CBSE Class 10 Science

Sample Paper - 08

Maximum Marks: 80

Time Allowed: 3 hours

General Instructions:

i. The question paper comprises three sections – A, B and C. Attempt all the sections.
ii. All questions are compulsory.
iii. Internal choice is given in each section.
iv. All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
v. All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50 - 60 words each.
vi. All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80 – 90 words each.
vii. This question paper consists of a total of 30 questions.

Section A

1. State the law of conservation of mass.

2. Account for the following: Elements of group 18 are called zerovalent.

3. **Answer the questions that follows on the basis of your understanding of the following paragraph and the related studied concepts:**

   Bio-gas is an excellent fuel as it contains up to 75% methane. It burns without smoke, leaves no residue like ash in wood, charcoal and coal burning. It is heating capacity is high. Bio-gas is also used for lighting. The slurry left behind is removed periodically and used as excellent manure, rich in nitrogen and phosphorous. The large-scale utilisation of bio-waste and sewage material provides a safe and efficient method of

waste-disposal besides supplying energy and manure.

i. What type of source of energy is mentioned in the above picture?
ii. Does this source of energy can cause pollution? Justify your answer with a brief explanation.
iii. Write the two advantages of biogas as fuel.
iv. Write the different components of Biogas?

4. Following questions are based on the two tables given below. Study these tables related to blood sugar levels and answer the questions that follow.

Table A (Blood glucose chart)

	Mean Blood Glucose Level (mg/dL)
Doctor's advice needed	380
	350
	315
	280
	250
	215
Good	180
	150
Excellent	115

	80
	50

Table B (Blood Report of Patient X and Y)

Time of check	**Blood Glucose ranges** (mg/dL)	
	Patient X	Patient Y
Before breakfast (Fasting)	<100	70-130
Before lunch, supper and snack	<110	70-130
Two hours after meals	<140	<180
Bedtime	<120	90-15

Answer the following questions:

a. Refer to Table B showing the blood report of the levels of glucose of patients X and Y. Infer the disease which can be diagnosed from the given data.
b. Identify the hormone whose level in the blood is responsible for the above disease.
c. Which one of the following diets would you recommend to the affected patient?
    i. High sugar and a low-fat diet.
    ii. Low sugar and high protein diet.
    iii. High Fat and low fibre diet.
    iv. Low sugar and high fibre diet.
d. Refer to Table A and suggest the value of the mean blood glucose level beyond which doctor's advice is necessary:
    i. 80 mg/dL
    ii. 115 mg/dL
    iii. 50 mg/dL
    iv. 80 mg/dL

5. The cause of Astigmatism is

a. Varying curvature in vertical lines

b. Varying curvature in horizontal lines

c. Varying curvature in both horizontal and vertical lines

d. None of these

OR

Statement A: The focal length of the eye lens is fixed, Statement B: The cornea of the eye can be compared with the shutter of the camera

a. Neither statement A nor statement B is true

b. Both the Statement A and B are true

c. Statement B is true, A is false

d. Statement A is true, B is false

6. How many National Parks are there in Gujarat?

a. 5

b. 30

c. 24

d. 4

7. Which of following statement is not correct about electric fuse
A. It is always connected in live wire
B. It is always connected in the end of the circuit
C. Thinner the fuse wire, greater is its current capacity
D. Its current capacity must be less than the maximum current
a. B and C
b. A and B
c. A and C
d. A, B, C and D

8. Bleaching powder is used in the paper industry as a

a. dehydrating agent

b. bleaching agent

c. reducing agent

d. drying agent

OR

An acid can react with

a. $PbSO_4$

b. AgCl

c. Na_2SO_4

d. Na_2CO_3

9. Match the following with the correct response:

(1) Saprotrophs	(A) Organisms obtaining food from green plants
(2) Parasites	(B) Organisms obtaining food from host
(3) Autotrophs	(C) Organisms obtaining food from dead plants and animals
(4) Herbivores	(D) Organisms which prepare their own food

a. 1-B, 2-D, 3-A, 4-C

b. 1-C, 2-B, 3-D, 4-A

c. 1-D, 2-A, 3-C, 4-B

d. 1-A, 2-C, 3-B, 4-D

10. In natural ecosystems, decomposers include:

a. Only bacteria and fungi

b. Herbivores and carnivores

c. Only microscopic animals

d. Both (b) and (c)

11. Electropositive character of elements in a period _____ from left to right.

a. Increases

b. first increase, then decrease

c. remains the same

d. decreases

12. Aqueous solutions of zinc sulphate and iron sulphate were taken in test tubes I and II by four students A, B, C and D. Metal pieces of iron and zinc were dropped in the two solutions and observations made after several hours were recorded in the form of table as given below:

Student	Metal	Solution	Colour change of solution	Deposit/Coating obtained
A	Fe	$ZnSO_4$	Turned green	Silvery grey coating
	Zn	$FeSO_4$	No change	No change
B	Fe	$ZnSO_4$	No change	Black deposit
	Zn	$FeSO_4$	Colour faded	Grey coating
C	Fe	$ZnSO_4$	No change	No change
	Zn	$FeSO_4$	Turned colourless	Black deposit
D	Fe	$ZnSO_4$	No change	Grey deposit
	Zn	$FeSO_4$	No change	Black deposit

The correct reporting has been made in observations:

a. A

b. C

c. D

d. B

13. **Assertion:** In esterification, carboxylic acid and alcohol react in the presence of acid to give ester.

