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SCIENCE PRACTICE PAPER

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CBSSE-SCIENCE

PRACTICE PAPER 03

General Instructions :

- (i) This question paper consists of 39 questions in 5 sections.
- (ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- (iii) Section A consists of 20 objective type questions carrying 1 mark each.
- (iv) 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.
- (v) 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.
- (vi) 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.
- (vii) Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

Time : 3 hrs.

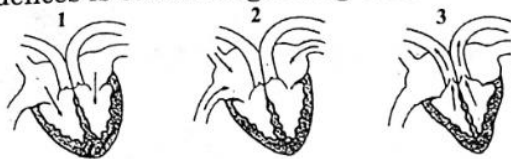
Max. Marks : 80

SECTION - A

Select and write the most appropriate option out of the four options given for each of the questions 1 - 20. There is no negative mark for incorrect response.

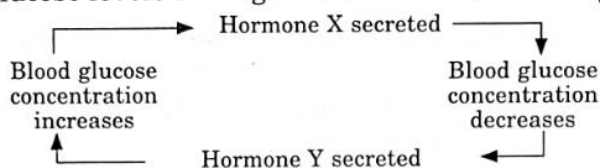
1. Which of the following statements is correct about rainbow?
 - (a) In primary rainbow, red colour is on the outside and violet colour is on the inside.
 - (b) In primary rainbow, violet colour is on the outside and red colour is on the inside.
 - (c) Secondary rainbow is brighter than primary rainbow.
 - (d) In secondary rainbow, light wave suffers one total internal reflection before coming out.
2. Which of the following statements is true?
 - (a) A convex lens with power + 4 D has a focal length - 0.40 m.
 - (b) A convex lens with power - 4 D has a focal length + 0.25 m.
 - (c) A concave lens with power + 4 D has a focal length - 0.25 m.
 - (d) A concave lens with power - 4 D has a focal length - 0.25 m.
3. For a current in a long straight solenoid N and S-poles are created at the two ends. Among the following statements, the correct statement is
 - (a) The field lines inside the solenoid are in the form of straight lines which indicates that the magnetic field is the same at all points inside the solenoid.
 - (b) The strong magnetic field produced inside the solenoid can not be used to magnetise a piece of magnetic material like soft iron, when placed inside the coil.
 - (c) The pattern of the magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet.
 - (d) The N and S-poles exchange position when the direction of current through the solenoid remains unchanged.
4. In case of four wires of same material, the resistance will be minimum when its length and diameters are respectively
 - (a) L and D
 - (b) $2L$ and D
 - (c) $\left(\frac{L}{2}\right)$ and $2D$
 - (d) $2L$ and $\left(\frac{D}{2}\right)$
5. Select the incorrect statement stated below related to concave mirror.
 - (a) Outer surface is coated with opaque substance.
 - (b) Inner surface is polished and thus reflective.
 - (c) It is known as converging mirror.
 - (d) It is used to observe the phenomenon of refraction.
6. Which of the following is correct ?
 - (a) 1 Tesla = $4\pi \times 10^{-7}$ Gauss
 - (b) 1 Tesla = 8.89×10^9 Gauss
 - (c) 1 Tesla = 10^4 Gauss
 - (d) 1 Tesla = 1.98 Gauss.

7. The figure given below shows three stages in the cardiac cycle. Which of the following sequences is correct regarding this?



- (a) 2, 3, 1 (b) 1, 2, 3
 (c) 2, 1, 3 (d) 3, 1, 2

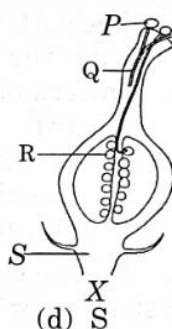
8. Refer to the diagram showing how blood glucose levels are regulated in the human body.



Identify hormones X and Y and select the correct option regarding them.

- (a) Hormone X is secreted by pancreas while hormone Y is secreted by thymus.
 (b) Deficiency of hormone X in the body can lead to diabetes mellitus.
 (c) X is glucagon and Y is insulin.
 (d) All of these

9. New plants may be grown from groups of cells that are taken from mother plants. The given diagram show parts of a plant X. Cell samples obtained from which of the labelled structures will grow into new plants that are genetically identical to plant X?



