

Sample Paper 4

Class X 2022-23

Science (086)

Time: 3 Hours

Max. Marks: 80

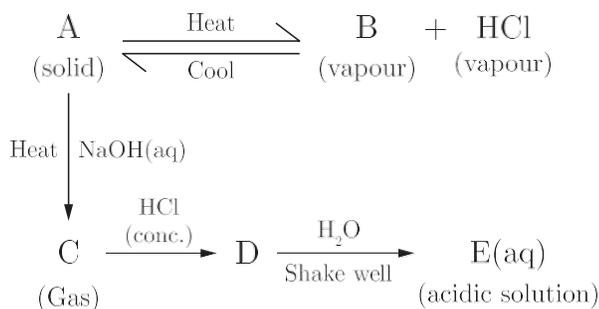
General Instructions:

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. Answer 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

Select and write one most appropriate option out of the four options given for each of the questions 1 – 20.

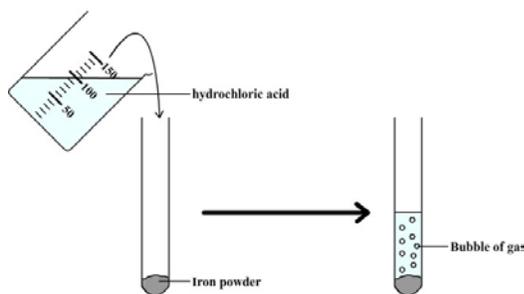
1. The schematic diagram is given below :



Which of the following is an incorrect statement?

- (a) A and E are chemically same.
- (b) A and D are chemically same.
- (c) D and E are chemically same.
- (d) C and E are chemically same.

2. What happens when dilute hydrochloric acid is added to iron fillings as shown in the figure?



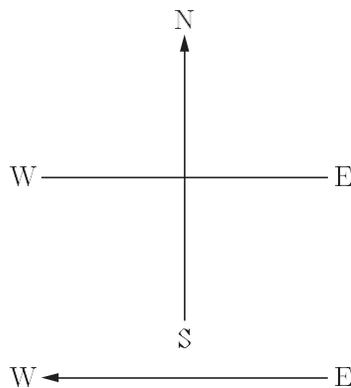
- (a) Hydrogen gas and iron chloride are produced.
 (b) Chlorine gas and iron hydroxide are produced.
 (c) No reaction takes place.
 (d) Iron salt and water are produced.
3. When hydrogen sulphide gas is passed through a blue solution of copper sulphate, a black precipitate of copper sulphide is obtained and the sulphuric acid so formed remains in the solution. The reaction is an example of:
- (a) combination reaction
 (b) displacement reaction
 (c) decomposition reaction
 (d) double displacement reaction

4. Which of the following pair is incorrect in the given table?

	Reaction	Reaction Name
(a)	$\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$	Combustion reaction and oxidation reaction
(b)	$\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{KNO}_3$	Double displacement and precipitation reaction
(c)	$\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$	Combination reaction
(d)	$\text{CuSO}_4 + \text{Zn} \rightarrow \text{ZnSO}_4 + \text{Cu}$	Combination reaction

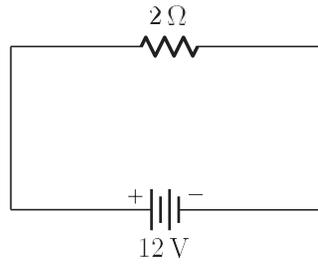
5. Which of the following metal displace hydrogen from dilute acid?
- (a) Zinc
 (b) Magnesium
 (c) Copper
 (d) Sodium
6. Which of the following statements is not correct?
- (a) All metal carbonates react with acid to give a salt, water and carbon dioxide.
 (b) All metal oxides react with water to give salt and acid.
 (c) Some metals react with acids to give salt and hydrogen.
 (d) Some non-metal oxides react with water to form acid.