Reason: Esterification is the reverse of saponification.

a. Assertion is CORRECT but, reason is INCORRECT.
b. Assertion is INCORRECT but, reason is CORRECT.
c. Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
d. Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.

14. **Assertion:** When the length of a wire is doubled, then its resistance also gets doubled.
Reason: The resistance of a wire is directly proportional to its length.

a. Assertion is INCORRECT but, reason is CORRECT.
b. Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
c. Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
d. Assertion is CORRECT but, reason is INCORRECT.

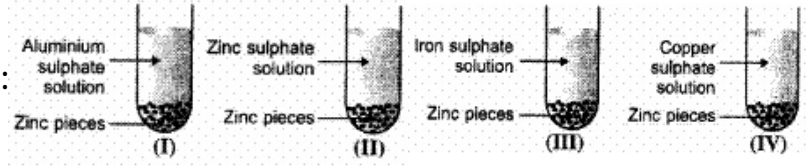
Section B

15. (a) An aqueous solution has a PH value of 7.0. Is this solution acidic, basic or neutral?
(b) If H^+ concentration of a solution is 1×10^{-2} mol L^{-1} what will be its P4 value?
(c) Which has higher PH value: 1 - M HCl or 1 - M NaOH

16. Give the characteristic tests for CO_2.

OR

Zinc pieces were placed in each of the four test tubes containing different salt solutions as shown below



A colour change would be observed in solutions:

17. The position of three elements A, B and C in the Periodic Table are shown below:

Group 16	Group 17
-	-
-	A
-	-
B	C

i. State whether A is a metal or non-metal.
ii. State whether C is more reactive than A
iii. Will C be larger or smaller in size than B?
iv. Which type of ion, cation or anion, will be formed by element A?

18. What is meant by clotting of blood? Write a flow chart showing major events taking place in clotting of blood?

OR

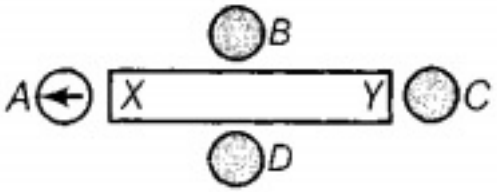
What is the advantage of digestive cavity?

19. Why does the sun appear reddish in the morning (as well as in evening)?

20. What are fossils? What do they tell us about the process of evolution?

21. List in tabular form three distinguishing features between cerebrum and cerebellum.

22. i. The diagram shows a bar magnet surrounded by four plotting compasses. Copy the diagram and mark the direction of the compass needle for each of the cases B, C and D.



ii. Which is the North pole, X or Y?

23. Suppose your parents have constructed a two room house and you want that in the living room there should be a provision of one electric bulb, one electric fan, a refrigerator and a plug point for appliances of power up to 2 kilowatts. Draw a circuit diagram showing electric fuse and earthing as safety devices.

24. In the figure given below, a narrow beam of white light is shown to pass through a triangular glass prism. After passing through the prism, it produces a spectrum XY on the screen.

i. Name the phenomenon.
ii. State the colours seen at X and Y.
iii. Why do different colours of white light bend at different angles through a prism?

OR

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?

Section C

25. How will you get metal from concentrated ore?

26. a. Name the gas evolved during fermentation process.
    b. What role is played by yeast in the conversion of cane sugar ($C_{12}H_{22}O_{11}$) to ethanol?
    c. How can the following be obtained from pure ethanol? Express chemical reactions by the chemical equations.
        i. Sodium ethoxide
        ii. Ethyl ethanoate
        iii. Ethanal

27. What is the difference between an intercellular and intracellular digestion?

28. Why are budding, fragmentation and regeneration all considered as asexual types of reproduction? With neat diagrams explain the process of regeneration in Planaria.

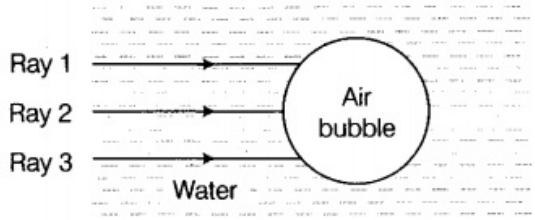
OR

Give reasons:

i. Placenta is extremely essential for foetal development.
ii. Blocking of vas deferens prevents pregnancy.
iii. Wind acts as a pollinating agent.
iv. Use of condoms prevents pregnancy.
v. Blocking of Fallopian tubes prevents pregnancy.

29. What is the need of combining different resistors? What is the resultant resistance when a number of resistances are connected in series?