- (a) P (b) Q (c) R (d) S

10. Select the correct matches.

| | Cross | Progeny |
|-------|---|-----------------------------------|
| (i) | RRYY (Round yellow) × RRYY (Round yellow) | Round yellow only |
| (ii) | RrYy (Round yellow) × RrYy (Round yellow) | Round yellow and Round green only |
| (iii) | rryy (Wrinkled green) × rryy (Wrinkled green) | Wrinkled green only |
| (iv) | RRYY (Round yellow) × rryy (Wrinkled green) | Round green only |

- (a) (i) and (iii) (b) (ii) and (iv)
 (c) (ii) and (iii) (d) (i) and (iv)

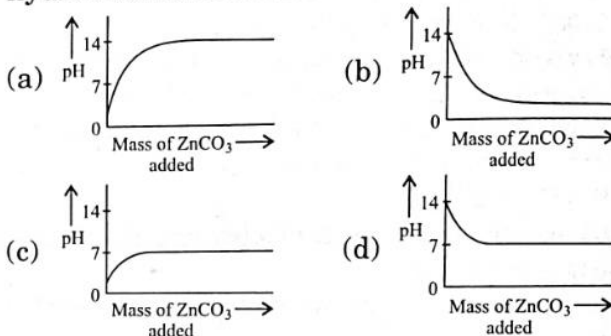
11. Trophic levels are

- (a) steps of the food chain
 (b) energy consumption in food chain
 (c) energy captured from sunlight
 (d) carnivores of the food chain.

12. Which of the following is biodegradable?

- (a) Cow dung (b) Plastic wastes
 (c) DDT (d) Heavy metals

13. Which of the following graphs show the change in pH when zinc carbonate is added to hydrochloric acid until it is in excess?



14. The non-metals are either solids or gases except _____ which is a liquid.

- (a) mercury (b) carbon
 (c) iodine (d) bromine

15. Which of the following is not an oxidation or reduction reaction?

- (a) $\text{CH}_4(g) + 2\text{O}_2(g) \rightarrow \text{CO}_2(g) + 2\text{H}_2\text{O}(l)$
 (b) $\text{Cl}_2(g) + \text{S}^{2-}(aq) \rightarrow \text{S}(s) + 2\text{Cl}^-(aq)$
 (c) $\text{Mg}(s) + \text{Zn}^{2+}(aq) \rightarrow \text{Mg}^{2+}(aq) + \text{Zn}(s)$
 (d) $\text{NaOH}(aq) + \text{HCl}(aq) \rightarrow \text{NaCl}(aq) + \text{H}_2\text{O}(l)$

16. What happens when ferrous sulphate crystals are heated?

- (a) A gas having the smell of burning sulphur is evolved.
 (b) No gas is evolved.
 (c) Brown coloured gas is evolved.
 (d) Colourless and odourless gas is evolved.

Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

- (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. Assertion : Fuse wire must have high resistance and low melting point.

Reason : Fuse is used for small current flow only.

18. Assertion : For a point on the axis of a circular coil carrying current, magnetic field is maximum at the centre of the coil.

Reason : Magnetic field is proportional to the distance of point from the circular coil.

19. Assertion : Silver bromide is stored in dark bottles in the labs.

Reason : Silver bromide decomposes when exposed to light.

20. Assertion : Left ventricle of heart has a thinner wall than that of the right ventricle.

Reason : Right ventricle needs to pump blood to nearby lungs only.

SECTION - B

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

21. Discuss the sound that we hear during the beating of heart.

22. Fishes die when taken out of water. Give reason.

23. How is the movement of leaves of the sensitive plant different from the movement of a shoot towards light?

OR

How do auxins promote the growth of a tendril around a support?

24. "In human beings, the statistical probability of getting either a male or female child is 50 : 50." Justify.

OR

(a) How many pairs of allelic characters did Mendel study in pea plant?

(b) State any two properties due to which Mendel selected pea plant.

25. A solution of the substance *X* is used for whitewashing.

(i) Name the substance *X* and write its formula.

