

SET -4 (SOLUTION)

SCIENCE

TIME: 3 HRS.

MAX. MARKS: 80

General Instructions:

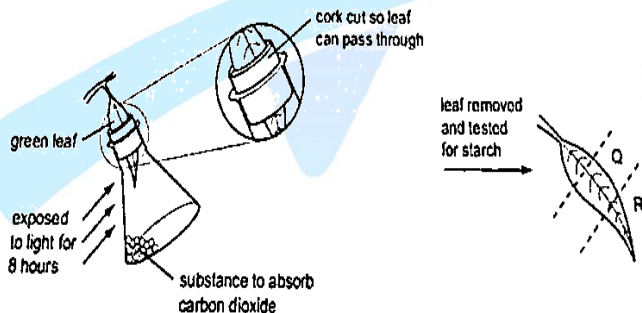
1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. Student are expected to attempt only one of these questions.
3. **Section A** consists of 16 objective type questions carrying 1 mark each. Q. No. 17 to 20 are Assertion-Reason based questions.
4. **Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
5. **Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answer to these questions should be in the range of 50 to 80 words.
6. **Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
7. **Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION A

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

1. A chemical compound used in glass, soap as laboratory reagent and in paper industries is
(a) **washing soda** (b) baking soda
(c) bleaching powder (d) common salt
2. Carbon can use four hydrogen atoms to form methane (CH_4), because
(a) valency of carbon is four
(b) valency of hydrogen is one
(c) **Both (a) and (b)**
(d) carbon gets noble gas configuration by making four covalent bonds with hydrogen
3. A molecule of ammonia (NH_3) has
(a) **only single bonds**
(b) only double bonds
(c) only triple bonds
(d) two double bonds and one single bond
4. Which metallic oxides reacts with both acid and base is
(a) MgO (b) Na_2O
(c) Al_2O_3 (d) CaO
5. Gold is used for making jewellery. What are the properties of gold that make it a suitable metal for making jewellery?
(a) Ductility (b) Malleability
(c) Lustrous (d) **All of the above**
6. Due to the formation of .., silver particles become black on prolonged exposure to air.
(a) Ag_3N (b) Ag_3O
(c) **Ag_2S** (d) Ag_2S and Ag_3N
7. Which among the following are unsaturated hydrocarbons?
(i) $\text{CH}_3\text{-CH}_2\text{-CH}_3$
(ii) $\text{CH}_3\text{-CH=CH-CH}_3$
(iii) $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3\text{---C---CH}_3 \\ | \\ \text{CH}_3 \end{array}$
(iv) $\begin{array}{c} \text{CH}_3\text{---C=CH}_2 \\ | \\ \text{CH}_3 \end{array}$

- (a) (i) and (iii) (b) (ii) and (iii)
 (c) **(ii) and (iv)** (d) (ii), (iii) and (iv)
8. Which of the following statement(s) is/ (are) true about heart?
- A. Left atrium receives oxygenated blood from different parts of body, while right atrium receives deoxygenated blood from lungs.
 B. Left ventricle pumps oxygenated blood to different body parts, while right ventricle pumps deoxygenated blood to lungs.
 C. Left atrium transfers oxygenated blood to left ventricle which sends it to different body parts.
 D. Right ventricle pumps deoxygenated blood to lungs through pulmonary vein.
- (a) C and D (b) B and D
 (c) A and D (d) **B and C**
9. A plant is kept in the dark for two days. A leaf from this plant, is used in an experiment to investigate the effect of two factors on photosynthesis as shown in the diagram.



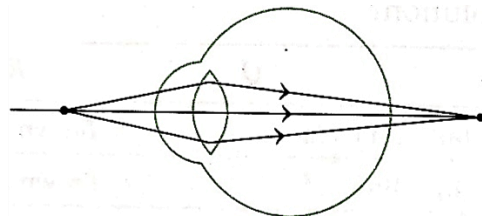
What are the colours of Q and R, when the leaf is tested for starch, using iodine solution?

