Solution
PREBOARD EXAM- 2 2025-26
Class 10 - Science
Section A

1.

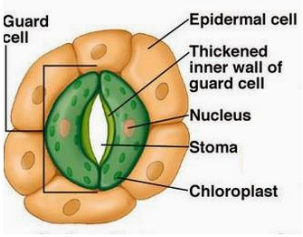
(d) C and D only
Explanation:
In Amoeba, the nucleus divides, first then cytoplasm to form daughter nuclei. This is binary fission. Budding takes place in yeast.

2.

(c) Round and yellow
Explanation:
Since roundness and yellow colour are shown by capital letters in the genotype so they are dominant traits. We know that only dominant traits are expressed in the F1 generation.

3.

(b) III
Explanation:
Stoma is the central opening or pore.



4.

(d) (ii), (iii), (iv), (i)
Explanation:
Nucleus divides first and then the cytoplasm, when Amoeba undergoes fission. Single cell, nucleus splits, followed by cell splitting into two daughter cells.

5. **(a)** Tiger, grass, snake, frog
Explanation:
Tiger, grass, snake, frog

6.

(b) (A)
Explanation:
Genetic drift cannot be removed by self pollination.

7.

(d) Meninges
Explanation:
The meninges refer to the membranous coverings of the brain and spinal cord.

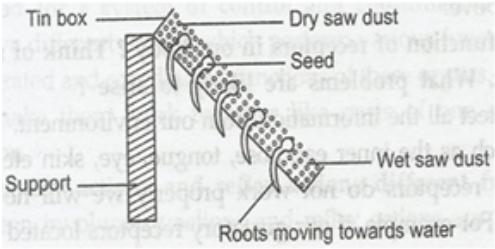
8.

(c) A is true but R is false.
Explanation:
X chromosomes in the child is inherited from mother and may be inherited by father also.

9. **(a)** Both A and R are true and R is the correct explanation of A.
   Explanation:
   Insulin is a hormone released by the beta cells of the pancreas. It maintains the blood glucose level in the body, by its proper utilization. So, lack of insulin causes accumulation of glucose in the blood and hence a disease called diabetes mellitus is caused. Thus both assertion and reason are true and reason is the correct explanation of the assertion.
10. • 20,000 J
    • Only 10% usable energy/amount of organic matter is transferred from one trophic level to the next higher trophic level in a food chain and rest 90% is lost to the environment as heat.
11. Following methods could be applied to reduce the intake of pesticides:
    i. Minimise the use of pesticides, and use other methods to control pests
    ii. Consuming washed fruits and vegetables which will wash away the harmful pesticides
    iii. Developing vegetarian feeding habits as biological magnification of a harmful chemical increases with increasing trophic level.(i.e. feed upon plants as plants belong to lower trophic level so, they have less accumulation of insecticides, whereas organisms of higher trophic level have higher concentration of insecticides and pesticides).

    OR

    i. Vegetable waste can be used for Landfill
    ii. Metal are non-biodegradable can undergo recycling
    iii. Recycling is best method to treat plastic waste.
12. Take a tin box with hole at bottom. Fill it with moist saw dust. Sow some gram seeds in it. Keep the tin box in tilted position. When seeds start germinating, water the saw dust only in lower side of the tin box. You will observe that the radicle move towards the wet saw dust. This shows that root is positively hydrotropic.

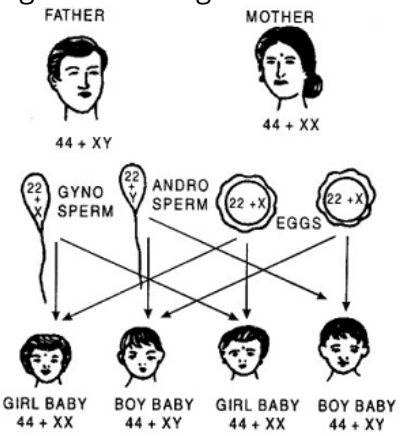


13. The main function of the reproductive system is to produce the gametes for the sexual reproduction. Reproductive system is not necessary for the survival of the individual. So even if reproductive system is fully removed, the persons may have a good health. That is why the persons who are sterile cannot reproduce but can survive.
14. i. Pulmonary vein
    ii. Vena cava
    • Right atrium
    • After receiving blood, the right atrium contracts
    • As a result blood passes into the right ventricle
    • Then the ventricle contracts and the deoxygenated blood flows into the lungs through pulmonary artery.
15. a. Salivary glands; Starch/Carbohydrate
    b. Stomach, Anus
    c. i. The inner lining of the stomach will not be protected from the action of acid.
    ii. Digested food will not be absorbed. / Absorption area will be reduced.

