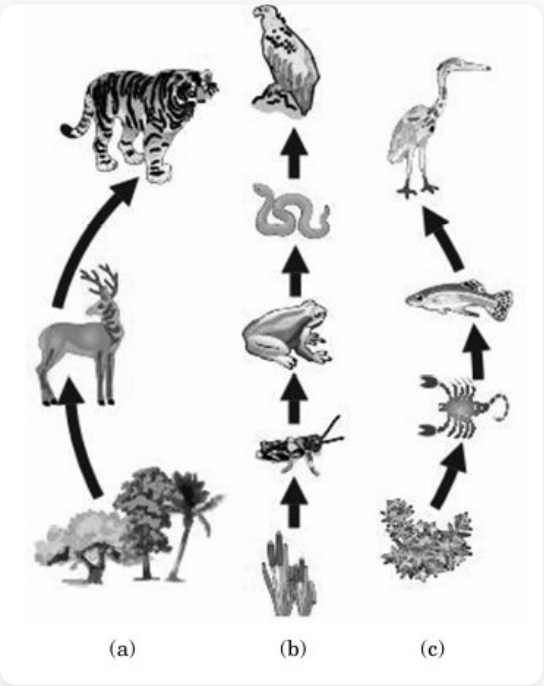
Study the picture given below showing three food chains (a), (b), and (c) and answer the following questions:

(i) Name the type of ecosystems that exist in food chains (b) and (c).

(ii) The first trophic level in all food chains are producers. Why? What percentage of solar energy do these producers capture for their use?

(iii) Why are the arrows shown in the diagram in one direction only and not vice versa? Justify.

[3 Marks]



Question 39.

List two roles of each of the following in human reproductive system : (i) Seminal vesicles and prostate gland (ii) Oviduct (iii) Testis

[3 Marks]

Section E

Question 40. What is a chemical reaction? Describe one activity each to show that a chemical change has occurred in which (i) change of colour, and (ii) change in temperature has taken place.

[5 Marks]

Question 41.

(i)Define a reflex arc. Why have reflex arcs evolved in animals? Trace the sequence of events which occur when you suddenly touch a hot object.

(ii) Name the part of nervous system which helps in communication between the central nervous system and other parts of the body. What are the two components of this system ?

[5 Marks]

Question 42.

(i) Leaves of 'chhui-mui'plant begin to fold up and droop in response to a stimulus. Name the stimulus and write the cause for such a rapid movement. Is there any growth involved in the movement?

(ii) Define geotropism in plants. What is meant by positive and negative geotropism ? Give one example of each type.

[5 Marks]

Question 43.

The variation of image distance (v) with object distance (u) for a convex lens is given in the following observation table. Analyse it and answer the questions that follow :

(i) Without calculation, find the focal length of the convex lens. Justify your answer.

(ii) Which observation is not correct ? Why ? Draw ray diagram to find the position of the image formed for this position of the object.

(iii) Find the approximate value of magnification for u = 30 cm.

[5 Marks]

S. No.	Object distance (u) cm	Image distance (v) cm
1	– 150	+ 30
2	– 75	+ 37·5
3	– 50	+ 50
4	– 37·5	+ 75
5	– 30	+ 150
6	– 15	+ 37·5

Question 44.

(i) Define principal axis of a lens. Draw a ray diagram to show what happens when a ray of light parallel to the principal axis of a concave lens passes through it.

(ii) The focal length of a concave lens is 20 cm. At what distance from the lens should a 5 cm tall object be placed so that its image is formed at a distance of 15 cm from the lens? Also calculate the size of the image formed.

[5 Marks]

Question 45.

(i) Define a decomposition reaction. How can we say that (I) electrolysis of water, and (II) blackening of silver bromide when exposed to sunlight, are decomposition reactions ? Mention the type of energy involved in each case.

(ii) The type of reactions in which (I) calcium oxide is formed, and (II) calcium hydroxide is formed are opposite reactions to each other. Justify this statement with the help of chemical equations.

[5 Marks]