30. An air bubble in water is shown in the figure. Three rays of light are incident on the air bubble.

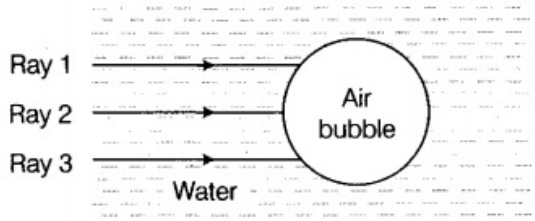


The angle of incidence of ray 1 on the air bubble is greater than the critical angle. The angle of incidence of ray 2 on the air bubble is less than the critical angle. Ray 3 is perpendicular to the surface of the bubble.

i. In figure at the point where ray 1 meets the air bubble, mark
   a. the normal to the surface
   b. the angle of incidence
ii. Complete the ray diagram to show how all three rays continue after they meet the air bubble.
iii. Define refractive index of water. If the speed of light in air is 3×10^8 ms^{-1} and the speed of light in water is 2.2×10^8 ms^{-1}. Calculate the refractive index of water.

OR

An air bubble in water is shown in the figure. Three rays of light are incident on the air bubble.



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Answer

Section A

1. Mass is never lost or gained in chemical reactions. We say that mass is always conserved. In other words, the total mass of products at the end of the reaction is equal to the total mass of the reactants at the beginning.

2. Elements of group 18 have completely filled outermost shell and have no tendency to gain or lose electrons. Thus, elements of this group have zero valency and are almost unreactive. So, they are called zerovalent.

3. i. It is a renewable source of energy.
   ii. No, Biogas is a renewable, as well as a clean, source of energy. The gas generated through bio-digestion is non-polluting; it actually reduces greenhouse emissions.
   iii. The two advantage of biogas as a fuel are:
      a. It burns without smoke, leaves no residue like ash in wood, charcoal and coal burning.
      b. Eco-friendly, cheaper, easy to use.
   iv. Biogas is a mixture of methane, hydrogen, carbon dioxide, and hydrogen sulphide.
4. a. Diabetes
   b. (b) Insulin
   c. (iv) low sugar high fibre diet
   d. (i) 180mg/dL
5. (c) Varying curvature in both horizontal and vertical lines

   Explanation: The defect by which the person is not able to differentiate horizontal and vertical position, is called astigmatism. It is caused by an error in the shape of the cornea. It can be corrected by using cylindrical lenses.

OR

(a) Neither statement A nor statement B is true, **Explanation:** The image on the retina is formed by two lenses – the cornea, which is a converging lens whose focal length is

fixed, and the eye-lens, which is a convex lens whose focal length is not fixed and can be varied by changing its shape.

In optics, an aperture is a hole or an opening through which light travels. The pupil of the eye is its aperture in optics nomenclature; the iris is the diaphragm that serves as the aperture stop.

6. (d) 4, **Explanation:** The Gujarat state of western India has four National Parks and twenty-one Wildlife Sanctuaries which are managed by the Forest Department of the Government of Gujarat.

S. No.	**Name of National Park**	**Year of Notification**	**Total Area(km^2)**
1	Vansda NationalPark	1979	23.99
2	Blackbuck National Park Velavadar	1976	34.53
3	Gir ForestNationalPark	1975	258.71
4	Marine National Park, Gulf of Kutch	1982	162.89

7. (a) B and C Explanation:

   A. A fuse wire is a safety wire connected in series with the live wire, in case of any large current supply or malfunctioning in the electric connections it melts and breaks the electric circuit.

   B. A fuse wire is connected in series so as to pass the current totally through the fuse. It is not connected in the end of the circuit.

   C. The relation between thickness of a wire and it's current carrying capability is that, more the thickness more the current a wire can carry. So fuse wires are made of sufficient thickness. Means thinner the fuse wire, lesser is its current capacity.

   D. The fuse needs to be rated slightly higher than the maximum operating current of the protected device, so that the fuse won't blow when the equipment is used.

   Statement B and C are not correct about electric fuse.

8. (b) bleaching agent, **Explanation:** Bleaching powder is used to bleach cotton and linen in textile industry and wood pulp in paper industry.

OR

(d) Na_2CO_3, **Explanation:** Acids react with metal carbonates to evolve CO_2 gas.

9. (b) 1-C, 2-B, 3-D, 4-A, **Explanation:** Organisms can be grouped as producers, consumers and decomposers according to the manner in which they obtain their sustenance from the environment. Producers or autotrophs prepare their own food. Consumers can be classed as herbivores, carnivores, omnivores and parasites. Herbivores obtain food directly from green plants. Parasites obtain food from a host.

(1) Saprotrophs	(C) Organisms obtaining food from dead plants and animals
(2) Parasites	(B) Organisms obtaining food from host
(3) Autotrophs	(D) Organisms which prepare their own food
(4) Herbivores	(A) Organisms obtaining food from green plants

10. (a) Only bacteria and fungi, **Explanation:** In natural ecosystems, decomposers include microorganisms, comprising bacteria and fungi, which break down the dead remains and waste products of organisms. These decomposers break down the complex organic substances into simple inorganic substances.
11. (d) decreases, **Explanation:** As we move from left to right in a period, the positive charge increases due to gradual increase in the number of protons. So, the valence electrons are pulled in more strongly by the nucleus and it becomes more and more difficult for the atoms to lose electrons. Thus, on moving from left to right in a period, the tendency of atoms to lose electrons decreases i.e electropositive character of elements decreases.
12. (b) C, **Explanation:** Fe + ZnSO4 → No reaction
    It is because iron is less reactive than Zinc.
    $Zn + FeSO_4 \rightarrow ZnSO_4 + Fe$

    The solution becomes colourless and black iron gets deposited.
13. (a) Assertion is CORRECT but, reason is INCORRECT. Explanation: Assertion is CORRECT but, reason is INCORRECT.
14. (b) Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion. Explanation: Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.