    OR

    Emulsification of fats.
    Acidic medium has to be made alkaline for the pancreatic enzymes to act.
16. Determination of the sex of child. Sex chromosomes determine sex in human beings. In males, there are 44 + XY chromosomes, whereas, in female there are 44 + XX chromosomes. Here X and Y chromosomes

determine sex in human beings.
Two types of gametes are formed in male, one type is having 50%, X-chromosome, whereas, other type is having Y-chromosome. In female, gametes are of one type and contain X-chromosome.
The females are homogametic. If male gamete having Y-chromosome (endosperm) undergoes fusion with female gamete having X-chromosome the zygote will have X Y chromosomes and this gives rise to male child.



If male gamete having X-chromosome undergoes fusion with female gamete having X-chromosome, the zygote will be having XX-chromosome and this gives rise to female child.

OR

i. The brain and the spinal cord constitute the central nervous system (CNS).
ii. The spinal cord is concerned with spinal reflex actions and the conduction of nerve impulses to and from the brain.
iii. The spinal cord is enclosed in a bony cage called vertebral column and is surrounded by membranes called meninges which protects it.
iv. All the nerves of the body together make up the peripheral nervous system. It consists of three types of nerves that are spinal nerves, cranial nerves, and visceral nerves.
v. The autonomic nervous system (ANS) means a self-governing nervous system. Its function is to control and regulate the functions of the internal organs of our body involuntarily.

Section B

17.

(d) Statement (A)
Explanation:
The human stomach produces gastric juices which contain hydrochloric acid in them resulting in a pH of 1.4.

18. **(a)** It is an endothermic reaction.
Explanation:
It is an endothermic reaction.

19.

(d) X
Explanation:
$C_{10}H_{21}COOH$: Hendecanoic acid (also known as undecanoic acid, undecylenic acid, and undecylic acid) is a naturally occurring carboxylic acid. It has a melting point in the range of 28 - 31^{o} C. It is a low melting solid.
$C_{19}H_{39}COOH$: Arachidic acid or eicosanoic acid is a white crystalline solid at room temperature (25 ^{o}C). It has a melting point in the range 74 - 76^{o}C.

20.

(b) (i) - (d), (ii) - (a), (iii) - (c), (iv) - (b)
Explanation:
- **NaCl** has **ionic bonds** between the sodium ion and the chloride ion.

- **Ammonia** has **polar covalent bonds** between the nitrogen atom and hydrogen atoms.
- **Nitrogen** molecule has **non-polar covalent bonds** between the two nitrogen atoms since the two atoms are alike.
- **C_{60}** is a member of **fullerenes** (Allotropes of carbon). Buckminsterfullerene contains a cluster of 60 carbon atoms joined together to form spherical molecules.

21. **(a)** N
Explanation:
N

22.
(c) None of these
Explanation:
The process of fermentation is carried in the dark at a temperature of about 30^oC. The vessel is kept closed and air is not allowed to enter.

23.
(d) A, C and D only
Explanation:
- Dilute hydrochloric acid will turn blue litmus red.
- It evolves H_2 gas with Zn metal.
  $Zn + 2HCl \rightarrow ZnCl_2 + H_2$
- Brisk effervescence will be due to CO_2 (g).
  $Na_2CO_3 + 2HCl \rightarrow 2NaCl + H_2O + CO_2$

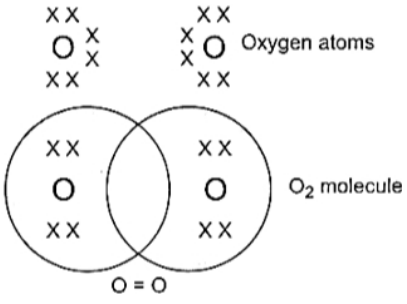
24.
(b) Both A and R are true but R is not the correct explanation of A.
Explanation:
A decomposition reaction is a reaction in which a compound breaks down into two or more simpler substances.
$2Pb(NO_3)_2 \longrightarrow 2PbO + 4NO_2 + O_2$

25. Salt of strong acid and strong base is neutral. Sodium sulphate is a salt of strong acid (sulphuric acid) and strong base(NaOH). Therefore, it is neutral whereas sodium carbonate is a salt of weak acid (carbonic acid) and strong base (sodium hydroxide). Therefore, it is basic in nature.

