FIITJEE

CBSE FULL TEST – II

ALL XTH STUDYING BATCHES

SCIENCE

Time: 3:00 Hours **Max Marks: 80**

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 there of 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 –questionno.-34 to 36 are long answer type questions carrying 5 marks each. Answer to these questions should be in the range of80 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.

Name of the Candidate : .....

Enroll Number : .....

Date of Examination : .....

SECTION – A

Very Short Answer type (1 mark each)

1. The earliest members of human species, Homo sapiens can be traced from _____.

2. Name the phenomenon due to which stars appear higher in the sky.

3. Name the device which converts electrical energy into mechanical energy.

4. Write the role of urinary bladder in human being

5. The front face of a circular loop of wire is found to be North-pole. What will be the direction of current in this face of the loop?

6. What is meant by saying that the metals are malleable and ductile?

7. "We need to balance a skeltal chemical equation".
   Give reason to justify the statement.

8. Why the pepsin is secreted by stomach?

9. What is the charge on an electron?

10. Name the acid present in vinegar.
    (A) Lactic acid (B) Acetic acid
    (C) Oxalic acid (D) Tartaric acid

11. Should the resistance of an ammeter be low or high?

Directions (Questions 12 – 13):) In the following questions, a statement of Assertion is followed by a statement of Reason.

Mark the correct choice as
(A) If both Assertion and Reason are true, and Reason is the correct explanation of Assertion
(B) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion
(C) If Assertion is true, but Reason is false
(D) If Reason is true, but Assertion is false
(E) If both Assertion and Reason are false

12. **Assertion:** Translocation of food occurs in Plants.
    Reason: Xylem tissue is responsible for Translocation.

13. **Assertion:** Pollination is the transfer of pollen grain to the anther.
    Reason: Pollination is carried out by wind, birds and insects.

14. Which of the following is/are strong acids?
    (A) CH_3COOH (B) H_2CO_3
    (C) H_2SO_4 (D) NH_3

15. How does use of a fuse wire protect electrical appliances?

16. A: Calcium sulphate hemihydrate is used for supporting the fractured bones.
R: When this white powder is mixed with water, a hard solid mass is formed.
(A) Both (A) and (R) are true and (R) is the correct explanation of (A).
(B) Both (A) and (R) are true and (R) is not the correct explanation of (A).
(C) (A) is true, but (R) is false
(D) (A) is false, but (R) is true

17. The rate at which electrical energy is dissipated into other forms of energy is called 'electric power' P. Thus,

$$\text{Power, } P = \frac{W}{t}$$

$$\text{or } P = \frac{V\ I\ t}{t} = V\ I$$

The SI unit of power is 'watt' (W).
1 watt = 1 joule / second
As, for a resistor, V = IR
Therefore,

$$P = V\ I = I^2R = \frac{V^2}{R}$$

Give answer to any four of the following questions on the basis of the above paragraph.

(i) Calculate the resistance of a heater of rating 600 W – 120 V.
(A) 24 Ω (B) 5 Ω
(B) 0.2 Ω (D) None of these

(ii) A 220 V – 100 W bulb is connected to a 110 V source. Calculate the power consumed by the bulb.
(A) 50 W (B) 25 W
(C) 100 W (D) 75 W

(iii) An electric iron consumes energy at the rate of 800 W. If main voltage be 200 V. What is the current flowing?
(A) 0.25 A (B) 8 A
(C) 4 A (D) None of these

(iv) An electric heater is rated 220 V, 500 W. Calculate the electrical energy consumed in 4 hours.
(A) 4 kWh (B) 5 kWh
(C) 2000 kWh (D) 2 kWh

(v) An electric appliance of resistance 100 Ω is used at 220 V. Find the current flowing through it.
(A) 2.2 A (B) 22 A
(C) 5/11 A (D) 4.4 A

18. Chlorine produced on passing electricity through brine solution undergoes reaction with dry slaked lime $Ca(OH)_2$ to produce bleaching powder.

$$Ca(OH)_2 + Cl_2 \longrightarrow \underset{\text{Calcium Oxychloride}}{CaOCl_2} + H_2O$$

Give answer to any four of the following questions on the basis of the above paragraph.