Section B

15. (a) The solution is neutral is nature.

    (b) [H^+] = $1 \times 10^{-2} mol L^{-1}$

    = 10^{-2}M

    PH = $log \left[\frac{1}{H^+}\right]$

    = - log [H^+]

    = - log [10^{-2}]

    = -(-2)log 10 = 2

    (c) 1 M NaOH solution (basic) higher PH. Value

    1 M HCl solution (acidic) lower PH. Value

16. Carbon dioxide (CO_2) gas turns lime water milky when passed through it due to the formation of insoluble calcium carbonate.

    $$\underset{Limewater}{Ca(OH)_2} + \underset{\substack{Carbon \\ dioxide}}{CO_2} \rightarrow \underset{\substack{Calcium \\ Carbonate}}{CaCO_3} + H_2O$$

    OR

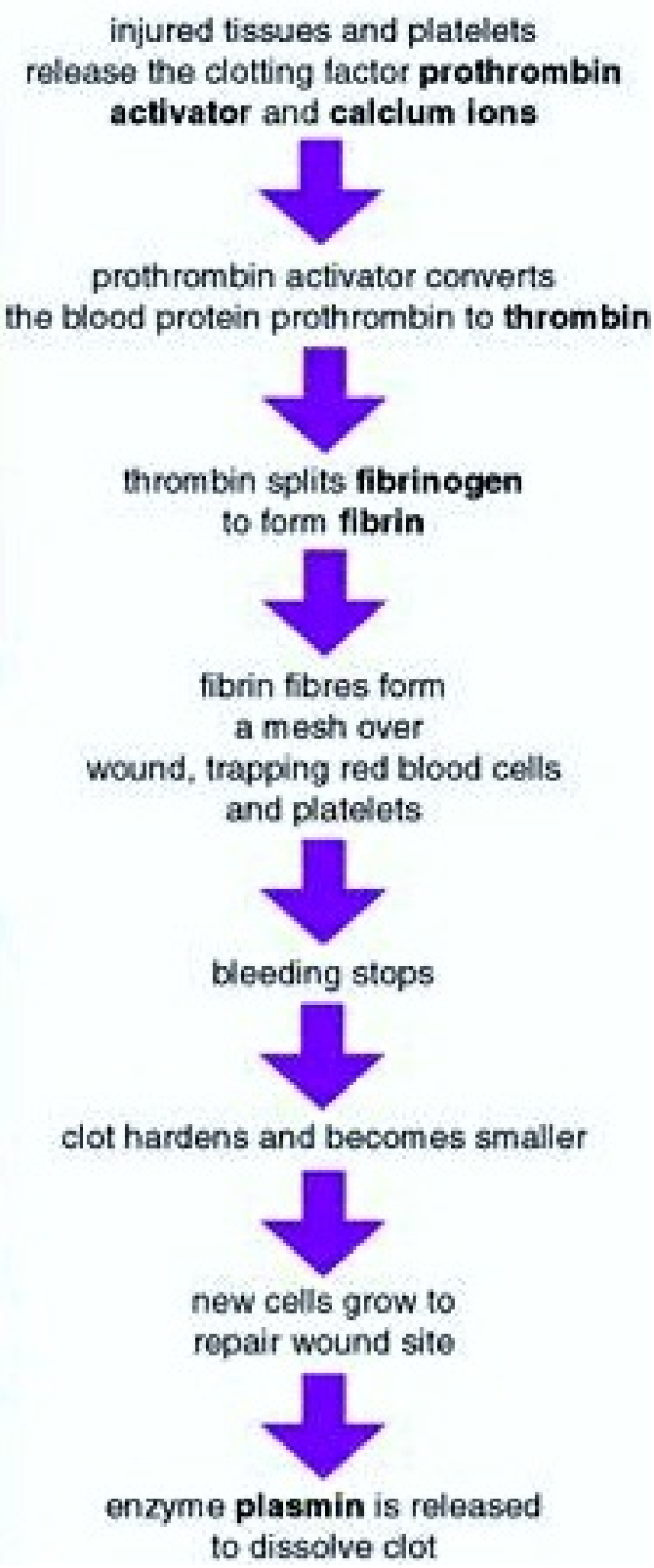
    The colour change will take place in III and IV as zinc is more reactive than iron as well as copper.

    $$Zn + \underset{Pale\ Green}{FeSO_4} \rightarrow \underset{Colorless}{ZnSO_4} + Fe$$

    $$Zn + \underset{Blue}{CuSO_4} \rightarrow \underset{Colorless}{ZnSO_4} + Cu$$

17. i. A is a non-metal.
    ii. C is less reactive than A.
    iii. C will be smaller than B.
    iv. A will form anion.