10. Human males all the chromosomes are paired perfectly except one. This/these unpaired chromosomes is/are
- (i) large chromosomes
 - (ii) small chromosomes
 - (iii) Y-chromosome
 - (iv) X-chromosome
- (a) (i) and (ii)
(b) (iii) only
(c) (iii) and (iv)
(d) (ii) and (iv)
11. The growth of tendril in pea plants is due to
- (a) effect of light
 - (b) effect of gravity
 - (c) rapid cell divisions in tendrillar cells that are away from the support
 - (d) rapid cell divisions in tendrillar cells in contact with the support
12. In Spirogyra, asexual reproduction takes place by
- (a) breaking up of filaments into smaller bits
 - (b) division of a cell into two cells
 - (c) division of a cell into many cells
 - (d) formation of young cells from older cells
13. An electric kettle consumes 1 kW of electric power when operated at 220 V. A fuse wire of what rating must be used for it?
- (a) 1 A
 - (b) 2 A
 - (c) 4 A
 - (d) 5 A
14. A constant current flows in a horizontal wire in the plane of the paper from east to west as shown in Figure. The direction of magnetic field at a point will be North to South.

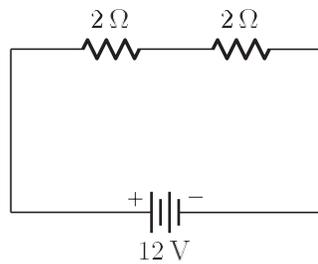


- (a) directly above the wire
- (b) directly below the wire
- (c) at a point located in the plane of the paper, on the north side of the wire
- (d) at a point located in the plane of the paper, on the south side of the wire.

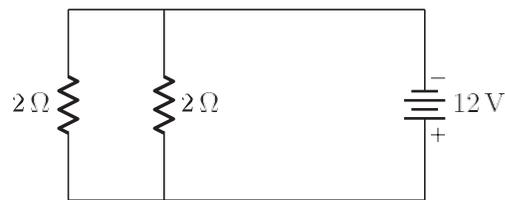
15. In the following circuits (Figure), heat produced in the resistor or combination of resistors connected to a 12 V battery will be



(i)



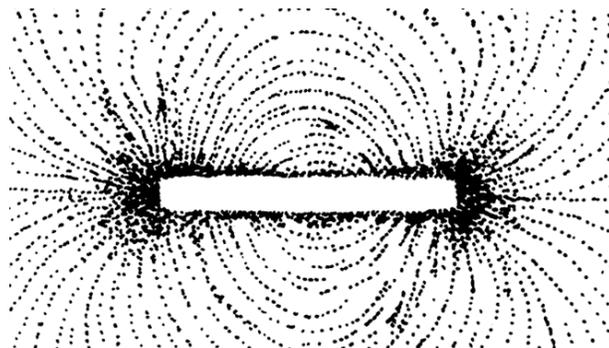
(ii)



(iii)

- (a) same in all the cases
- (b) minimum in case (i)
- (c) maximum in case (ii)
- (d) maximum in case (iii)

16.



Choose the incorrect statement from the following regarding magnetic lines of field

- (a) The direction of magnetic field at a point is taken to be the direction in which the north pole of a magnetic compass needle points.
- (b) Magnetic field lines are closed curves.
- (c) If magnetic field lines are parallel and equidistant, they represent zero field strength.
- (d) Relative strength of magnetic field is shown by the degree of closeness of the field lines.

Question no. 17 to 20 are Assertion - Reasoning based questions.

17. **Assertion :** Silver chloride turns grey in sunlight.

Reason : Silver is one of the least reactive metals.

- (a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
- (b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
- (c) Assertion is True but the Reason is False.
- (d) Both Assertion and Reason are False.

18. **Assertion :** Mendel chose a number of varieties of garden pea as plant material for his experiments.

Reason : Garden pea has well defined characters and was bisexual.

- (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
- (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
- (c) Assertion (A) is true but reason (R) is false.
- (d) Assertion (A) is false but reason (R) is true.

19. **Assertion :** In plants, water is transported through phloem.

Reason : It is because sieve tubes are absent in phloem.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (c) Assertion is true but Reason is false.
- (d) Both Assertion and Reason are false.

20. **Assertion :** In a conductor, free electrons keep on moving but no magnetic force acts on a conductor in a magnetic field.
- Reason :** Force on free electrons due to magnetic field always acts perpendicular to its direction of motion.
- (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
- (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
- (c) Assertion (A) is true but reason (R) is false.
- (d) Assertion (A) is false but reason (R) is true.

SECTION-B

Question no. 21 to 26 are very short answer questions.

21. Why are cooking vessels and water boilers generally made of copper and aluminium as shown in figure?



OR

Hydrogen is a non-metal, still it is given a place in the reactivity series. Why?