i. Oxidation states of chlorine in bleaching powder are:
(A) 0, 0 (B) +1, -1
(C) -1, -1 (D) 0, -1

ii. During electrolysis of brine Cl_2 is liberated at
(A) Cathode (B) Anode
(C) Both (A) and (B) (D) Can't be predicted

iii. Bleaching powder act as _____ in many chemical reactions.
(A) Oxidizing agent (B) Reducing agent
(C) Both (A) and (B) (D) None of these

iv. Which of the following are correct regarding $CaOCl_2$?
(A) It is used as bleaching agent for bleaching cotton and linen in textile industry.
(B) To bleach wood pulp in paper industry.
(C) To bleach washed clothes in laundry.
(D) All of these

v. Bleaching powder is used as _____ in water to make it germ free.
(A) Disinfectant (B) Pesticide
(C) Precipitating agent (D) None of these

19. In single-celled organisms, the food may be taken in by the entire surface. There is a range of strategies by which the food taken in and used by the organisms. Some organisms break down the food materials outside their body and absorb it. Examples are fungi like bread moulds, yeast and mushrooms. Others take in whole material and break it down inside their bodies. What can be taken in and broken down depends on the body design and functioning. Some other organisms derive nutrition from plants or animals without killing them. This parasitic nutritive strategy is used by a wide variety of organisms like cuscuta (amar-bel), ticks, lice, leeches and tapeworms. Amoeba feeds by holozoic mode of nutrition. It engulfs the food particle using pseudopodia, the process is called phagocytosis. The engulfed food gets enclosed in a food vacuole. paramaecium have cilia that help them to engulf the food through the oral groove. Humans are omnivores, they can eat plant-based food as well as animal-based food. Human digestive system has an alimentary canal and associated digestive glands, which produce digestive juices that help in digestion of the food i.e. Salivary glands secrete saliva which initiates digestion in the mouth itself. Gastric glands secrete hydrochloric acid and enzyme pepsin. The liver secretes bile for digestion of fats.
The pancreas secretes many digestive enzymes like trypsin, chymotrypsin, lipase, amylase are present in the pancreatic juice.

Give answer to any four of the following questions on the basis of the above paragraph.

i. Select the incorrect pair.
(A) Respiration- – Oxidation of food to obtain energy
(B) Nutrition – Obtaining and utilising nutrients
(C) Transportation- Response to stimuli
(D) Excretion – Removal of waste by-products

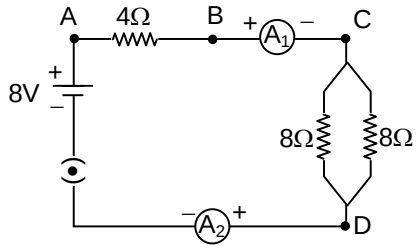
ii. What is the mode of nutrition in fungi?
(A) chemoautotrophic (B) photoautotrophic
(C) holozoic (D) saprotrophic

iii. How does amoeba capture its food?
(A) with the help of hands (B) with the help of Pseudopodia
(C) with the help of mouth (D) use cilia to push food to mouth

iv. The digestion of protein completed in:–
(A) stomach (B) mouth
(C) small intestine (D) large intestine

v. Amylase is carbohydrate digesting enzyme secreted by:–
(A) pancreas (B) stomach
(C) mouth (D) pancreas and mouth both

20. In the given circuit diagram A_1 and A_2 are two ammeters. A source of 8 V is connected in the circuit and three resistors having the resistances of 4 Ω, 8 Ω and 8 Ω respectively are connected in the circuit.



Give answer to any four of the following questions on the basis of the above paragraph.

(i) Find the effective resistance of two 8 Ω resistors in the combination.
(A) 8 Ω (B) 4 Ω
(C) 2 Ω (D) 16 Ω

(ii) Find the current flowing through 4 Ω resistor.
(A) 1 A (B) 2 A
(C) 0.5 A (D) 0.25 A

(iii) Find the potential difference across 4 Ω resistor.
(A) 8 V (B) 2 V
(C) 4 V (D) 1 V

(iv) Find the power dissipated in 4 Ω resistor.
(A) 16 W (B) 8 W
(C) 32 W (D) 4 W

(v) Find the difference in ammeter readings, if any.
(A) 1 A (B) 2 A
(C) 0.5 A (D) Zero

SECTION – B

Short Answer type-I (2 marks each)

21. The elements of the second period of the periodic table are given below:
Li Be B C N O F
(a) Give reason to explain why atomic radii decreases from Li to F
(b) Identify the most metallic and non-metallic element.

22. Draw a circuit diagram of an electric circuit containing a cell, a key, an ammeter, a resistor of 2 Ω in series with a combination of two resistors (4 Ω each) in parallel and an ideal voltmeter across the parallel combination. Will the potential difference across the 2 Ω resistor be the same as that across the parallel combination of 4 Ω resistors? Give reason.