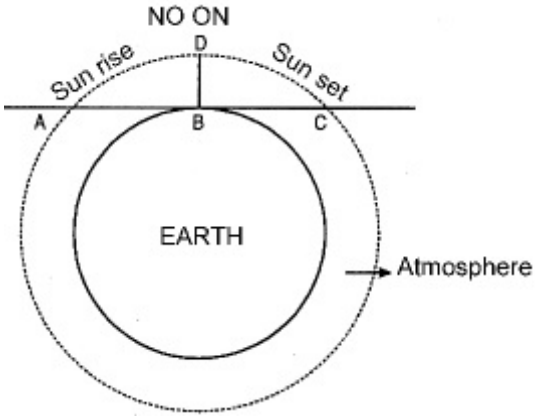
18. A blood clot is formed when blood cells and fibrin strands clump together. A clot that blocks blood flow is called a thrombus.



OR

A digestive cavity not only is a place where digestion of large particles can take place, but it can also be used to store food.

19. Earth is surrounded by envelope of gases called atmosphere. At the time of sunrise (or at sunset), light has to travel greater thickness [AB at sun-rise and BC at sunset] than what it covers when sun is overhead at noon [it has to travel only DB]. The wavelength of blue colour is about half that of red, blue light is scattered nearly = 16 times red. As a result, the sun appears red at sunrise or at sunset due to negligible scattering of red in comparison with blue.

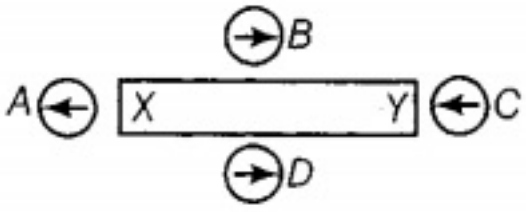


20. Preserved traces of living organisms are called fossils found closer to the surface of earth are more recent in origin than the fossils we find in deeper layers.
Fossils also help us to find evolutionary relation between organisms.

21.

Cerebrum	Cerebellum
1. It is a part of the forebrain.	1. It is a part of the hindbrain.
2. It form about 83% part of the total brain weight.	2. It form about 11% part of the total brain weight.
3. It is the largest part of the brain.	3. It is the second-largest part of the brain.

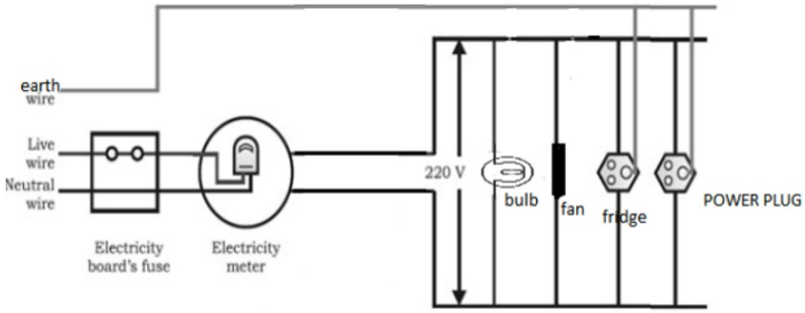
22. i.



ii. The North Pole is **X.**

23. The circuit diagram showing the electric fuse and earthing as safety devices is as

follows:



24. i. The phenomenon is called dispersion.
    ii. X — Violet Y — Red
    iii. Different colours of white light bend through different angles with respect to the incident beam of light due to difference in speed of light of different wavelengths.

OR

Let us assume that the window pane is between F2 and infinity from this lens and this is a convex lens. We know that when the object is between infinity and F_2, its inverted and real images is formed between 2F and $2F_2$.

Now, the distant building is at infinity from the lens. Its image would be formed at 2F. So, the screen needs to be moved towards the lens in order to get a sharp image. Its approximate focal length is 10 cm (less than image distance in earlier case).

Section C

25. Extraction of the metal from the concentrated ore. The metal is extracted from the concentrated ore by the following steps:
    (i) Conversion of the concentrated ore into its oxide. This is usually done by calcination and roasting process. The method depends upon the nature of the ore. A carbonate ore is converted into oxide by calcination while a sulphide ore is converted into oxide by roasting.
    (ii) Conversion of oxide to metal by reduction process.
    (i) Conversion of ore into metal oxide: It can be done by two methods
    (a) Calcination: It is the process of heating the concentrated ore in the absence of air. The calcination process is used to removed volatile impurities, water from the

hydrated ores and to convert carbonate ores into metal oxide.
For example :
(i) Zinc occurs as zinc carbonate in calamine ($ZnCO_3$). The ore is calcinated (heated strongly) in the absence of air to convert it to zinc oxide. During calcination, carbon dioxide is expelled.

$ZnCO_3$	$\xrightarrow{Calcination}$	ZnO	+	CO_2
Zinc carbonate (Calamine ore)		(Zinc. Oxide)		

(ii) Aluminium occurs as $Al_2O_3.2H_2O$ in its bauxite ore. When the bauxite ore is calcined, water vapours are expelled and anhydrous aluminium oxide is obtained.

