CBSE Class 10 Science

Sample Paper 02 (2020-21)

Maximum Marks: 80

Time Allowed: 3 hours

General Instructions:

i. The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. All questions are compulsory.
ii. Section–A - question no. 1 to 20 - all questions and parts thereof are of one mark each. These questions contain multiple-choice questions (MCQs), very short answer questions and assertion - reason type questions. Answers to these should be given in one word or one sentence.
iii. Section–B - question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should in the range of 30 to 50 words.
iv. Section–C - question no. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should in the range of 50 to 80 words.
v. Section–D – question no. - 34 to 36 are long answer type questions carrying 5 marks each. Answers to these questions should be in the range of 80 to 120 words.
vi. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
vii. Wherever necessary, neat and properly labeled diagrams should be drawn.

Section A

1. Write the balanced chemical equation for the following reaction and identify the type of reaction.

   Magnesium (s) + Hydrochloric acid (aq) $\rightarrow$ Magnesium chloride (aq) + Hydrogen (g)

   OR

   Write the balanced chemical equation for the following reaction and identify the type of reaction.

Potassium bromide (aq) + Barium iodide (aq) → Potassium iodide (aq) + Barium bromide (aq)

2. Is the **decomposition of ferrous sulphate** exothermic or endothermic in nature?
3. The hardness of water is caused by:
   a. All of these
   b. $Mg(HCO_3)_2$
   c. $CaCl_2$
   d. $CaSO_4$
4. Name a mirror that can give an erect and enlarged image of an object.
5. Why are danger light signals red in color?
6. Give two examples of hydrated salts.

OR

Explain how antacid works.

7. How does the resistance of a wire vary with its area of cross-section? Explain.
8. Why is an alternating current considered to be advantageous over direct current for long range transmission of electric energy?
9. Name the physical quantity whose unit is JC^{-1}.

OR

What happens to the other bulbs in a series circuit, if one bulb blows off?

10. Name minute tubules which end in the alveoli of the lungs.
11. From which substance urea is formed in the liver?

OR

In which part of plants sugar and other metabolites are synthesized?

12. In the following food chain, 5 J of energy is available to man. How much energy was available at producer level?
    Plants → Sheep → Man

OR

What name has been given to those organisms which break down the complex organic

compounds present in dead animals and plants?

13. Mention any three methods adopted by plants to minimise the transpiration rate.
14. **Assertion:** To dilute sulphuric acid, acid is added to water and not water to acid.
    Reason: Specific heat of water is quite large.
    a. Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
    b. Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
    c. Assertion is CORRECT but, reason is INCORRECT.
    d. Assertion is INCORRECT but, reason is CORRECT.
15. **Assertion (A):** Garden is an artificial ecosystem.
    Reason (R): Biotic and abiotic components of the ecosystem are manipulated by humans.
    a. Both A and R are true and R is correct explanation of the assertion.
    b. Both A and R are true but R is not the correct explanation of of the assertion
    c. A is true but R is false.
    d. A is false but R is true.

OR

Assertion (A): In plants, there is no need for specialised respiratory organs.
Reason (R): Plants do not have great demands for gaseous exchange.
a. Both A and R are true and R is correct explanation of the assertion.
b. Both A and R are true but R is not the correct explanation of the assertion
c. A is true but R is false.
d. A is false but R is true.

16. **Assertion (A):** The sex of a child is determined by the mother.
    Reason (R): Humans have two types of sex chromosomes: XX and XY.
    a. Both A and R are true and R is correct explanation of the assertion.
    b. Both A and R are true but R is not the correct explanation of the assertion
    c. A is false but R is true.
    d. A is true but R is false.
17. **Read the following and answer any four questions:**
    In human beings, the process of intake of essential nutrients in the form of food takes place through an entire system known as the digestive system. The human digestive

system constitutes a long tubular structure called the alimentary canal and various digestive glands associated with it. These glands secrete different digestive enzymes.