23. Name the reducing agent in the following reaction:

$3MnO_2 + 4Al \longrightarrow 3Mn + 2Al_2O_3$

State which is more reactive, Mn or Al and why?

OR

Write balanced chemical equations for the following reactions.
(a) Silver bromide on exposure to sunlight decomposes into silver and bromine.
(b) Sodium metal reacts with water to form sodium hydroxide and hydrogen gas.

24. How is the ozone formed?

25. What do you mean by dispersion of white light?

26. i) What is budding?
ii) Diagrammatically show the process of budding in Hydra.

OR

State the form in which the following are stored:–
(i) Unused carbohydrates in plants
(ii) The energy derived from food in humans

SECTION – C

Long Answer type-I (3 marks each)

27. Write one role of the following. **(3 Marks)**
(i) Xylem
(iii) Guard cells
(iii) Pseudopodia

28. Explain the action of dilute hydrochloric acid on the following with chemical equation:
(i) Magnesium
(ii) Sodium hydroxide
(iii) Crushed egg shells

OR

(a) Draw the structure of 2-Methylpropanal
(b) Write the IUPAC name of neopentane
(c) Write one isomer of butane

29. (a) Draw a well labeled diagram of Female Reproductive System. **(2 Marks)**
(b) The gene for red hair is recessive to gene of black hair. What will be hair colour of a person if he inherits a gene of red hair from his mother and gene for black hair from his father? **(1 Mark)**

30. What are the advantages of sexual reproduction over asexual reproduction?

OR

What are the 3 major pathways in which glucose can be broken down in a cell?

31. State three reasons for the following facts.
(i) Sulphur is a non-metal
(ii) Magnesium is a metal
One of the reason must be supported with a chemical equation.

32. Give the characteristics of magnetic field lines.

33. (a) Name the gas evolved when sodium reacts with ethanol. Also write the chemical reaction involved.
(b) What is catenation?

SECTION – D

Long Answer type-I (5 marks each)

34. (a) Write electron dot diagram for chlorine (atomic no. 17) and calcium (Atomic no. 20). Show the formation of calcium chloride by transfer of electrons.
(b) Identify the nature of above compound and explain three physical properties of such compound.

OR

State reason for the following statements:
(i) Tap water conducts electricity whereas distilled water does not.
(ii) Dry hydrogen chloride gas does not turn blue litmus red whereas dilute hydrochloric acid does.
(iii) During summer season, a milk man usually adds a very small amount of baking soda to fresh milk.
(iv) For dilution of acid, acid is added into water and not water into acid.
(v) Ammonia is a base but does not contain hydroxyl group.

35. A. Draw the excretory system and label the parts. **(2 Marks)**
B. i) State the method used for growing rose plants, jasmine plants. **(1 Mark)**
ii) What happens when Planaria gets cut into two pieces? **(1 Mark)**
iii) Why are testis located outside the abdominal cavity? **(1 Mark)**

36. A small candle, 1.5 cm in size is placed at 15 cm in front of a concave mirror of radius of curvature 20 cm. At what distance from the mirror should a screen be placed in order to obtain a sharp image? Describe the nature and size of the image.

OR

Calculate the distance at which an object should be placed in front of convex lens of focal length 15 cm to obtain an image triple of its size?

HINTS AND SOLUTIONS

1. Africa

2. Due to atmospheric refraction of light stars appear higher in the sky.

3. An electric motor converts electrical energy into mechanical energy.

4. Urinary bladder stores urine temporarily until the pressure of expanded bladder leads an urge to pass it.

5. The direction of current in this face of the loop will be anticlockwise.

6. They can be converted into sheets and wires.

7. Skeltal chemical equation are unbalanced. We need to balance chemical equation because of law of conservations of mass. It states that matter can neither be created nor be destroyed. Therefore chemical equation must be balanced in each and every chemical reaction.

8. Pepsin is a protein digesting enzyme in stomach.

9. An electron has 1.6×10^{-19} C (negative) charge on it.

10. B

11. The resistance of an ammeter should be low. When the ammeter resistance is low, almost all the current in the circuit is allowed to pass through the ammeter.

12. **C**

Sol. Assertion is true, but Reason is false

13. **A**

Sol. Both Assertion and Reason are true, and Reason is the correct explanation of Assertion

14. C

15. An electrical fuse works by breaking the circuit when there is a fault in an appliance that causes too much current to flow.