$Al_2O_3.2H_2O$	$\xrightarrow{Calcination}$	Al_2O_3	+	$2H_2O$
Bauxite Ore		Aluminium Oxide		

b) Roasting: It is the process of heating the concentrated ore strongly in the presence of excess air. This process is used for converting sulphide ores to metal oxide.
For example, zinc occurs as sulphide in zinc blende (ZnS). It is strongly heated in excess of air when it forms zinc oxide and sulphur dioxide gas is expelled.

$2ZnS + 3O_2$	$\xrightarrow{Roasting}$	2ZnO	+	$2SO_2$
Zinc sulphide (Zinc blende ore)		Zinc Oxide		

ii) Conversion of metal oxide to metal: The metal oxide formed after calcination or roasting is converted into metal by reduction. Some of the methods commonly used for the reduction of metal oxides to metals are discussed below:
I) Reduction by heating in the air : Metals low in the reactivity series can be obtained from their oxides by heating in air. For example, mercury is obtained from cinnabar (HgS) ore by this method. The method involves the following steps:
i) The concentrated mercuric sulphide (cinnabar or) is roasted in air when mercuric oxide is formed.

$2HgS$	+	$3O_2$	$\xrightarrow{Roasting}$	$2HgO$	+	$2SO_2$
Mercuric sulphide (Cinnabar ore)				Mercuric oxide		

$2HgO$	→	$2Hg$	+	O_2
Mercuric oxide		Mercuric metal		

ii) Mercuric oxide is heated to about 300oC and it decomposes to give mercury metal.

II) Chemical reduction: The metal oxides from calcination or roasting processes are reduced to free metal by using chemical agents like carbon, aluminium, sodium or calcium.

(a) Reduction with carbon: The oxides of moderately reactive metals like zinc, copper, nickle, tin, lead etc. can be reduced by using carbon as reducing agent. In this process, the metal oxide is mixed with coke and heated in a furnace. Carbon reduces the metal oxide to free metal.

For e.g. when zinc oxide is heated with carbon, zinc metal is produced.

ZnO	+	C	$\xrightarrow{Heat}$	Zn	+	CO
Zinc oxide		Reducing agent		Zinc metal		Carbon monoxide

Similarly, lead is obtained from lead oxide by heating with carbon.

PbO	+	C	→	Pb	+	CO
Lead oxide				Lead metall		

Coke is very commonly used as a reducing agent because it is cheap.

(b) Reduction with carbon monoxide: Metals can be obtained from oxides by reduction with carbon monoxide in the furnace. For example, iron is obtained from ferric oxide by heating with carbon monoxide.

$$Fe_2O_3(s) + 3CO \xrightarrow{Heat} 2Fe + 3CO_2$$

c) Reduction with aluminium: Certain metal oxides are reduced by aluminium to metals. The method is known as aluminothermy or thermite process. For example, chromium, manganese, titanium, vanadium metals are obtained by the reduction of

their oxides with aluminium powder.

$3MnO_2$	+	4Al	$\xrightarrow{Heat}$	3Mn	+	$2Al_2O_3$
Manganese oxide				Manganese		
Cr_2O_3	+	2Al	$\xrightarrow{Heat}$	2Cr	+	Al_2O_3
Chromium oxide				Chromium		

Similarly, chromium is obtained by heating chromium oxide with aluminium powder.

(d) Reduction by electrolysis or electrolytic reduction: The oxides of active metals are commonly extracted by the electrolysis of their fused salts using suitable electrodes. This is also called electrolytic reduction. The process of extraction of metals by electrolysis process is called electrometallurgy.

For e.g., aluminium oxide is very stable and aluminium cannot be prepared by reduction with carbon. It is prepared by the electrolysis of molten alumina (Al2O3). In this process, pure alumina is dissolved in molten cryolite (Na3ALF6) in an iron tank lined with carbon. During electrolysis, the aluminium ions, Al3+ are reduced at cathode (by the electrons) to form aluminium.

Al^{3+}	+	$3e^-$	→	Al
Aluminium ion (from molten alumina)				Aluminium (At cathode)

During electrolytic reduction of molten salts, the metals are always produced at the cathode (negative electrode).

26. a. The gas that is evolved is evolved during the fermentation process is carbon dioxide (CO_2). It is accompanied by brisk effervescence.

    b. Yeast is the source of enzymes - invertase and zymase. These enzymes are needed for fermentation of cane sugar ($C_{12}H_{22}O_{11}$) to ethanol.

    Invertase helps in breaking sucrose (a naturally occurring carbohydrate present in cane sugar) into its components - glucose and fructose.

    $$C_{12}H_{22}O_{11} + H_2O \xrightarrow{invertase} C_6H_{12}O_6[glucose] + C_6H_{12}O_6[fructose]$$

Zymase converts glucose into alcohol and carbon dioxide.

$C_6H_{12}O_6 \xrightarrow{zymase} 2C_2H_5OH + 2CO_2 \uparrow$

c. The required chemical reactions for pure ethanol are as follows:-

i. Sodium ethoxide (C_2H_5ONa) can be obtained from pure ethanol when it is made to react with sodium. Sodium displaces hydrogen from ethanol.

$2C_2H_5OH + 2Na \rightarrow 2C_2H_5ONa + H_2 \uparrow$

ii. Ethyl ethanoate can be obtained from pure ethanol by warming ethanol with ethanoic acid in the presence of conc. sulphuric acid. This is esterification reaction.