22. Explain the significance of peristaltic movement that occurs all along the gut during digestion.
23. How are the breathing movements controlled?
24. Urine passed during summer is usually less in quantity and is somewhat thicker. Why is it so?
25. Which component of white light deviates (i) the least and (ii) the most while passing through a glass prism? State the reason of this difference in deviation.

OR

Name the part of eye where images formed in a normal human eye. State how the image position changes in myopia and hypermetropia.

26. Classify the following ecosystems into natural and artificial ecosystem:
Forest ecosystem, aquarium, Marine ecosystem and crop land ecosystem.

SECTION-C

Question no. 27 to 33 are short answer questions.

27. Identify the substances that are oxidised and that are reduced in the following reactions :

- (i) $\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$
- (ii) $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$
- (iii) $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$

28. State which of the following reaction will take place or not and why?

- (i) $\text{Zn(s)} + \text{CuSO}_4(\text{aq}) \rightarrow \text{ZnSO}_4(\text{aq}) + \text{Cu(s)}$
- (ii) $\text{Fe(s)} + \text{ZnSO}_4(\text{aq}) \rightarrow \text{FeSO}_4(\text{aq}) + \text{Zn(s)}$
- (iii) $\text{Zn(s)} + \text{FeSO}_4(\text{aq}) \rightarrow \text{ZnSO}_4(\text{aq}) + \text{Fe(s)}$

29. (i) What is the role of mucus in stomach?
(ii) How exit of food from the stomach is regulated?
(iii) Where does food enter from stomach?

OR

Write one function of each of the following components of the transport system in human beings

- (a) Blood vessels
- (b) Lymph
- (c) Heart

30. (a) Which mirror do we use as a rear-view mirror in vehicles?
(b) Draw a ray diagram to illustrate the formation of an image when an object is placed anywhere in front of the mirror on its principal axis. State the nature and position of the image formed.
31. (a) Explain in brief, convex lens is converging in nature.
(b) A convex lens forms a real and inverted image of a needle at a distance of 50 cm from it. Where is the needle placed in front of convex lens if the image is equal to the size of the object? Also find the power of the lens.
32. Answer the following questions :
(i) What is the direction of magnetic field lines outside a bar-magnet?
(ii) The magnetic field lines in a given region are getting crowded. What does it indicate?
(iii) State one advantage of AC over DC.

OR

- (a) Give the significance of the following in a domestic circuit:
 - (i) electric meter,
 - (ii) earthing.
 - (b) List two precautions that should be taken to avoid overloading.
33. Explain some harmful effects of agricultural practices on the environment.

SECTION-D

Question no. 34 to 36 are Long answer questions.

34. Write chemical equations to represent what happens when :

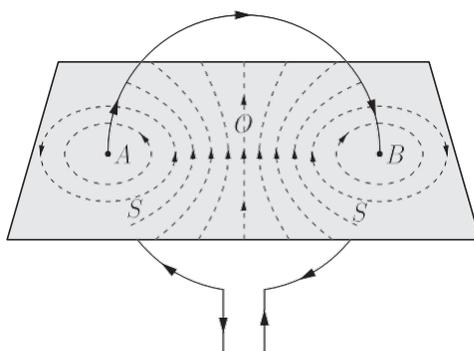
- (a) Ethanol burns in air.
- (b) Ethanol reacts with sodium metal.
- (c) Ethanol is heated with alkaline KMnO_4 .
- (d) Ethanol is heated with ethanoic acid in presence of few drops of concentrated sulphuric acid.
- (e) Ethanol is heated at 443 K with excess concentrated H_2SO_4 .

OR

- (a) Give a chemical test to distinguish between saturated and unsaturated hydrocarbons.
 - (b) Name the products formed when ethane burns in air. Write the balanced chemical equation for the reaction showing the types of energies liberated.
 - (c) Why is reaction between methane and chlorine in the presence of sunlight considered a substitution reaction.
35. (a) "Use of a condom is beneficial for both the sexes involved in a sexual act." Justify this statement giving two reasons.
- (b) How do oral contraceptive help in avoiding pregnancies ?
 - (c) What is sex selective abortion? How does it affect a healthy society ? (State any one consequence)

OR

- (i) Describe the various steps involved in the process of binary fission with the help of a diagram.
 - (ii) Why do multicellular organisms use complex way of reproduction ?
36. When a current is passed through the circular loop of wire, a magnetic field lines near the coil are nearly circular and concentric. At the centre of the circular loop, the magnetic field lines are straight.
- The strength of the magnetic field produced by a current-carrying circular coil (or circular wire) depends on :
- (i) current flowing through the coil.
 - (ii) radius of the circular coil.
 - (iii) number of turns of wire in the circular coil.
- The direction of the field lines can be found by applying Right-Hand Thumb Rule.