(ii) Write the reaction of the substance *X* with water.

26. List two possible ways in which a concave mirror can produce a magnified image of an object placed in front of it. State the difference if any between these two images.

SECTION - C

Question No. 27 to 33 are short answer questions.

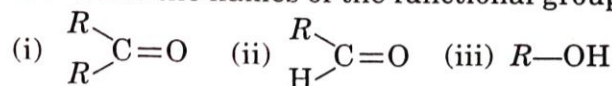
27. Give reason for the following:

(a) There is either a convergence or a divergence of magnetic field lines near the ends of a current carrying straight solenoid.

(b) The current carrying solenoid when suspended freely rests along a particular direction.

28. An object 5 cm in height, is placed at 15 cm in front of a concave mirror of focal length 10 cm. At what distance from the mirror should a screen be placed to obtain a sharp image of the object. Calculate the height of the image.

29. Write the names of the functional groups in



30. (i) Explain the significance of photosynthesis. Write the balanced chemical equation involved in the process.

(ii) Balance the following chemical equation
 $Na + H_2O \rightarrow NaOH + H_2$

31. (a) Define an acid-base indicator. Mention one synthetic acid-base indicator.

(b) If someone in the family is suffering from the problem of acidity after overeating, which of the following substances lemon juice, vinegar or baking soda solution would you suggest as a remedy?

Mention the property on the basis of which you will choose the remedy.

OR

A compound 'X' on losing water of crystallization partially gives compound 'Y' which is used for making chalk and other pottery articles. But when 'X' is strongly heated, 'X' gives 'Z' which is used as a drying agent. Identify X, Y, Z and write the chemical equations involved.

32. (a) Why did Mendel carry out an experiment to study inheritance of two traits in garden pea?

(b) What were his findings with respect to inheritance of traits in F_1 and F_2 generation?

(c) State the ratio obtained in the F_2 generation in the above mentioned experiment.

33. (a) "Industrialisation has adversely deteriorated the environment." Give four reasons in support of this statement.

(b) In some states of our country there is a ban on the use of polythene bags for shopping. Why?

SECTION - D

Question No. 34 to 36 are long answer questions.

34. How are the magnetic field lines of a bar magnet drawn using a small compass needle? Draw one magnetic field line each on both sides of the magnet.

OR

Why does a current-carrying conductor kept in a magnetic field experience force? On what factors does the direction of this force depend? Name and state the rule used for determination of direction of this force.

35. Of the three metals X, Y and Z. X reacts with cold water, Y with hot water and Z with steam only. Identify X, Y and Z and also arrange them in the order of increasing reactivity.

OR

(i) (a) Are all pure liquids bad conductors of electricity?

(b) Name a liquid which is good conductor of electricity but does not undergo electrolysis on passing electric current.

(c) If pure water is used, no electrolysis takes place. Why?

(ii) Write one point of difference between electrolytic reduction and reduction with carbon. Give one example of each.

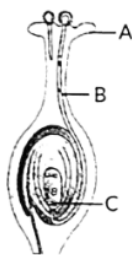
36. (a) Suggest any two categories of contraceptive methods to control the size of human population which is essential for the prosperity of a country. Also explain about each method briefly.

(b) Name two bacterial and two viral infections each that can get sexually transmitted.

(c) List two advantages of using condom during sexual act.

OR

(a) Identify A, B and C in the given diagram and write their functions.



(b) Mention the role of gamete and zygote in sexually reproducing organisms.

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. Study the table related to three hydrocarbons A, B, C and answer the questions that follow.

| Organic compound | Molecular formula |
|------------------|-------------------|
| A | C_3H_8 |
| B | C_5H_{10} |
| C | C_4H_6 |

(a) Why are A, B and C classified as hydrocarbons?

(b) To which homologous series does C_5H_{10} belong to? State its general formula and give the formula of next member of this series.

OR

(b) Write next three members of homologous series to which C_3H_8 belongs.