Q	R
(a) Blue/black	Brown
(b) Brown	Brown
(c) Blue/black	Blue/black
(d) Brown	Blue/black

10. A cross between a tall pea plant (TT) and short pea plant (tt) resulted in progeny that were all tall plant because
- (a) **tallness is the dominant trait**
 (b) shortness is the dominant trait

- (c) tallness is the recessive trait
 (d) height of pea plant is not governed by gene Tor 't

11. The correct sequence of organs in the male reproductive system for transport of sperms is
- (a) **testis → vas deferens → urethra**
 (b) testis → ureter → urethra
 (c) testis → urethra → ureter
 (d) testis → vas deferens → ureter
12. Which among the following are not the functions of the ovary at puberty in female?
- A. Formation of germ cells
 B. Secretion of testosterone
 C. Development of placenta
 D. Secretion of oestrogen
- (a) A and B (b) **B and C**
 (c) C and D (d) B and D
13. An object is placed in front of a convex mirror. Its image is formed
- (a) at a distance equal to the object distance in front of the mirror
 (b) at twice the distance of the object from the mirror
 (c) at half the distance of the object in front of the mirror
 (d) **at behind the mirror and it's position varies according to the object distance**
14. Observe the given diagram carefully. What could be the cause of this defect?



- (i) The focal length of the eye lens is too long.
 (ii) The eye ball becomes too small.
 (iii) The focal length of the eye lens is too small.
 (iv) The eye ball becomes too long.
- (a) **i and ii** (b) i and iv
 (c) ii and iii (d) iii and iv

15. Which of the following two organisms are producers?

- (a) Plants and phytoplanktons
- (b) Plants and consumers
- (c) Zooplanktons and phytoplanktons
- (d) Phytoplanktons and chlorophyll

16. How much of the net primary productivity of a terrestrial ecosystem is eaten and digested by herbivores?

- (a) 1% (b) 10%
- (c) 40% (d) 90%

Direction (Q. Nos.17-20) consist of two statements- Assertion (A) and Reason (R). Answer these questions by 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, but 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 (A)** Graphite is slippery to touch.

Reason (R) The various layers of carbon atoms in graphite are held together by weak van der Waals' forces. (ANSWER-A)

18. **Assertion (A)** Plants lack the nervous system but they do coordinate.

Reason (R) Plants contain hormones that regulate growth and development. (ANSWER-A)

19. **Assertion (A)** The magnetic field produced by a current carrying solenoid is independent of its length and cross-sectional area.

Reason (R) The magnetic field inside the solenoid has variable value. (ANSWER-C)

20. **Assertion (A)** Blood pressure is much greater in arteries than veins.

Reason (R) The force exerted by blood against the wall of the vessel is called blood pressure. (ANSWER-B)

SECTION B

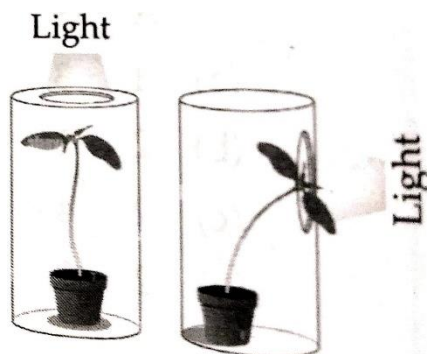
Question No. 21 to 26 are very short answer questions.

21. Give a test that can be used to differentiate between butter and cooking oil.

Sol.- Butter contains saturated compounds while cooking oil contains unsaturated compounds. Since, unsaturated compounds are oxidised by alk. $KMnO_4$ with disappearance of its pink colour.

Therefore, when cooking oil is treated with a few drops of alk. $KMnO_4$, pink colour of $KMnO_4$ disappears. With butter, however the pink colour of $KMnO_4$ does not disappear. (2)

22. What conclusions can be drawn from the activity shown in the image below. Also, mention the term used to describe this phenomenon



Sol.- The given activity shows the response of plant to the direction of sunlight. It can be concluded that light acts as a stimulus for plant growth. The term which is used to describe this phenomenon is known as phototropism. (2)

23. (a) A green stemmed rose plant denoted by GG and a brown stemmed rose plant denoted by gg are allowed to undergo a cross with each other.

