

SAMPLE PAPER 4

Class 10 - Science

Time Allowed: 3 hours

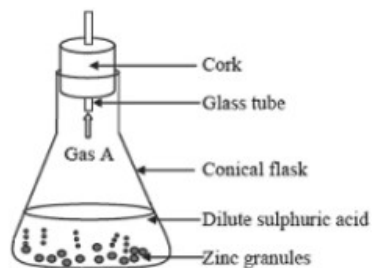
Maximum Marks: 80

General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective-type questions carrying 1 mark each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answers to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

Section A

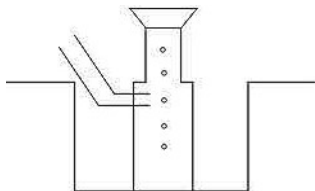
1. Which characteristic is observed by the reaction shown in the given image? [1]



- | | |
|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <p>a) Formation of a precipitate</p> <p>c) Evolution of a gas</p> | <p>b) Change in temperature</p> <p>d) Both change in temperature and evolution of gas</p> |
|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
2. What happens when dilute HCl is added to iron fillings? Select the correct answer. [1]
- | | |
|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <p>a) Hydrogen gas and iron chloride are produced</p> <p>c) No reaction takes place</p> | <p>b) Iron salt and water are produced</p> <p>d) chlorine gas and iron hydroxide are produced</p> |
|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
3. pH (power of Hydrogen) value of black coffee is: [1]

- a) 5
c) 7
- b) 3
d) 8

4. Which of the following is not an allotropic form of carbon? [1]
- a) Diamond
c) Graphite
- b) Fluorine
d) Fullerene
5. A metal is heated with dil H_2SO_4 . The gas evolved is collected by the method shown in the figure. Answer the following questions based on it: [1]



Name the gas evolved.

- a) H_2 gas
c) CO gas
- b) O_2 gas
d) CO_2 gas
6. Which of the following has an electrovalent bond(s)? [1]
- A. CaF
B. NaCl
C. MgO
D. CO_2
- a) A and C
c) All of these
- b) A, B and C
d) C and D
7. The structural formula of an ester from which an acid and an alcohol is formed is as follows. Name the acid and the alcohol. [1]
- $$\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C}-\text{O}-\text{C}-\text{C}-\text{C}-\text{H} \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$$
- a) Formic acid, Ethanol
c) Propanoic acid, Methanol
- b) Ethanoic acid, Ethanol
d) Formic acid, Propanol
8. In which kind of respiration more energy is released? [1]
- a) All of these
c) Aerobic respiration
- b) Photorespiration
d) Anaerobic respiration
9. The two versions of a trait (character) which are brought in by the male and female gametes are situated on [1]
- a) any chromosome
c) sex chromosomes
- b) two different chromosomes
d) copies of the same chromosome
10. The correct sequence of reproductive stages seen in flowering plants is [1]
- a) gametes, zygote, embryo, seedling
c) zygote, gametes, embryo, seedling
- b) gametes, embryo, zygote, seedling
d) seedling, embryo, zygote, gametes

11. The component of a chromosome that controls heredity is [1]
 a) Histones b) Proteins
 c) RNA d) DNA
12. What is correct about human kidney? [1]
 a) Each kidney has 2 ureters b) It is cylindrical
 c) It has 100 nephrons d) It is bean shaped
13. A coil of many circular turn wrapped around a insulator forms a [1]
 a) Solenoid b) Bar magnet
 c) Circular magnet d) U-shaped magnet
14. Which among the following is the correct way connecting ammeter and voltmeter in the circuit to determine the equivalent resistance of two resistors in series? [1]
 a) Both ammeter and voltmeter in parallel b) Ammeter in series and voltmeter in parallel
 c) Ammeter in parallel and voltmeter in series d) Both ammeter and voltmeter in series
15. Montreal protocol became effective in: [1]
 a) 1985 b) 1987
 c) 1992 d) 1989
16. In the following groups of materials, which group (s) contains only non-biodegradable items? [1]
 i. Wood, paper, leather
 ii. Polythene, detergent, PVC
 iii. Plastic, detergent, grass
 iv. Plastic, bakelite, DDT
 a) (iv) b) (ii) and (iv)
 c) (i) and (iii) d) (iii)
17. **Assertion (A):** In a reaction, $Zn(s) + CuSO_4(aq) \longrightarrow ZnSO_4(aq) + Cu(s)$ [1]
 Zn is a reductant but itself get oxidized
Reason (R): In a redox reaction, the oxidant is reduced by accepting electrons and reductant is oxidized by losing electrons.
 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 true but R is false. d) A is false but R is true.
18. **Assertion (A):** The testes descend into the scrotum just before birth. [1]
Reason (R): Human males have 2 testes in the body.
 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 true but R is false. d) A is false but R is true.
19. **Assertion (A):** Magnetic field lines never intersect. [1]

Reason (R): At a particular point magnetic field has only one direction.