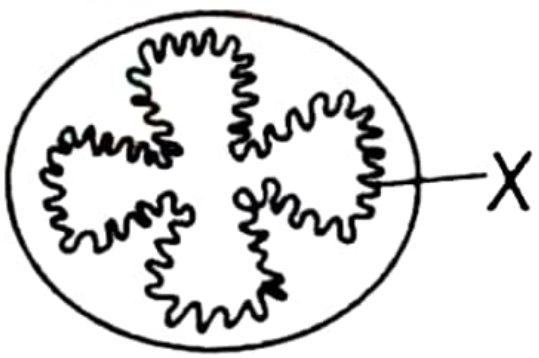
i. In which order do these events occur in human nutrition?
   a. Digestion → Ingestion → Absorption → Assimilation
   b. Digestion → Ingestion → Assimilation → Absorption
   c. Ingestion → Absorption → Assimilation → Digestion
   d. Ingestion → Digestion → Absorption → Assimilation

ii. The diagram shows the human digestive system. Identify the structures which secrete digestive enzymes.
   a. A, B, C, and D
   b. A, C, D, and E
   c. A, C, and E
   d. B, C, and D

iii. Only two of the following statements accurately describes what happens in the mouth.
   A. Amylase breaks down large starch molecules into smaller maltose molecules.
   B. Chewing increases the surface area of food for digestion.
   C. Saliva emulsifies fat into smaller droplets.
   D. Teeth break large insoluble molecules into smaller soluble molecules.

   Which statements are correct?
   a. A and B
   b. B and C
   c. C and D
   d. A and D

iv. The diagram represents a transverse section of the human intestine. What is the role of structure labelled X?



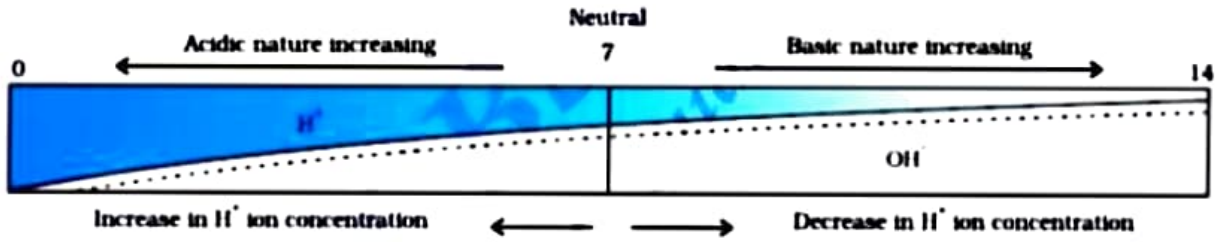
   a. They help to digest food

b. They increase the surface area for absorption of food
c. They protect against bacteria
d. They move mucus over the surface

v. The gall bladder of a patient is removed because of gall bladder stones. Which kind of nutrient in the diet should be avoided?
a. Carbohydrates
b. Proteins
c. Fats
d. Vitamins and minerals

18. **Read the following and answer any four questions:**

A scale for measuring hydronium ion in a solution called the pH scale. The pH of a neutral solution is 7. A value of less than 7 on the pH scale represents an acidic solution. As the pH value, increases from 7 to 14 it represents OH- ion concentration in solution i.e a basic solution.



i. Human Body works within the pH range of
a. 7.4 to 8
b. 4.4 to 5.4
c. 7 to 7.8
d. 6.1 to 7

ii. The strength of acid and bases depend on the _____
a. number of H^+ ion produce
b. number of OH^- ion produce
c. both (a) and (b)
d. none of the above

iii. A solution turns red litmus blue, its pH is likely to be
a. 1
b. 4

c. 5

d. 10

iv. Tooth decay starts when the pH of the mouth lower than

a. 7.5

b. 5.5

c. 6.7

d. 8.4

v. The higher the hydronium ion concentration _____ is the pH value.

a. lower

b. greater

c. same

d. zero

19. **Read the following and answer any four questions:**

For the flow of charge in a conductor metallic wire, gravity does not play any role. The electron moves only if there is a difference in electric potential. The difference of potential may be produced by a battery, consist of one or more electric cells. The chemical action with a cell generate the potential difference across the terminal of the cell, even when no current is drawn from it, potential difference set the charges in motion in the conductor produce an electric current, the cell has to expend its chemical energy stored in it.

i. The potential difference between 2 points is measured as:

a. $V = \frac{W}{Q}$

b. $V = \frac{R}{I}$

c. $V = \frac{Q}{I}$

d. V = IR

ii. Keeping the potential difference constant, the resistance of the circuit is halved. The current will become:

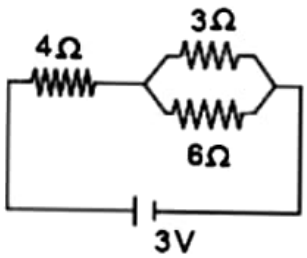
a. one-fouth

b. four times

c. half

d. double

iii. The potential difference across the 3-ohm resistance in the following diagram is:



a. $\frac{1}{9}$ V
b. 3 V
c. 2 V
d. 1 V

iv. The other name of the potential difference is:
a. amperage
b. wattage
c. voltage
d. potential energy

v. The S.I unit of electric potential difference is volt (V) named after:
a. Alessandra volta
b. Alandra volta
c. Alessandra volt
d. Alexandra volt