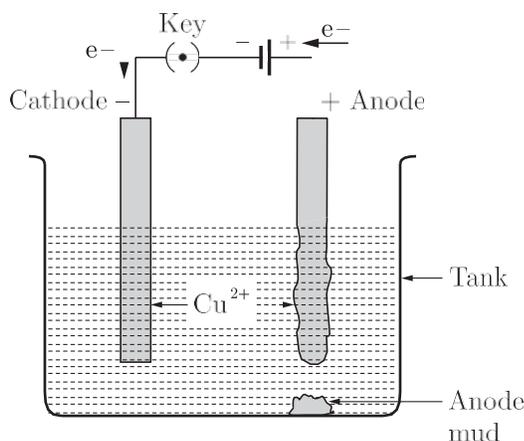
- (i) State Right-hand Thumb rule.
- (ii) A long horizontal power line is carrying a current of 100 A in the east-west direction. What is the direction of magnetic field at a point 1.0 m below it ?
- (iii) What type of curve we get, between magnetic field and distance along the axis of a current carrying circular coil ?
- (iv) If a current carrying straight conductor is placed in east-west direction, then find the direction of the force experienced by the conductor due to earth's magnetic field.

SECTION-E

Question no. 37 to 39 are case-based/data -based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

37. Refining is the process of purification of metals. One of the important method of refining is electrolysis. In electrolysis, electrical energy is used to bring about a non-spontaneous redox reaction. This is done by passing an electric current through a liquid containing ions, known as an electrolyte. In contrast to metals, the current in electrolytes is carried by the movement of ions rather than the movement of electrons. The solid conductors inserted into the liquid are called electrodes, the one with a positive charge is called the anode (because it attracts anions) and the one with the negative charge is called the cathode.

A diagrammatic representation of electrolysis of copper is shown below:



- (i) Name the electrolyte used in refining of copper.
- (ii) a. $\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}^-$
 b. $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$
 Which of these two reactions occur at cathode and anode?

OR

- (iii) What is anode mud? Name two metals which can be refined by electrolytic method.

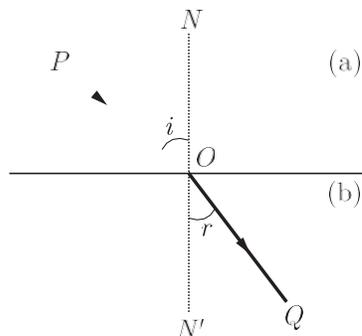
38. The growing size of the human population is a cause of concern for all people. The rate of birth and death in a given population will determine its size. Reproduction is the process by which organisms increase their population. The process of sexual maturation for reproduction is gradual and takes place while general body growth is still going on. Some degree of sexual maturation does not necessarily mean that the mind or body is ready for sexual acts or for having and bringing up children. Various contraceptive devices are being used by human beings to control the size of population.

- (i) List two common signs of sexual maturation in boys and girls.
 (ii) What is the result of reckless female foeticide?
 (iii) Which contraceptive method changes the hormonal balance of the body?

OR

- (iv) Write two factors that determine the size of a population.

39. When light ray goes from one transparent medium to another transparent medium, it suffers a change in direction, into second medium. The extent of the change in direction suffered by the phenomenon of change in the path of light rays when going from one medium to another medium is known as refraction. Ray is a given pair of media can be expressed in terms of refractive index. The refractive index is related to an important physical quantity in the relative speed of light in different media.



- (i) A ray of light enters into the glass from air. Does it bend towards normal?
- (ii) What is the unit of refractive index?
- (iii) Light enters from air to glass having refractive index 1.50. What is the speed of light in the glass? The speed of light in vacuum is $3 \times 10^8 \text{ ms}^{-1}$.

OR

- (iii) When light goes from one medium to another, which of the three parameters, frequency, wavelength, velocity change?