List your observations regarding

- (i) Colour of stem in their F_1 progeny.
- (ii) Percentage of brown stemmed plants in F_2 progeny, if F_1 plants are self-pollinated.

Or

(b) How is the sex of a child determined in human beings?

Sol.- (a) (i)

	♂	G	G
♀	g	Gg	Gg
	g	Gg	Gg

All the plants will be with green stem in F_1 progeny.

(ii)

	♂	G	g
♀	G	GG	Gg
	g	Gg	gg

25% plants will be brown stemmed.

Or

(b) A male gamete carries either X or one Y chromosome, while a female gamete carries only X-chromosome.

Therefore, sex of the child depends upon the type of chromosome carried by sperm.

- (i) If a sperm carrying X-chromosome fertilizes the egg, the child born will be a male (XY). (1)
- (ii) If a sperm carrying Y-chromosome fertilizes the egg, the child born will be a male (XY). (1)

24. A student focussed the image of a candle flame on a white screen by placing the flame at various distances from a convex lens. He noted his observation in the following table.

S.NO	Distance of the Screen from lens (cm)	Distance of the Flame from lens (cm)
I	20	60
II	24	40
III	30	30
IV	40	24
V	70	12

Analyse the above table and give the answers of the following questions.

- (i) What is the focal length of convex lens?
- (ii) Which set of observation is incorrect and why?

Sol.- (i) We know that, when object is placed at $2F$, the distance of an object from lens = distance of image from lens.

Therefore, from III observation, radius of curvature $R = 30 \text{ cm}$

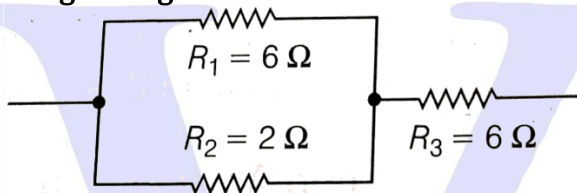
Thus, focal length $f, = \frac{R}{2} = \frac{30}{2} = 15 \text{ cm}$ (1)

(ii) Last observation is incorrect because when an object is placed at a distance less than 15 cm away from convex lens, we will have virtual image, which cannot be taken on screen. (1)

25. (a) What is meant by electric current? Write its SI unit. Calculate the amount of charge that flows through a conductor when a current of 5 A flows through it for 2 min .

Or

(b) The given figure shows three resistors



Find the combined resistance.

Sol.- (a) Electric current is defined as the rate of flow of electric charge through any cross-section of a conductor.

SI unit of electric current is ampere (A).

Give, $I = 5 \text{ A}, t = 2 \text{ min} = 2 \times 60 \text{ s} = 120 \text{ s}, q = ?$

We know that, charge, $q = I \times t$

$\Rightarrow q = 5 \times 120 = 600 \text{ C}$

Thus, amount of charge flowing through conductor is 600 C . (2)

Or

(b) Here, R_1 is parallel to R_2 .

For parallel combination,

$$\therefore \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{6} + \frac{1}{2} = \frac{1+3}{6}$$

$$\frac{1}{R} = \frac{4}{6} = \frac{2}{3} \therefore R = \frac{3}{2}$$

Now, R and R_3 are in series.

$$\therefore R_s = R + R_3 = \frac{3}{2} + 6 = \frac{3+12}{2} = 7.5 \Omega \quad (2)$$

26. How are water and minerals transported in plants?

Sol.- Water and minerals are transported through xylem in plants. The cells in roots that are in contact with soil actively take up ions, creating a difference in the concentration of ions between the cell's sap of roots and soil water.