20. **Read the following and answer any four questions:**

The Earth's crust is a major source of metal. The element which occurs naturally in earth crust is known as mineral, metal is found in a free state, combined state as oxides. Ores are usually contaminated by impurities. These impurities are removed by various methods such as roasting, calcination, and electrolytic refining, etc.

i. Which of the following pair of metals exist in their native state in nature?
a. Ag and Hg
b. Ag and Zn
c. Au and Hg
d. Au and Ag

ii. Sulphide ore is converted into metal oxide by the process of:
a. carbonation
b. roasting
c. calcination

d. anodising

iii. _____ is an ore of mercury.

a. Cinnabar

b. Mercury oxide

c. Hematite

d. Bauxite

iv. Which of the following statement is correct?

a. Na and K are the least reactive elements

b. Mg and Al are highly reactive elements

c. Zn, Fe are highly reactive elements

d. Pb is the least reactive element

v. Which of the following alloys contains mercury as one of the constituents?

a. Stainless steel

b. Solder

c. Duralumin

d. Zinc amalgam

Section B

21. What are villi? What are its functions?

OR

Why breathing rate increases after a vigorous physical exercise?

22. Why is it necessary to separate the oxygenated and deoxygenated blood in mammals and birds?
23. Why does an atom of an element react with another atom to form a molecule?
24. Five solutions A, B, C, D and E when tested with universal indicators 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 H+ ion concentration.

25. Sudha finds out that the sharp image of window pane of her science laboratory is formed

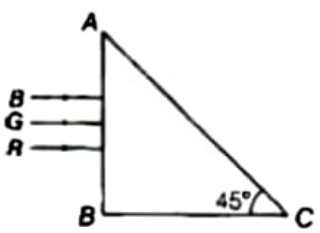
at a distance of 15 cm from the lens. She now tries to focus the building visible of her outside the window instead of the window pane without disturbing the lens. In which direction will she move the screen to obtain a sharp image of the building? What is the approximate focal length of this lens?

26. Draw a circuit diagram of an electric circuit containing of two resistors ammeter, a resistor of 2Ω in series with a combination of two resistors (4 each) in parallel and a voltmeter across the parallel combination. Will the potential difference across the 2Ω resistors be the same as that across the parallel combination of 4Ω resistors? Give reason.
27. A study found that children with light-coloured eyes are likely to have parents with light coloured eyes. On this basis, can we say anything about whether the light eye colour trait is dominant or recessive? Why or why not?

OR

List any three structures of animals as examples of homologous organs.

28. State any three ways of effective Garbage disposal so that pollution caused by it can be minimized.
29. Differentiate between Right ventricle and Left ventricle
30. What happens when dilute hydrochloric acid is added to iron filings?
31. Arrange the following elements in increasing order of their atomic radii: Li, Be, F and N.
32. Atomic number of an element is 16. Write its electronic configuration. Find the number of valence electrons and its valency.
33. Three light rays, red (R), green (G) and blue (B) are incident on a right-angled prism ABC at face AB. The refractive indices of the material of the prism for red, green and blue wavelengths are 1.39, 1.44 and 1.47 respectively.
Out of the three, which colour of ray will emerge out of face AC? Justify your answer. Trace the path of these rays after passing through face AB.



34. A student wants to project the image of a candle flame on the walls of school laboratory by using a lens.

i. Which type of lens should he use and why?

ii. At what distance in terms of focal length F of the lens should he place the candle flame, so as to get

a. a magnified and

b. a diminished image respectively, on the wall?

iii. Draw ray diagrams to show the formation of the image in each case.

OR

i. Define optical centre of spherical lens.

ii. A divergent lens has a focal length of 20 cm. At what distance should an object of height 4 cm from the optical centre of the lens be placed, so that its image is formed 10 cm away from the lens. Find the size of the image also.

iii. Draw a ray diagram to show the formation of image in above situation.

35. a. What is reproduction? List its two types.

b. Write the difference between modes of reproduction unicellular and multicellular organisms?

36. a. State Fleming's left-hand rule.

b. Write the function of the following parts of an electric motor.

i. Brushes

ii. Split ring

OR

a. Draw magnetic field lines produced around a current-carrying straight conductor passing through cardboard. Name, state and apply the rule to mark the direction of these field lines.

b. How will the strength of the magnetic field change when the point where the magnetic field is to be determined is moved away from the straight wire carrying constant current? Justify your answer.