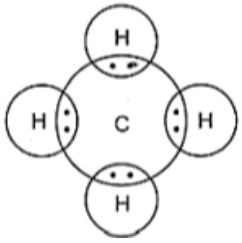
26. i. Compound X is ethanoic acid (CH_3COOH) and compound Y is ethyl ethanoate ($CH_3COOCH_2CH_3$).
ii. $CH_3COOH + CH_3CH_2OH \xrightarrow{Conc.\ H_2\ SO_4} CH_3COOCH_2CH_3 + H_2O$

OR

a. Oxygen has 8 electrons with 6 electrons in its outermost shell. It shares two electrons with another atom of oxygen to make a molecule of oxygen. By doing so; both the atoms of oxygen get 8 electrons in their outermost shell. Thus, a double bond is formed between two oxygen atoms.



b. Lewis dot structure of methane.



27. Copper is not affected by dry air at ordinary temperature. On exposure to moist air, it gets covered with a beautiful green coating of either basic carbonate or basic sulphate.
$2Cu + H_2O + CO_2 + O_2 \rightarrow CuCO_3.Cu(OH)_2$
$8Cu + 6H_2 + 2SO_2 + 5O_2 \rightarrow 2[CuSO_4.3Cu(OH)_2]$
Copper present in bronze or in utensils is corroded by moist air containing acidic oxides like carbon dioxide, sulphur dioxide etc. The greenish layer formed is of basic copper carbonate or basic copper sulphate. This phenomenon is called 'corrosion of metals'.

28. i. The pH of milk is 6. As it changes to curd, the pH will reduce because curd is acidic in nature. The acids present in it decrease the pH.
ii. No, gastric juice is a strong acid.
iii. Milk of magnesia is a base and it can be used as an antacid.
OR
The pH value of saliva after the meal is 5.8.

29. i. Those reactions in which one element takes the place of another element in a compound, are known as displacement reactions.
Example: $CuSO_4$ (aq) + Zn (s) $\longrightarrow$ $ZnSO_4$ + Cu
When a strip of zinc metal is placed in a copper sulphate solution, then zinc sulphate solution and copper are obtained. In this reaction, zinc displaces copper from copper sulphate compound so that copper is set free. The blue colour of copper sulphate solution fades due to the formation of zinc sulphate.
ii. Those reactions in which two compounds react by an exchange of ions to form two new compounds are called double displacement reactions.
Example: $AgNO_3$ (aq) + NaCl (aq) $\longrightarrow$ AgCl (s) + $NaNO_3$ (aq)
When silver nitrate solution is added to sodium chloride solution, then a white precipitate of silver chloride is formed along with the sodium nitrate solution. In this reaction, two compounds, silver nitrate and sodium chloride react to form two new compounds, silver chloride, and sodium nitrate.

OR

a. The reactions in which there is an exchange of ions between the reactants are called double displacement reactions.
Example:- $Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$

b. (i) Combination reaction:- A reaction in which two or more compounds combine to form one single compound.

(ii) $\underset{\text{Quick lime}}{CaO} + H_2O \rightarrow \underset{\text{Calcium Hydroxide}}{Ca(OH)_2}$

Chemical name of the product formed is Calcium hydroxide (slaked lime)
(iii) The two observations are:
Reaction takes place vigorously and large amount of heat is released.

Section C

30.

(b) (A)
Explanation:
As a convention, the direction of flow of positive charge was taken to be the direction of electric current. The direction of flow of electrons is opposite to the direction of conventional current.

31.

(b) A and the device X is a convex lens

Explanation:

Inverted, sharp and real image of distant tree is formed by a convex lens.

32.

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

Explanation:

Both A and R are true but R is not the correct explanation of A.

33. i. Divergence or degree of closeness of magnetic field lines near the ends of a current-carrying straight solenoid indicates an increase in the strength of the magnetic field near the ends of the solenoid.
    ii. A current-carrying solenoid acts as a bar magnet. We know that a freely suspended bar magnet aligns itself in the North-South direction. So, a freely suspended current-carrying solenoid also aligns itself in the North-South direction.
    iii. Burnt out fuse cannot be re-used. Also, a fuse wire works because of its lower melting point. If the fuse with a larger rating is used with an appliance, the fuse wire shall not melt and hence would fail to serve the required purpose. So, a new fuse of the same rating should be used for electrical safety.

34. i. V $\propto$ I i.e current is directly proportional to applied voltage.
    ii. at 2.5 V current will be 0.25 A

OR

(i) V = 6V

$R_1 = 1\Omega$

$R_2 = 2\Omega$

Total resistance, $R = R_1 + R_2$

$= 1 + 2 = 3\Omega$

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

$= \frac{6}{3}$

= 2A

Therefore, power (P_1) = I^2R

$= (2)^2 \times 2$

= 8W

(ii) V = 4V, $R_1 = 12\Omega$, $R_2 = 2\Omega$

$\because$ Potential difference is constant in a parallel circuit. Hence power dissipated across the 2 Ω resistor is directly given as:

$P_2 = \frac{V^2}{R}$

$= \frac{4\times4}{2}$

= 8W

Ratio $\frac{P_1}{P_2} = \frac{8}{8}$ = 1:1

As an interesting observation might be that power dissipated in parallel circuit does not depend on the resistor connected in parallel,while in a series circuit,as the current flow is determined by all the resistors,power dissipation is dependent on the other resistors in the circuit.