Water moves into the roots through osmosis to eliminate this difference in concentration, forming a steady movement of water in the root xylem. This creates a column of water that is steadily pushed upwards. Loss of water from leaves through transpiration creates a suction that pulls water from the xylem of the roots to the aerial parts of the plant body. (2)

SECTION C

Question No. 27 to 33 are short answer questions.

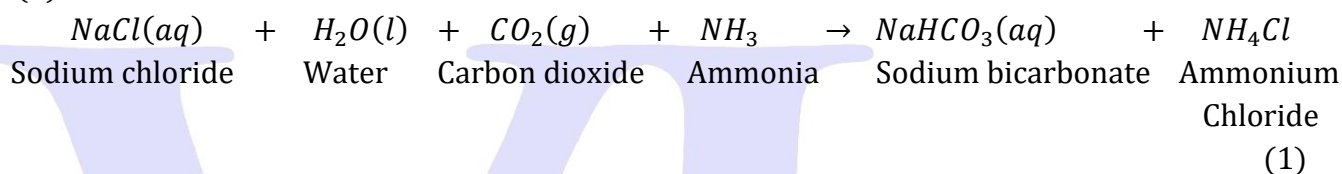
27. The pH of a salt used to make tasty and crispy pakoras is 14.

- (a) Examine the salt used.
- (b) Write a chemical equation for its formation.
- (c) List its two uses.

Sol.- The pH of a salt used to make tasty and crispy pakoras is 14.

(a) The salt is sodium hydrogen carbonate. Its formula is NaHCO_3 . This is also known as baking soda. (1)

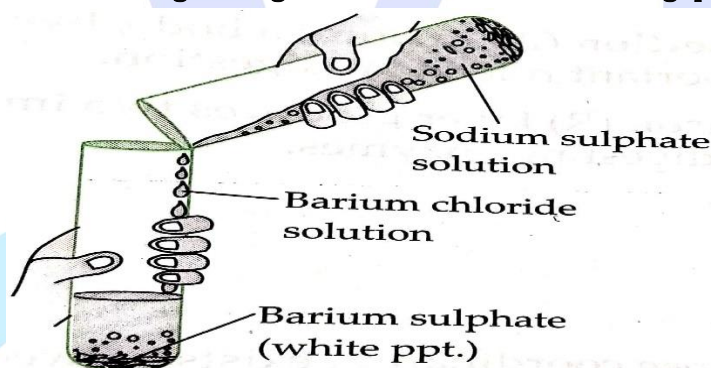
(b) The chemical reaction involved as



(c) Uses

- (i) it is used for making baking power.
 - (ii) It is also used as an ingredient in antacids.
- (1)

28. (a) Observe the given figure and answer the following questions



- (i) Write the complete balanced reaction for the reaction that takes place.
 - (ii) Type of reaction involved.
 - (iii) Is there any precipitate formed If any, write the colour of the precipitate
- Or

(b) What is observed when sulphur dioxide is passed through (i) water and (ii) lime water?

Also write chemical equations for the reactions that takes place.

Sol.- (a) (i) $\text{BaCl}_2\text{(aq)} + \text{Na}_2\text{SO}_4\text{(aq)} \rightarrow \text{BaSO}_4\text{(s)} + 2\text{NaCl(aq)}$ (1)
 Barium chloride Sodium sulphate (White ppt.)

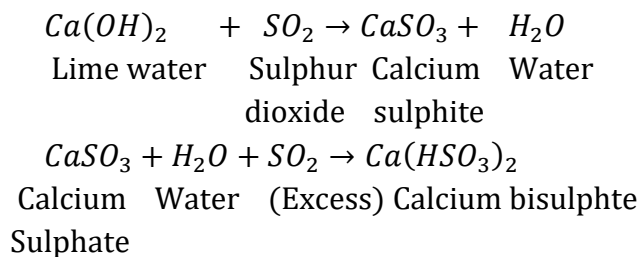
(ii) It is a double displacement reaction. (1)

(iii) Yes, a precipitate is white in colour (1)