$C_2H_5OH + CH_3COOH \xrightarrow{H_2SO_4} \underset{Ethyl Ethonoate}{CH_3COOC_2H_5} + H_2O$

iii. Ethanal can be obtained by performing the partial oxidation of pure ethanol in the absence of water. A chromium based reagent such as chromium trioxide can be used.

$C_2H_5OH + \frac{1}{2} O_2 \xrightarrow[Ch_3COOH]{CrO_3} CH_3CHO + H_2O$

27.

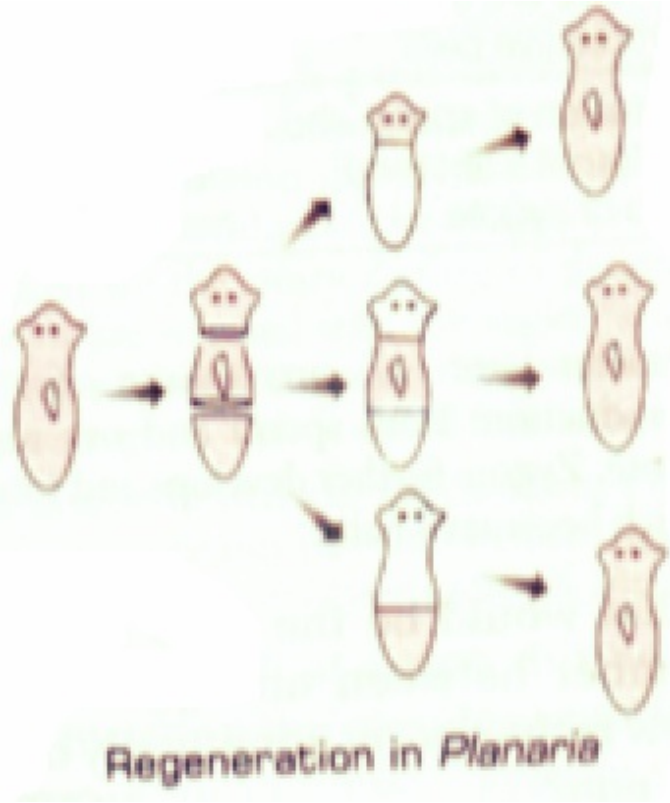
Intracellular digestion	Extracellular digestion
1)The digestion of food occurs within the cell.	1) The digestion occurs in the cavity of alimentary canal.
2) Digestive enzymes are secreted by the surrounding cytoplasm into the food vacuole.	2) Digestive enzymes are secreted by special cells into the cavity of alimentary canal.
3)Digestive products are diffused into the cytoplasm.	3) Digestive products diffuse across the intestinal wall into various parts of the body.
4) It is a less efficient method.	4) It is a more efficient method of digestion.
5) It occurs in unicellular organisms.	5) It occurs in multicellular organisms.

28. Budding, fragmentation and regeneration are all example of asexual reproduction because all of them involve only one parent. Male and female gametes are not

involved in the reproduction. Thus in all of the three process no variation is produced.

Planaria can be cut into any number of pieces and each piece grows into a complete organism. This process is known as regeneration (see fig.) Regeneration is carried out by specialised cells known as neoblast (adult stem cells).

These cells proliferate and produce large numbers of cells. From this mass of cells, different cells undergo changes to become various cell types and tissues, giving rise to whole new organism with same DNA content as its parent. These changes take place in an organised manner referred to as development.



OR

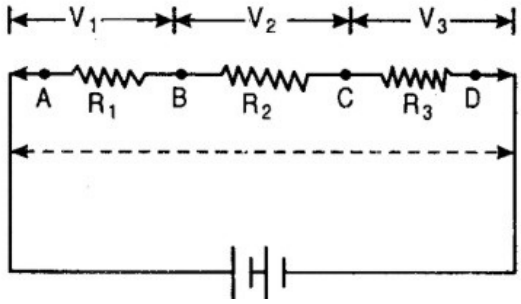
i. Placenta is a temporary organ which is extremely essential for foetal development because it helps in nutrition, respiration, excretion, etc., of the foetus through the maternal supply. Baby connects with placenta via umblical cord.
ii. Blocking of vas deferens is known as vasectomy which prevents passage of sperms, hence, there is no fertilisation thus it prevents pregnancy.
iii. Anemophily or wind pollination is a form of pollination where, wind acts as a pollinating agent because it helps in transfer of pollen grains from anther to stigma of a flower. e.g. wheat, rice corn.

iv. Condoms as physical barrier, which prevent entry of sperms into vagina, hence prevents pregnancy.
v. If Fallopian tube is blocked surgically, which is better known by the name tubectomy, sperm and egg do not meet and fuse and fertilisation does not take place.

29. Combination of resistors: Resistors of all values of resistances are not available. Hence resistors are connected in a number of ways to increase or decrease the combined resistance. There are two distinct ways in which resistors can be connected. They are resistors in series and resistors in parallel.

Resistors connected in series

Resistors are said to be in series if they are joined end to end so that the same current flows through each one of them in succession. Since there is a single path for the moving charge, the same current must flow through each resistor. Let the conductor AB, BC and CD having resistances equal to R_1, R_2 and R_3 respectively, be joined in series and let the current passing through them be I.