16. A

17.

(i) A

Power $P = \frac{V^2}{R}$

Or Resistance $R = \frac{V^2}{P} = \frac{120 \times 120}{600} = 24 \text{ Ohm}$

(ii) B

Power $P = \frac{V^2}{R}$

or Resistance $R = \frac{V^2}{P} = \frac{220 \times 220}{100} = 22 \times 22 \text{ Ohm}$

New potential difference, $V' = 110$ volt

$\therefore$ Power consumed by the bulb now, $P' = \frac{V'^2}{R} = \frac{110 \times 110}{22 \times 22} = 25$ watt

(iii) C
Electric power, P = VI
Thus, the current, I = P / V
I = 800 W / 200 V = 4 A;

(iv) D
Energy consumed = P × t
$= \frac{500}{1000} kW \times 4h = 2kWh$

(v) A
As, V = IR
I = V/R = 220/100 = 2.2 A

18.

i. C
ii. B
iii. A
iv. D
v. A

19.

i. **C**
ii. **D**
iii. **B**
iv. **C**
v. **D**

20.

(i) B
Two resistors of 8 Ω each are connected in parallel, therefore, effective resistance

$$\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{8} + \frac{1}{8} = \frac{1}{4}$$

or $R_P = 4\Omega$

(ii) A
Total resistance of the circuit R = 4 + 4 = 8 Ω
Current through the circuit, I = V/R = 8/8 = 1 A
Since current is same in series circuit so current flowing through 4Ω resistor = 1 A

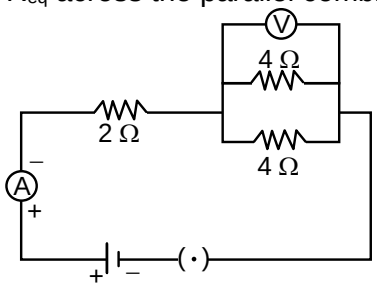
(iii) C
Potential difference across 4Ω resistance V = IR = 1 × 4 = 4 V

(iv) D
Power dissipated in 4Ω resistor, P = VI = 4 × 1 = 4 W

(v) D
There is no difference in ammeter readings, since same current flows through all the components in series circuit.

21. (a) It is because nuclear charge increases from left to right with atomic numbers. As a result the attraction of nucleus for valence electrons increases and size decreases.
(b) Most metallic is Li, as it is most electropositive in period.
Most non-metallic F, as it is most electronegative in period.

22. Yes, it will be the same since R_{eq} across the parallel combination of 4 Ω resistors is also 2 Ω.



23. Al is reducing agent.
Al is more reactive than Mn as Al displaces Mn from its oxide.

OR

(a) $2AgBr(s) \xrightarrow{\text{Sunlight}} 2Ag(s) + Br_2(g)$

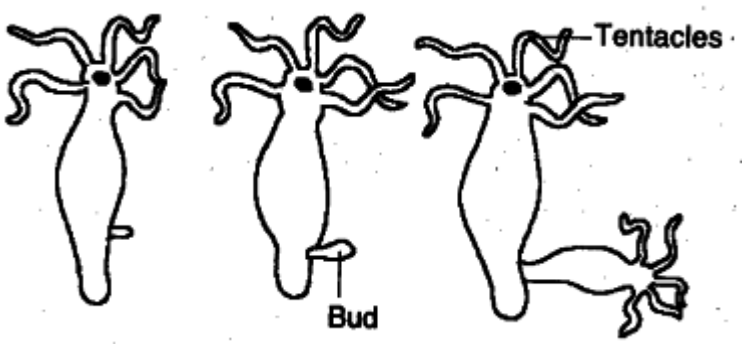
(b) $2Na(s) + 2H_2O(s) \longrightarrow 2NaOH(aq) + H_2(g)$

24. Ozone at the higher levels of the atmosphere is a product of UV radiation acting on oxygen (O_2) molecule. The higher energy UV radiations split apart some molecular oxygen (O_2) into free oxygen (O). These atoms then combine with the molecular oxygen to form ozone.

25. When white light is passed through a glass prism it splits into its spectrum of colours (in order violet, indigo, blue, green, yellow, orange and red) and this process of white light splitting into its constituent colours is termed as dispersion of light.

26. (i) Budding is a kind of asexual reproduction in which a small bud produced on the parent body and develops into a complete organism. In Hydra, a bud develops as an out growth due to repeated cell division at one specific site. These buds develop into tiny individuals and when fully mature, detach from the parent body and become new independent individual.