Or

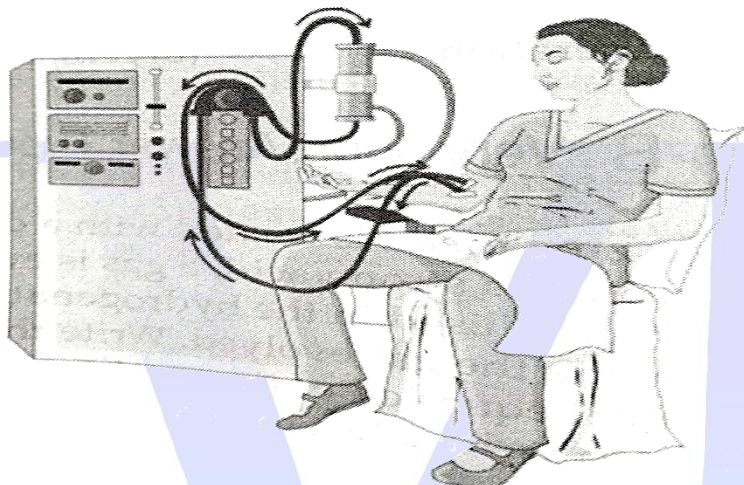
(b) (i) When SO_2 is passed through lime water, calcium sulphate (White ppt.) is formed, which reacts with excess SO_2 to form calcium hydrogen sulphite.

The chemical equation for the reactions are



(2)

29. Observe the given diagram carefully and answer the following questions.



(a) Identify and the process shown.

(b) Under what conditions is it carried out?

(c) Name the device which is used to carry out this process.

Sol.- (a) The process of dialysis is shown in the given image. It is an artificial process of filtering blood, which is done to remove the nitrogenous waste products from the blood. (1)

(b) This process is carried out when a person's kidney are no longer able to effectively filter waste products from the blood due to kidney failure or severe kidney dysfunction. (1)

(c) An artificial kidney is a device which is used to carry out this process. (1)

30. Some modern insecticide has been introduced each having different properties like accumulation in the bodies of predators, broken down by soil bacteria, easily washed into lakes and rivers and taken up by plant roots. Among all these insecticides, which one will help in reducing or keeping the level of environment pollution to lowest?

Sol.- Insecticides are non-biodegradable chemicals added to crop fields to stop the growth of harmful insects infecting the crops. Modern insecticides are developed keeping in mind about the harm they cause to the environment and its components. (1)

Biodegradable insecticides can be decomposed into harmless substances, which will subsequently be dispersed in their specific pathways and cause no pollution.

Non-biodegradable insecticides buildup in the fat tissues of the body and pass on to the organisms that feed on them. (1)

Hence, they accumulate along the food chain resulting in significant amounts in the tissues of consumers at the highest trophic level. This is called as bio magnification.

The property of newly developed insecticide which includes that it can easily get decomposed into simpler components by soil bacteria, will help in reducing or keeping the level of environmental pollution to lowest. (1)

31. A 6 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 25 cm. The distance of the object from the lens is 40 cm. Then, determine

(a) the position

(b) and the size of the image formed.

Sol.- Given, height of the object, $h_0 = 6 \text{ cm}$

Focal length of lens, $f = 25 \text{ cm}$

Distance of the object, $u = -40 \text{ cm}$

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

$$\frac{1}{v} = \frac{1}{f} + \frac{1}{u} = \frac{1}{25} + \frac{1}{(-40)} = \frac{8-5}{200} = \frac{3}{200}$$

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

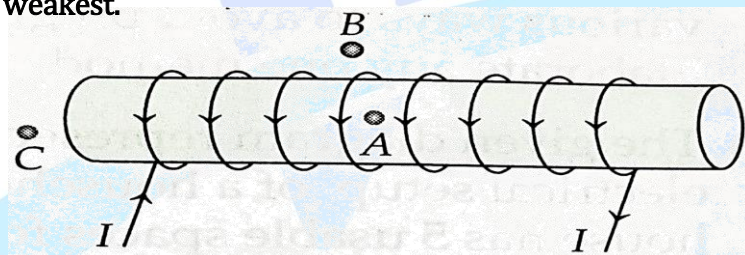
(2)