35. Focal length, f = +200cm

Object distance, u = -100cm

$\frac{1}{f} = \frac{1}{v} + \frac{1}{V}$

$\frac{1}{v} = \frac{1}{f} - \frac{1}{V}$

$\frac{1}{v} = \frac{1}{200} + \frac{1}{100}$

$\frac{1}{v} = \frac{3}{200}$

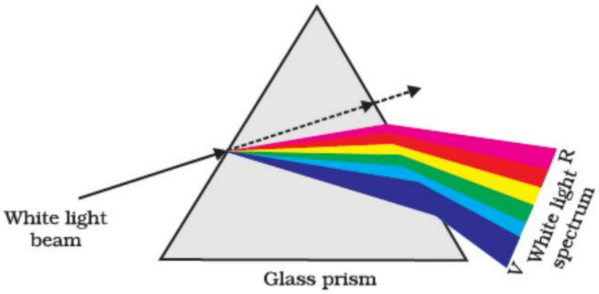
$v = \frac{200}{3} = 66.67cm$

$m = \frac{-v}{V} = \frac{-66.67}{-100}$

m = 0.666

As v is +ve so image is Virtual and is formed behind the mirror.

36. a.



b. The band of seven colours obtained on the screen after dispersion of white light
Reason: Different components of white light (colours) bend through different angles with respect to the incident ray as they pass through a prism

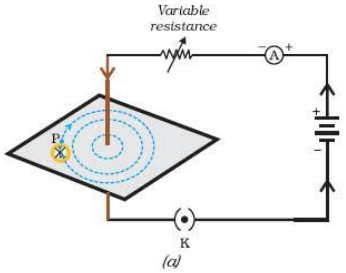
37. $P = \frac{1}{f}, P \propto \frac{1}{f}$

The power of the lens is inversely proportional to the focal length of the lens. A lens with the focal length 20 has more power than a lens with a focal length of 40 cm.
Therefore, a lens with higher power should be used to obtain more convergent light.

38. i. i. If the polarity of the magnet and the direction of current both are reversed,using Fleming's left hand rule it gets displaced towards the left.
ii. Devices that use current-carrying conductors and magnetic fields are electric motor, electric generator etc.

ii. When a current-carrying conductor is placed in a magnetic field, it experiences a force, due to which the rod gets displaced.

iii. The rule that determines the direction of the force on the conductor AB is Fleming's left-hand rule. According to Fleming's left-hand rule, stretch the thumb, forefinger and middle finger of your left hand such that they are mutually perpendicular.
If the first finger points in the direction of the magnetic field and the second finger in the direction of current, then the thumb will point in the direction of motion or force.
OR
The magnetic field lines around a current carrying conductor can be represented by concentric circles which can be determined by right hand thumb rule.



(a)

(b)

39. When an electric charge Q moves against a potential difference V, then the amount of work done is given by
$W = Q \times V$ ----------(i)
We also know that,

$Q = I \times t$ ----------(ii)
and from Ohm's law,
V = IR----------(iii)
Putting the values of Eqs. (ii) and (iii) in Eq. (i), we get
$W = I \times t \times I \times R$
∴ Work done, $W = I^2 Rt$
Assuming that all the electrical work done is converted into heat energy.
∴ $W = H = I^2Rt$
Heating effect is desirable because it is useful for the functioning of electrical bulbs, and undesirable because it leads to unnecessary loss of energy.

OR

Electric energy is the total amount of work done by the current in a given time or electric energy is the total amount of energy consumed in an electric circuit in a given time. The total energy consumed not only depends upon the power of the appliance but also upon the time for which the power is maintained.
If a power P (watt) is maintained for t second, the work done or the energy consumed Ω(joule) = P(watt)× t(second)
Or W = $P\left(\frac{J}{S}\right) \times \ t(s) = \ Pt \ joule$
But P = VI ∴ Ω= VIt joule
Practical Unit of Electric Energy. The usual unit of electric energy i.e. joule is too small unit. Hence in practice, a bigger unit of electric energy called kWh (kilowatt-hour) is usually used. This unit is also called B.O.T. (Board of Trade Unit). In all the English speaking countries including India; kWh or B.O.T. is the practical or commercial unit of electric energy. The cost of electric energy consumed is rated in terms of the B.O.T. unit.
The unit kWh is equal to the work done or energy consumed when a power of 1kΩ is consumed for 1 hour.