38. All living cells need nutrients, O_2 and other essential substances. Also, the waste and harmful substances need to be removed continuously for healthy functioning of cells. So, a well developed transport system is mandatory for living organisms. Complex organisms have special fluids within their bodies to transport such materials. Blood is the most commonly used body fluid by most of the higher organisms. Blood comprises of RBC, WBC and platelets. Lymph also helps in the transport of certain substances.

(a) The amount of blood corpuscles change in the patients of dengue fever. Which component of blood is affected in this disease?

(b) Name the blood cells whose reduction in number can cause haemophilia, a clotting disorder that leads to excessive loss of blood from the body even in a minor cut.

(c) WBCs are called soldiers of the body. Justify.

OR

(c) How does lymph help in transport?

39. Atmospheric refraction is the phenomenon of bending of light on passing through earth's atmosphere. As we move above the surface of earth, density of air goes on decreasing. Local conditions like temperature etc., also affect the optical density of earth's atmosphere. On account of atmospheric refraction, stars seen appear higher than they actual are; advanced sunrise; delayed sunset, oval appearance of the sun at sunrise and sunset; stars twinkle, planets do not.

(a) Due to atmospheric refraction, how apparent length of the day gets affected?

(b) Why the apparent position of the star appears raised?

(c) Is the position of a star as seen by us its true position? Justify your answer.

OR

(c) Why does the sun appear oval at sunrise and sunset, and circular at noon?

ANSWERS

1. (a)

$$2. (d): P = \frac{1}{f(m)} = \frac{100}{f(\text{cm})} \Rightarrow -4 = \frac{100}{f}$$

$$f = -25 \text{ cm or } f = -0.25 \text{ m}$$

3. (a): The pattern of the magnetic field associated with solenoid is same as the pattern of the magnetic field around a bar magnet. The strong magnetic field of solenoid can be used to magnetise magnetic material and on exchanging N and S-pole the direction of current also changes.

4. (c) : Choice (a), L and D

$$\therefore R_1 = \frac{\rho L}{\pi D^2}$$

Choice (b), 2L and D

$$\therefore R_2 = \frac{\rho 2L}{\pi D^2} = 2R_1$$

Choice (c), $\frac{L}{2}$ and 2D

$$\therefore R_3 = \frac{\rho L}{2\pi(2D)^2} = \frac{R_1}{8}$$

Choice (d), 2L and $\frac{D}{2}$

$$\therefore R_4 = \frac{\rho 2L}{\pi\left(\frac{D}{2}\right)^2} = 8 \frac{\rho L}{\pi D^2} = 8R_1$$

5. (d): Mirror is used to observe the phenomena of reflection.

6. (c) : 1 Tesla = 10^4 Gauss

7. (c) : In figure (2), blood is entering into the right auricle through superior and inferior vena cava and blood is entering into left auricle through pulmonary vein. Figure (1) shows movement of blood from the auricles into the ventricles. Figure (3) shows movement of blood from the right ventricle into the pulmonary artery and from the left ventricle into aorta.

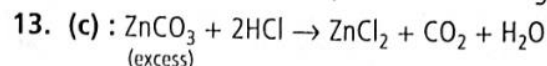
8. (b): In the given figure, X is insulin and Y is glucagon. Both these hormones are secreted by endocrine cells of pancreas (islets of Langerhans). Deficiency of hormone insulin (X) secretion can lead to diabetes mellitus.

9. (d) : There are two types of cells in an organism—somatic cells (2n) and germ cells (n). Somatic cell samples give rise to new organisms that are genetically identical to their parents because in somatic cells, crossing over does not occur and hence variations are not produced. Germ cells produce variations. Thus, cell samples taken from part S (thalamus) of plant X will give rise to new plants that are genetically identical to plant X.

10. (a) : In the cross between RRYy (round yellow) and RRYy (round yellow), the offsprings would be RRYy (round yellow) and in the cross between rryy (wrinkled green) and rryy (wrinkled green) the offsprings would be rryy (wrinkled green).

11. (a) : The various steps, representing organisms in a food chain, at which transfer of food and energy takes place are called trophic levels.

12. (a) : Cow dung can be decomposed by the action of biological or microbial action, hence it is bio-degradable.