(b) Magnification, $m = \frac{h_i}{h_0} = \frac{v}{u}$

$$h_i = \frac{v}{u} \times h_0 = \frac{200}{3 \times (-40)} \times 6 = -10 \text{ cm}$$

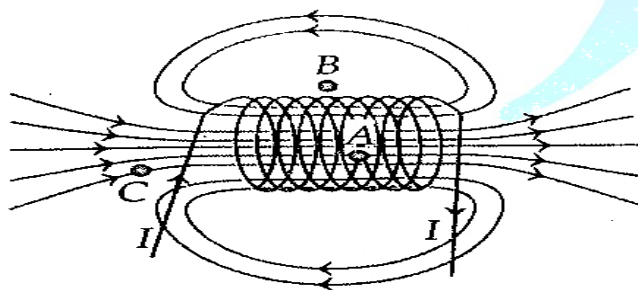
(1)

32. For the given solenoid carrying current, sketch the magnetic field lines. Analyse and provide reasoning to explain at which of the three points A, B or C the magnetic field strength is strongest and where it is weakest.



Sol.-Magnetic field lines due to a solenoid

(1)

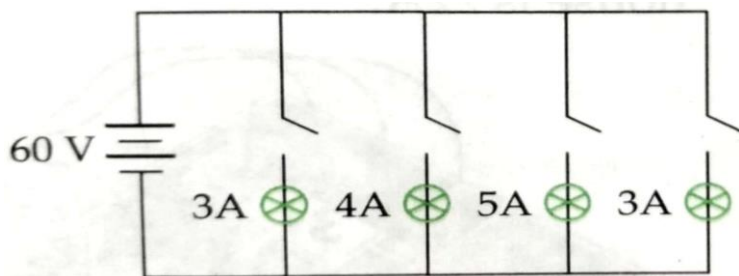


In case of an ideal solenoid, magnetic field strength is maximum at point A and is minimum or zero at point B. This is because the magnetic field is strong, where magnetic field lines are crowded and is weak, where magnetic field lines are far apart. At the point C, the density of the field lines is less than that of point A but greater than that of point B and C is

$$B_B < B_C < B_A$$

(3)

33. In the given circuit A, B, C and D are four lamps connected with a battery of 60 V.



Analyse the circuit to answer the following questions.

(a) Explain with proper calculations which lamp glows the brightest?

(b) What are the advantages of this combination of lamps?

Sol.- (a) The lamp with the highest power will glow the brightest.

As, power = Voltage $\times$ Current

In this case, all the lamps have same voltage, i.e 60 V.

For lamp A, Current = 4A

$$\therefore \text{Power} = 60 \times 3 = 180W$$

For lamp B, current = 4 A

$$\therefore \text{Power} = 60 \times 4 = 240 W$$

For lamp, C current = 5 A

$$\therefore \text{Power} = 60 \times 5 = 300 W$$

For lamp D, current = 3A

$$\therefore \text{Power} = 60 \times 3 = 180 W$$

(i) As, the lamp C is having the maximum power, so it will glow the brightest. (1 ½)

(b) The two advantage of lamps in parallel combination are

(ii) If one lamp gets faulty, it will not affect the working of other lamps.

(iii) In parallel combination of lamps each lamp will use the full potential of the battery. (1 ½)

SECTION D

Question No. 34 to 36 are long answer questions.

34. (a) (i) An organic compound A is a constituent of many medicines and used as an antifreeze and has the molecular formula C_2H_2O . Upon reaction with alk. $KMnO_4$, 19wa the compound A is oxidised to another compound B with formula $C_2H_4O_2$. Identify the compounds A and B. Write the chemical equation for the reaction which leads to the formation of B. Also, write the chemical equation, when A and B react with each other.