- 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 true but R is false. d) A is false but R is true.
20. **Assertion (A):** Abiotic component of an ecosystem involves cycling of material and flow of energy. [1]
- Reason (R):** This is essential to keep biotic factors alive.

- 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 true but R is false. d) A is false but R is true.

Section B

21. i. Why does carbon form the largest number of compounds? Give two reasons. [2]
ii. Why are some of these called saturated and the other unsaturated compounds?
iii. Which one of these two is more reactive and why?
22. i. Trace the path of sperms from where they are produced in human body to the exterior. [2]
ii. Write the functions of secretions of prostate gland and seminal vesicle in humans.
23. Mention the role of pancreatic enzyme. [2]

OR

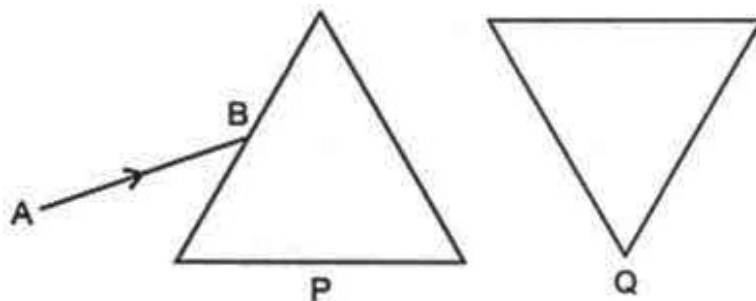
Give two points of difference between respiration in plants and respiration in animals.

24. Draw ray diagram showing the image formation by a concave mirror when an object placed at infinity. [2]
25. Describe how ozone present in the atmosphere is important for sustaining life on earth? [2]

OR

Why is food chain having two trophic levels most advantageous in terms of energy?

26. The given figure shows two identical prisms P and Q placed with their faces parallel to each other. A light ray of yellow colour AB is incident at the face of the prism P. Complete the diagram to show the path of the ray till it emerges out of the prism Q. [2]

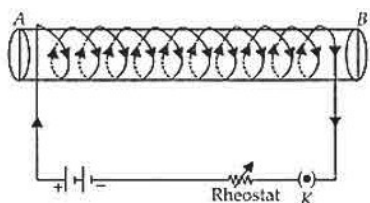


Section C

27. A cleaned aluminium foil was placed in an aqueous solution of zinc sulphate. When the aluminium foil was taken out of the zinc sulphate solution after 15 minutes, its surface was found to be coated with a silvery grey deposit. From the given observation, what can be concluded? [3]
28. i. List in tabular form three chemical properties on the basis of which we can differentiate between a metal and a non-metal. [3]
ii. Give reasons for the following:
a. Most metals conduct electricity well.
b. The reaction of iron (III) oxide $[\text{Fe}_2\text{O}_3]$ with heated aluminum is used to join cracked machine parts.

OR

- i. How is the method of extraction of metals high up in the reactivity series different from that for metals in the middle? Why cannot the same process be applied for them Name and explain the process of extraction of sodium?
- ii. Draw a labelled diagram of electrolytic refining of copper.
29. What do you understand by parasitic nutrition? [3]
30. a. Name the two types of gametes produced by men. [3]
b. Does a male child inherit X chromosome from his father? Justify.
c. How many types of gametes are produced by a human female?
31. How are the power and focal length of a lens related? You are provided with two lenses of focal length 20 cm and 40 cm respectively. Which lens will you use to obtain more convergent light? [3]
32. A hot plate of an electric oven connected to a 220 V line has two resistance coils A and B, each of 24Ω resistance, which may be used separately, in series, or in parallel. What are the currents in the three cases? [3]
33. A soft iron bar is enclosed by a coil of insulated copper wire as shown in figure. [3]



- i. When the plug of the key is closed, Where will the face B of the iron bar be marked?
- ii. How we can find the north-south polarities of an electromagnet?

Section D

34. Write the chemical formula and name of the compound which is the active ingredient of all alcoholic drinks. List its two uses. Write the chemical equation and name of the product formed when this compound reacts with - [5]
- a. sodium metal
- b. hot concentrated sulphuric acid

OR

Give an example of each of the following.

- i. A carbon compound containing two double bonds.
- ii. A molecule in which central atom is linked to three other atoms.
- iii. A compound containing both ionic and covalent bonds.
- iv. An organic compound which is soluble in water.
- v. A carbon compound which burns with a sooty flame.
35. i. Draw the female reproductive part of a flower and label: [5]
- a. The part which is sticky and receptors of pollen grains.
- b. The part that transfers male gametes.
- c. The part that contains the female gametes.
- ii. How do the pollen grains reach to the female reproductive part in a flower?
- iii. Describe how male and female gametes unite in a flowering plant with suitable diagrams.