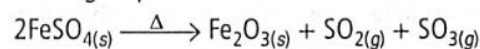


Initially, pH of HCl will increase until whole HCl gets neutralised by ZnCO_3 . Finally, the solution contains excess of ZnCO_3 which is a salt of weak base, Zn(OH)_2 and weak acid, H_2CO_3 . Thus, the pH of the solution will not increase beyond 7.

14. (d)

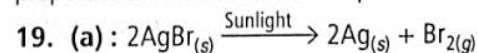
15. (d) : It is a neutralisation reaction which does not involve any change in oxidation states.

16. (a) : The green colour of ferrous sulphate crystals changes to brownish black colour of ferric oxide and smell of burning sulphur dioxide is evolved.



17. (c) : Fuse wire must have high resistance because According to Joule's law $H = I^2Rt$, heat produced is high if R is high. The melting point must be low so that wire may melt with increase in temperature. As a current larger than the specified value flows through the circuit the temperature of the fuse wire increases. This melts the fuse wire and breaks the circuit.

18. (c) : The magnitude of magnetic field produced by a current carrying circular coil is maximum at the centre and is not proportional to the distance of a point from the circular coil.



20. (d) : The mammalian heart is four chambered consisting of two ventricles and two atria. The right ventricle receives deoxygenated blood from the right atrium whereas the left ventricle receives oxygenated blood from the left atrium. The right ventricle has a thinner wall than that of left ventricle because the right ventricle needs to pump the deoxygenated blood to the nearby lungs only, whereas the left ventricle is required to pump out oxygenated blood with force away from heart to tissues and organs all over the body, so its wall is thick.

21. The closing of atrioventricular valves during ventricular systole produces the first heart sound called 'lub'. The closing of semilunar valves during ventricular diastole produces the second heart sound 'dub'.

22. In fishes, respiration takes place through gills. It is called branchial respiration. They take oxygen dissolved in the water.

When fishes are taken out of water they die as the supply of oxygen is cut from the gills and they cannot use gaseous O_2 .

23. The movement of leaves of a sensitive plant is neither towards, nor away from the stimulus like touch, etc. It is a non-directional movement (nastic movement), while movement of shoot is towards the stimulus like light, etc., it is a directional movement (tropic movement).

OR

When tendrils come in contact with any support, the part of the tendril in contact with the object does not grow as rapidly as the part of the tendril away from the object. This is caused by the action of auxin hormone. Less auxin occurs on the side of contact as compared to the free side. As a result, auxin promotes growth on the free side and the tendrils coil around the support.

24. Human females are homogametic (44 + XX), that is they produce only one type of ova (22 + X). Human males are heterogametic. They produce two types of sperms : (22 + X) and (22 + Y) in equal proportion that is 50 : 50 ratio. The chance of getting male or female child is also 50 : 50, as there is equal chance of androsperm (22 + Y) or gynosperm (22 + X) fertilising an ovum.

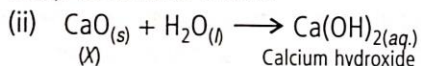
OR

(a) Mendel studied mainly seven pairs of allelic characters in pea plant.

(b) Mendel choose pea plants for his experiments because of the following reasons:

- (i) It has a short life cycle.
- (ii) It shows several well defined, easily detectable contrasting traits.

25. (i) The substance X is calcium oxide (also called quick lime). Its formula is CaO .



26. A concave mirror can produce a magnified image of an object when object is placed :

- (i) in between its pole and its focus,
- (ii) in between its focus and its centre of curvature.

Difference between these two images :

The image produced in first case will be virtual and erect.

The image produced in second case will be real and inverted.

27. (a) There is either a convergence or a divergence of magnetic field lines near the ends of a current carrying straight solenoid because it behaves similar to that of a bar magnet and has a magnetic field line pattern similar to that of a bar magnet. Thus the ends of the straight solenoid behaves like poles of the magnet, where the converging end is the south pole and the diverging end is the north pole.

(b) The current carrying solenoid behaves similar to that of a bar magnet and when freely suspended aligns itself in the north-south direction.