(ii)



OR

(i) Starch
(ii) ATP

27. (i) Xylem transports water, mineral in plants.
(iii) Guards cells regulate opening or closing of stomata.
(iii) Pseudopodia are temporary finger like projection in Amoeba to engulf food particles.

28. (i) $Mg(s) + 2HCl(dil) \longrightarrow MgCl_2(aq) + H_2(g)$

Hydrogen gas evolves.

(ii) $NaOH + HCl \longrightarrow NaCl + H_2O$

Salt and water is formed due to neutralization.

(iii) Crushed egg shells are $CaCO_3$

$$CaCO(s) + 2HCl \longrightarrow CaCl_2(aq) + H_2O + CO_2$$

Brisk effervescence of CO_2 takes place.

OR

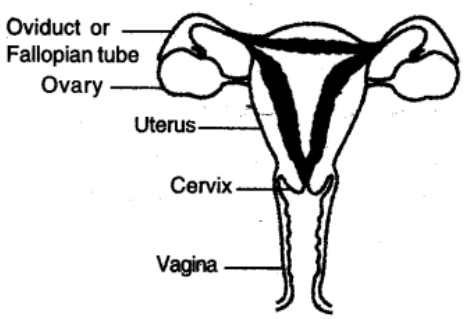
(a)
$$CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CHO$$

(b) 2, 2-Dimetthylpropane

(c) Isomer of butane $CH_3 - CH_2 - CH_2 - CH_3$ is 2-methylpropane

$$CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_3$$

29. (a)

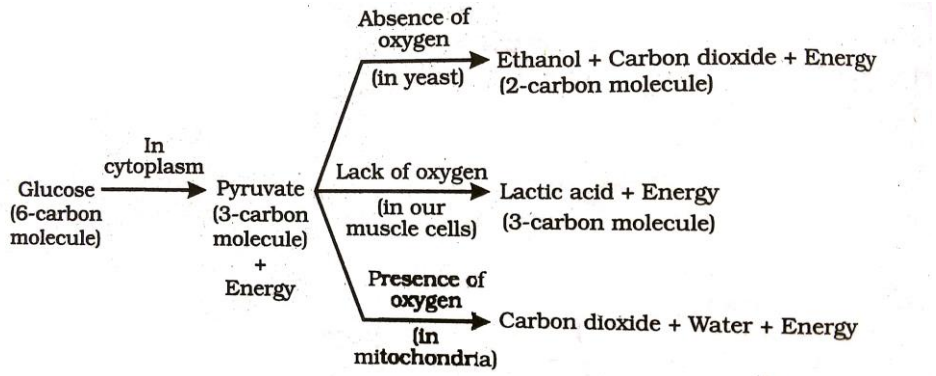


(b) Hair colour of person will be black because the gene for red hair is recessive.

30 Advantages of sexual reproduction:

- In sexual reproduction, more variations are produced. Thus, it ensures survival of species in a population.
- The new formed individual has characteristics of both the parents.

OR



31. Sulphur is a non-metal.

(i) Poor conductor of heat and electricity

(ii) Neither malleable nor ductile

(iii) $S + O_2 \rightarrow SO_2$

$SO_2 + H_2O \rightarrow H_2SO_3$

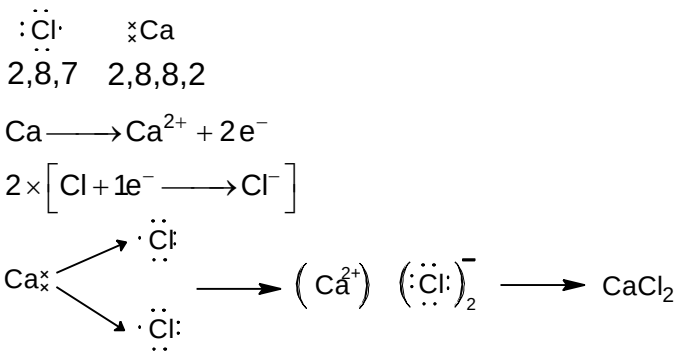
SO_2 is acidic oxide.

Magnesium is a metal.

(i) Good conductor of heat and electricity.
(ii) Malleable and ductile
(iii) $2Mg + O_2 \rightarrow 2MgO$
$MgO + H_2O \rightarrow Mg(OH)_2$
Magnesium oxide is basic in nature.