OR

Following are the two examples of plant movement. One is drooping of leaves in touch-me-not plant and second is attaching of pea plant to a support with the help of tendrils.

- i. What is the stimulus which is common for movement in both the cases?
- ii. What is the difference in movement in both the plants? Explain.
- iii. Give appropriate scientific terms for the movements described in both cases.
36. It is desired to obtain an erect image of an object, using concave mirror of focal length of 12 cm. [5]
- i. What should be the range of distance of an object placed in front of the mirror?
- ii. Will the image be smaller or larger than the object? Draw ray diagram to show the formation of image in this case.
- iii. Where will the image of this object be, if it is placed 24 cm in front of the mirror? Draw ray diagram for this situation also to justify your answer. Show the positions of pole, principal focus and the centre of curvature in the above ray diagrams.

OR

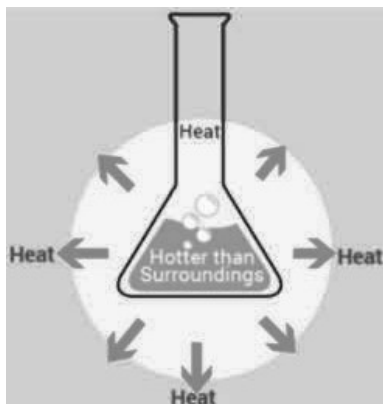
A student places a candle flame at a distance of about 60 cm from a convex lens of focal length 10 cm and focuses the image of the flame on a screen. After that he gradually moves the flame towards the lens and each time focuses the image on the screen.

- i. In which direction: toward or away from the lens, does he move the screen to focus the image?
- ii. How does the size of the image change?
- iii. How does the intensity of the image change as the flame moves towards the lens?
- iv. Approximately for what distance between the flame and the lens, the image formed on the screen is inverted and of the same size?

Section E

37. **Read the text carefully and answer the questions:** [4]

The dissolving of an acid or a base in water is a highly exothermic reaction. Care must be taken while mixing concentrated nitric acid or sulphuric acid with water. The acid must always be added slowly to water with constant stirring. If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns. The glass container may also break due to excessive local heating. Look out for the warning sign on the can of concentrated sulphuric acid and on the bottle of sodium hydroxide pellets.



- (i) What is the exothermic reaction?
- (ii) Write an example of an exothermic reaction.

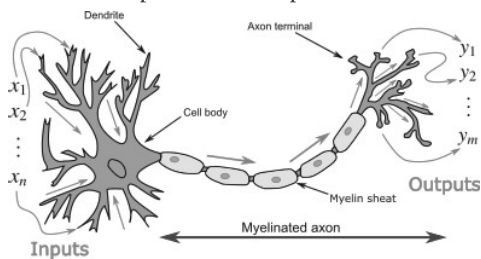
OR

How will you obtain sulphuric acid from an acidic oxide?

38. **Read the text carefully and answer the questions:** [4]

In animals, control and coordination are provided by nervous and muscular tissues. Touching a hot object is an urgent and dangerous situation for us. We need to detect it and respond to it. How do we detect that we are

touching a hot object? All information from our environment is detected by the specialised tips of some nerve cells. These receptors are usually located in our sense organs, such as the inner ear, the nose, the tongue, and so on. So gustatory receptors will detect taste while olfactory receptors will detect the smell. This information, acquired at the end of the dendritic tip of a nerve cell, see figure, sets off a chemical reaction that creates an electrical impulse. This impulse travels from the dendrite to the cell body, and then along the axon to its end.



- (i) Name the largest cell present in the body.
- (ii) What is an axon ?
- (iii) Name one gustatory receptor and one olfactory receptor present in a human beings.

OR

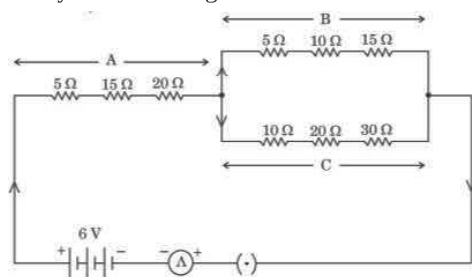
Name the following parts of a neuron:

- a. Where information is acquired.
- b. Through which information travels as an electrical impulse.

39. **Read the text carefully and answer the questions:**

[4]

Study the following electric circuit in which the resistors are arranged in three arms A, B and C:



- (i) Find the equivalent resistance of arm A.
- (ii) Calculate the equivalent resistance of the parallel combination of the arms B and C.
- (iii) Determine the current that flows through the ammeter.

OR

Determine the current that flows in the ammeter when the arm B is withdrawn from the circuit.

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