28. Given : object distance, $u = -15$ cm, object height, $h = 4$ cm, focal length, $f = -10$ cm; Image distance, $v = ?$

Using mirror formula,

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f} \Rightarrow \frac{1}{v} + \frac{1}{(-15)} = \frac{1}{-10} \Rightarrow \frac{1}{v} = \frac{1}{15} - \frac{1}{10}$$

$$\text{or } \frac{1}{v} = \frac{10-15}{150} = \frac{-5}{150} = \frac{-1}{30} \text{ or } v = -30 \text{ cm}$$

In order to obtain a sharp image of the object on the screen, screen should be placed at a distance of 30 cm in front of the mirror.

Also, magnification, $m = \frac{h'}{h} = \frac{-v}{u}$

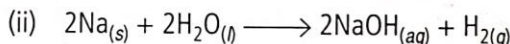
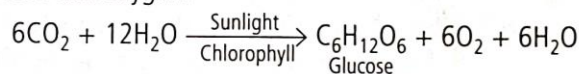
$$\text{or } \frac{h'}{5} = -\frac{(-30)}{(-15)} \text{ or } h' = \frac{-(30) \times 5}{(15)} = -10$$

$$\text{or } h' = -10 \text{ cm}$$

Thus, the height of the image is 8 cm.

29. (i) Ketone (ii) Aldehyde (iii) Alcohol

30. (i) Photosynthesis means synthesis of food with the help of light. It is the process that gives life to all living beings. Photosynthesis is a process by which plants utilise carbon dioxide and water in the presence of sunlight to produce glucose and oxygen.

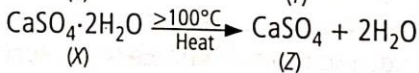
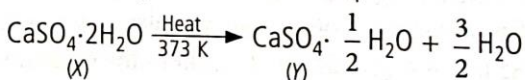


31. (a) Acid – base indicators : The indicators which show different colours or odours in acidic and basic medium are called acid-base indicators. Phenolphthalein is a synthetic acid-base indicator.

(b) Acidity can be neutralised by a base. Hence, we should choose baking soda solution because it is a weak base and will react with excess acid produced in the stomach due to hyperacidity and will neutralise it.

OR

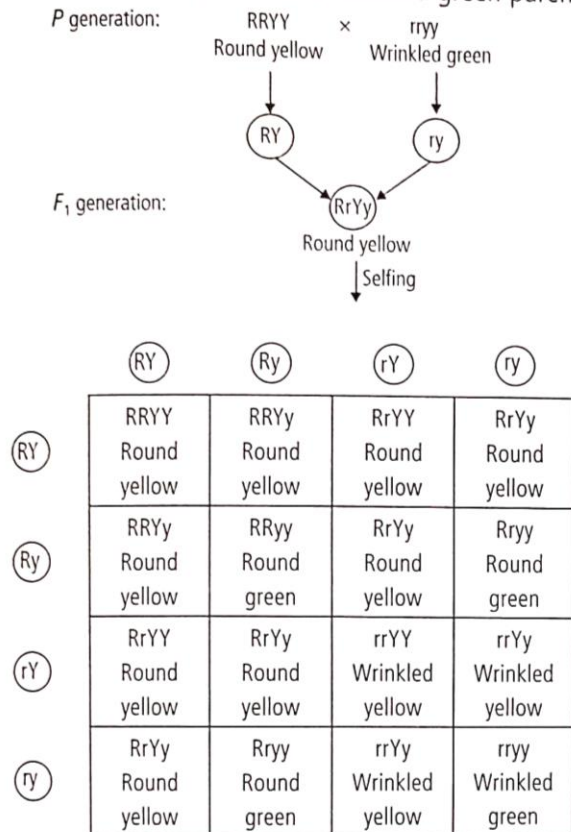
A commonly used compound for making chalks and other pottery articles is plaster of Paris. Its chemical formula is $CaSO_4 \cdot \frac{1}{2}H_2O$. It is obtained by heating gypsum ($CaSO_4 \cdot 2H_2O$) at 373 K which partially loses water of crystallization. When $CaSO_4 \cdot 2H_2O$ is strongly heated, it loses whole of its water of crystallization and gives anhydrous calcium sulphate which is used as a drying agent. Thus 'X' is $CaSO_4 \cdot 2H_2O$; Y is $CaSO_4 \cdot \frac{1}{2}H_2O$ and 'Z' is $CaSO_4$.