32. (i) Magnetic field lines are closed continuous curves. Magnetic field lines emerge from a magnet at N-pole and enter the magnet at S-pole outside the magnet. But magnetic field lines run from S-pole to N-pole within the magnet.
(ii) The magnetic field lines are crowded near the pole where the magnetic field is strong and are far apart near the middle of the magnet and far from the magnet where the magnetic field is weak.
(iii) The tangent at any point on the magnetic field lines gives the direction of the magnetic field at that point.
(iv) The magnetic field lines can never intersect each other. If they do so then there will be two tangents at that point and so there will be two directions of the same magnetic field, which is not possible. Hence, no two magnetic field lines can intersect each other.
(v) If magnetic field lines are parallel and equidistant, they represent uniform magnetic field strength.

33. (a) H_2 gas is evolved.
$2C_2H_5OH + 2Na \rightarrow 2C_2H_5ONa + H_2(g)$
(b) Catenation is the ability of an atom to form bond with other atoms of same element. Carbon has highest catenation property.

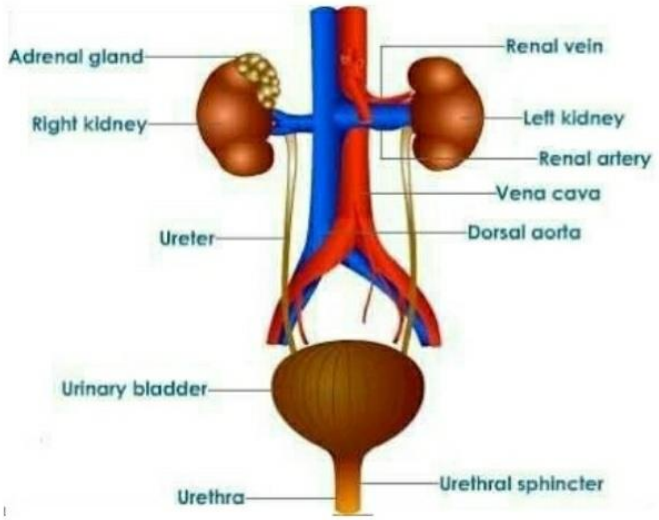
34. (a) 

(b) It is ionic compound physical properties are:
(i) It is hard and solid
(ii) It has high melting and boiling point
(iii) It is soluble in water

OR

(i) Tap water contains ions of different salt which conducts electricity, distilled water does not contain ions.
(ii) Dry HCl does not form ions but dilute HCl forms H^+ and Cl^-.
(iii) Baking soda prevents formation of lactic acid in milk during summer.
(iv) Adding water to acid is highly exothermic. Therefore acid is added to water slowly with cooling.
(v) Ammonia dissolves in water and forms OH^-, therefore it is basic in nature.

35. A



B. i) Cutting, grafting
ii) Developed whole body from a fragment
iii) The testis makes sperm. To do this, the temperature of the testis needs to be cooler than the inside of the body

36. The focal length, $f = R/2 = -20/2 = -10$ cm
The object distance $u = -15$ cm

Using mirror formula, $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$

We have $\frac{1}{-10} = \frac{1}{v} + \frac{1}{-15}$

$$\frac{1}{v} = \frac{1}{15} - \frac{1}{10}$$

or $v = \frac{15 \times 10}{-5} = -30$ cm

Nature of image: real and inverted
size of image:

$$m = \frac{h_i}{h_o} = \frac{-v}{u}$$

$$\Rightarrow \frac{h_i}{1.5} = \frac{-(-30)}{-15}$$

$$\Rightarrow h_i = -3$$

$\therefore$ image size = 3 cm

OR

Case-I: When the image is real

Magnification is negative for real image, $m = \frac{v}{u} = -3$

$\therefore v = -3u$
Given $f = +15$

Using lens formula, $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$

$$\frac{1}{15} = \frac{1}{-3u} - \frac{1}{u}$$

or $\frac{1}{15} = -\frac{4}{3u}$

or $$u = -\frac{15 \times 4}{3} = -20 \text{ cm}$$

Case-II: When the image is virtual magnification is positive

$$m = \frac{v}{u} = 3 \Rightarrow v = 3u$$

$$\frac{1}{15} = \frac{1}{3u} - \frac{1}{u} \Rightarrow \frac{1}{15} = \frac{1-3}{3u} = \frac{-2}{3u}$$

$$\Rightarrow u = \frac{-30}{3} = -10\,\text{cm}$$