Let V_1, V_2 and V_3 be the potential difference between the ends of the first, second and third conductor respectively.

By Ohm's law,

$V_1 = IR_1$; $V_2 = IR_2$ and $V_3 = IR_3$

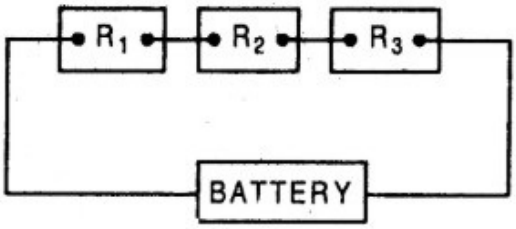
If V is the total potential difference between the ends A and D and R_s is the effective resistance of the combination of all the resistors, then

$V = IR_s$ But $V = V_1 + V_2 + V_3$

OR $IR_s = IR_1 + IR_2 + IR_3$

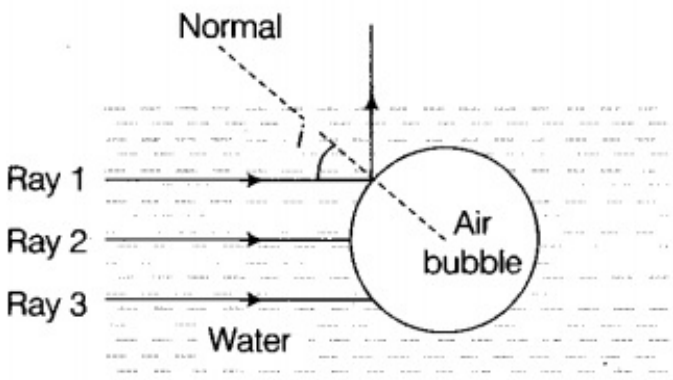
OR $R_s = R_1 + R_2 + R_3$

The above result holds good for any number of resistors joined in series.

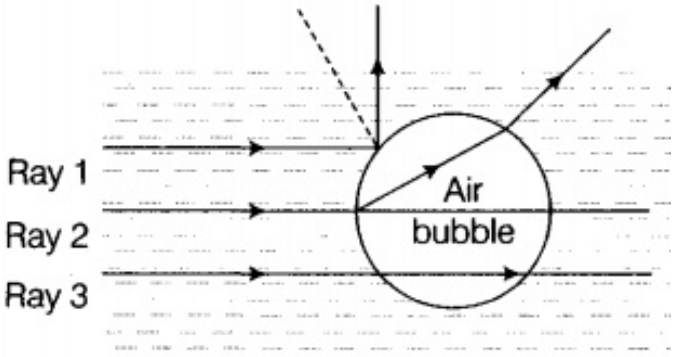


Thus when some resistors are joined in series, the total resistance is the sum of individual resistances.

30. i. Diagram for first part is shown as:



ii. The three rays continue after they meet the air bubble are shown as:



iii. Refractive index of water is defined as the ratio of the speed of light in a vacuum to the speed of light in water.

Speed of light in air, $v_a = 3 \times 10^8$ ms^{-1}

Speed of light in water, $v_w = 2.2 \times 10^8$ ms^{-1}

Therefore, Refractive index,

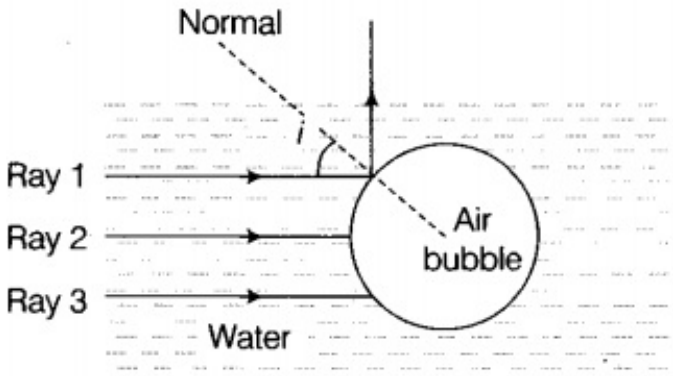
$n = \frac{v_a}{v_w}$

$= \frac{3 \times 10^8}{2.2 \times 10^8}$

= 1.4

OR

i. Diagram for first part is shown as:



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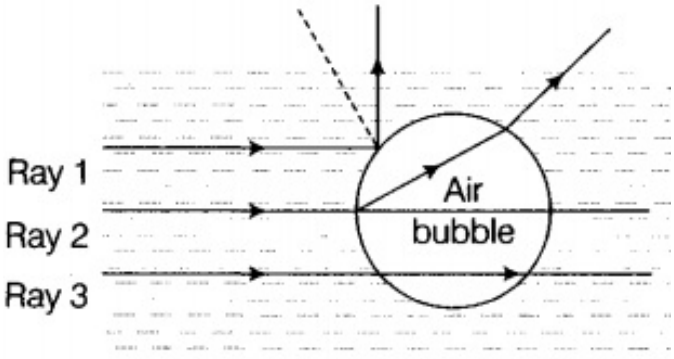

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