32. (a) Mendel carried out crosses with two traits to see the interaction and basis of inheritance between them. In a dihybrid cross given by Mendel, it was observed that when

two pairs of characters were considered each trait expressed independent of the other.

(b) In F_1 generation, only dominant traits expressed themselves but in F_2 generation parental traits as well as new recombinations occur. This can be explained with the help of a cross between round yellow and wrinkled green parents.



In F_1 generation, all plants are with round yellow seeds. But in F_2 generation, we find all types of plants - Round yellow, Round green, Wrinkled yellow and Wrinkled green.

(c) F_2 generation ratio : 9 (Round-yellow) : 3 (Round-green) : 3 (Wrinkled-yellow) : 1 (Wrinkled-green)

33. (a) Industrialisation has deteriorated our environment in the following ways :

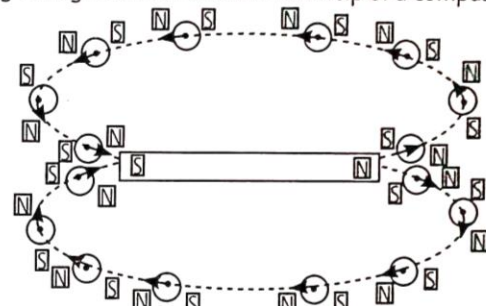
- Rapid industrialisation has increased the demand of more land area for setting up of new factories. This demand is being fulfilled by clearing up of forest area. Deforestation is one of the major causes of ecological imbalance, biodiversity loss and ecosystem instability.
- Industries release various harmful gases in the environment which pollute the air. These gases when inhaled by people around, cause various respiratory diseases in them.
- A lot of effluent and liquid waste is discharged from various industries which is mostly dumped into nearby water bodies. This causes water pollution. Polluted water causes death of various aquatic organisms and consumption of this polluted water causes various diseases in humans.
- The solid waste released from factories is dumped on open land and not treated properly to ensure their proper decomposition. This leads to land pollution that degrades

quality of soil and also causes various kinds of diseases in humans and animals.

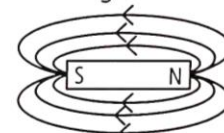
(b) Government of India is imposing a ban on the use of polythene bags because these are non-biodegradable substances which are not acted upon by the microbes. So, they cannot be decomposed and therefore persist in the environment for a long time thereby causing harm to the ecosystem. Polybags choke drains which results in water logging, that allows breeding of mosquitoes and hence leads to various diseases like malaria, dengue, etc.

34. Place the plotting compass near the magnet on a piece of paper. Mark the direction the compass needle points. Move the plotting compass to many different positions in the magnetic field, marking the needle direction each time. Join the points to show the field lines.

Drawing a magnetic field line with the help of a compass needle.



Field lines around a bar magnet.



OR

The force on a current-carrying conductor in a magnetic field is due to interaction between :

- magnetic field due to current carrying conductor and
- the external magnetic field in which the conductor is placed.

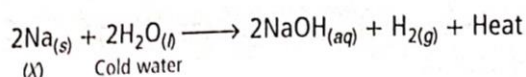
The direction of the force acting on the current carrying conductor placed in the magnetic field depends upon

- direction of the current through the conductor and
- direction of the magnetic field in which the conductor is placed.

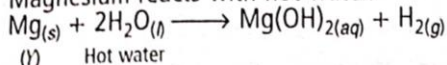
The direction of the force acting on the current carrying conductor placed in the magnetic field is determined by using Fleming's left hand rule.

According to this rule, stretch the thumb, forefinger and middle finger of your left hand such that they are mutually perpendicular. If the fore finger in the direction of magnetic field and the middle finger in the direction of current, then the thumb will point

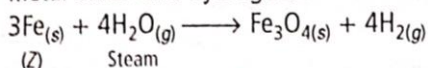
35. Metals like sodium and potassium react violently with cold water but the reaction of calcium with water is less violent.



Magnesium reacts with hot water.



Metals like aluminium, iron and zinc react with steam to form metal oxide and hydrogen.



Thus, X = Na or K or Ca, Y = Mg, Z = Fe or Al or Zn

Thus, increasing order of reactivity is

Z < Y < X.

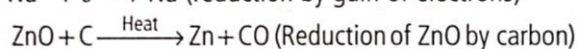
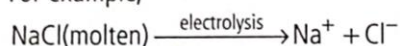
OR

(i) (a) No, there are exceptions as Hg is a good conductor of electricity.

(b) Mercury is a good conductor of electricity but does not undergo electrolysis.

(c) Pure water does not dissociate into ions on passing electric current.

(ii) The electrolytic reduction takes place at the cathode by the gain of electrons in electrolysis. At the same time, carbon reduction is carried out by heating a metal oxide with coke. For example,



36. (a) Two categories of contraceptive methods used to control the size of human population are :

(i) Barrier method- These are physical devices to prevent the entry of sperm in the female, e.g., condoms.

(ii) Chemical method - It involves the use of oral pills that check ovulation. These are mainly hormonal preparations and contain estrogen and progesterone.

(b) Bacterial diseases due to unsafe sex are gonorrhoea and syphilis. Viral diseases due to unsafe sex are AID and warts.

(c) Advantages of using condom during sexual act:

(i) Condom act as a mechanical barrier and prevent the entry of sperms in the female reproductive tract. Thus, it act as a contraceptive method and prevent unwanted pregnancy.

(ii) Condom also protect against sexually transmitted diseases (STDs).

OR

(a) 'A' represents stigma. It receives the pollen grains from the anther of stamen. Stigma is sticky so that pollen can stick to it and fertilisation can occur. 'B' represents pollen tube. Pollen tube acts as a conduit to transport the male gamete cells from the pollen grain at stigma to the ovules at the base of the carpel for the process of fertilisation. 'C' represents female germ cell. Female germ cell fertilises with male germ cell to form zygote which develops into an embryo within the ovule.

(b) Role of gamete : Gametes are the reproductive cells involved in sexual reproduction having half of the chromosome. Gametes carry variations generated during its formation (meiosis). A male gamete and a female gamete fuses to form zygote.

Role of zygote : The fusion of male gamete with female gamete forms a zygote during sexual reproduction. Zygote has normal number of chromosomes and new combinations of variation that express in new generation. The zygote undergoes repeated mitotic divisions to form the embryo which has the potential to form a complete individual.

37. (a) A, B and C are classified as hydrocarbons because these compounds are made up of carbon and hydrogen only. (b) C₅H₁₀ is an alkene. Its general formula is C_nH_{2n}. The next member of this series is C₆H₁₂.

OR

(b) The general formula of compound C₃H₈ is C_nH_{2n+2}. Thus the next three members of the homologous series will be C₄H₁₀, C₅H₁₂, C₆H₁₄

38. (a) In patients of dengue fever, there is significant decrease in platelets count. This result in the decrease of blood corpuscles.

(b) Platelets

(c) WBCs manufacture antibodies, which fight against disease causing germs and are responsible for immunity, thus called soldiers of the body.

OR

(c) Lymph is a colourless fluid which contains blood plasma along with leucocytes and have fewer proteins. Lymph carries digested and absorbed fats from intestine and drains excess fluid from extracellular space back into the blood.

39. (a) Due to atmospheric refraction, apparent length of the day increases by 4 minutes.

(b) Apparent position of the star appears raised due to atmospheric refraction.

(c) No. Due to atmospheric refraction the light coming from the star bends. The observer is able to see the image of star in his line of sight.

OR

(c) This can be explained in terms of atmospheric refraction. At sunrise and sunset, the sun is near the horizon. The rays of light from the upper part and lower part of the periphery of the sun bend unequally on travelling through earth's atmosphere. That is why the sun appears oval or flattened at the time of sunrise and sunset.

At noon, the sun is overhead. The rays of light from the sun enter earth's atmosphere normally. Therefore, they suffer no refraction or bending on passing through earth's atmosphere. Hence the sun appears circular at noon.