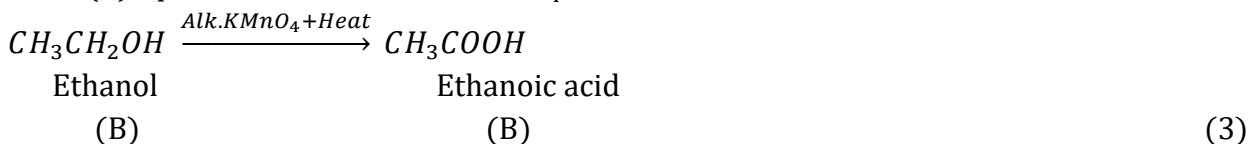
(ii) Abhishek cut a lump of element X by a knife. During its reaction with water, X floats and melts. What is X? Explain.

Or

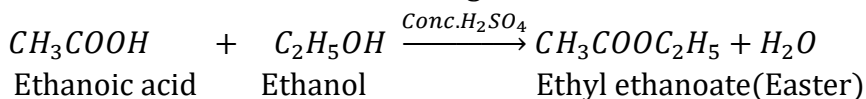
(b) An organic compound A of molecular formula C_2H_4 on reduction gives another compound B of molecular formula C_2H_6 . On reaction with chlorine in the presence of sunlight gives C of molecular formula C_2H_5Cl .

Name the compounds A, B and C. Also, write chemical equation for the conversion of A to B.

Sol. (a) (i) The organic compound A which is a constituent of many medicines and acts as antifreeze with the molecular formula C_2H_6O is ethanol (CH_3CH_2OH). Ethanol is oxidised to ethanoic acid (B) upon reaction with alk. $KMnO_4$.



A and B react with each other to give ester, the reaction involved is as follows.

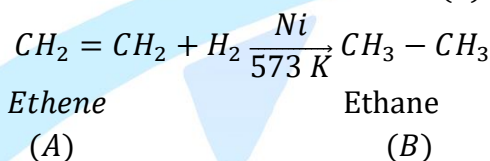
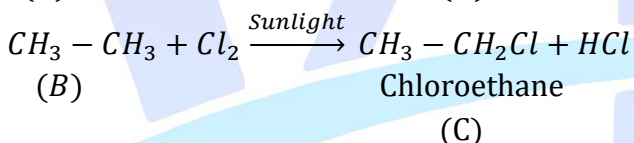
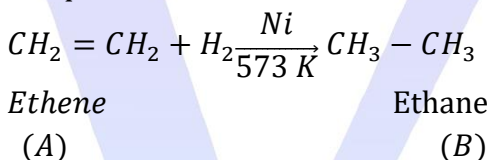


(ii) X is potassium (K).

Potassium being soft can be cut with a knife and being lighter than water, it will float at the surface. The heat produced during reaction with water melts it. (2)

Or

(b) The compound A of molecular formula C_2H_4 is an alkene. Upon reduction with hydrogen, it gives compound C of molecular formula C_2H_5Cl .



35. (a) (i) Write differences between pollination and fertilization.

(ii) 'Reproduction helps in providing stability to population of a species'. Justify this statement.

Or

(b) (i) Why does menstruation occur?

(ii) Sexual act always has the potential to result in pregnancy. What are the various ways to avoid pregnancy? Elaborate any one method.

Sol.- (a) (i) Differences between pollination and Fertilisation are as follows.

Pollination	Fertilisation
It is the transfer of pollen grain from anther to the stigma of the same or different flower.	It is the fusion of a male and a female gamete.
It carries male gamete producing pollen grain to the female sex organs.	It leads to the formation of zygote.
It is a physical process.	It is a biological process.
It occurs in seed plants only.	It occurs in both plants and animals.
It is an external process.	It can either be internal or external.

(3)

(ii) Reproduction is the process of producing new individuals of the same species by existing organisms of a species. It ensures by existing organisms of a species. It ensures transfer of genetic materials from the existing generation to next generation. (1)

It is basically important for the continuity of generation of an organisms of a species as DNA copying during reproduction helps to produce similar individuals as their parents to maintain stability of a species. (1)

Or

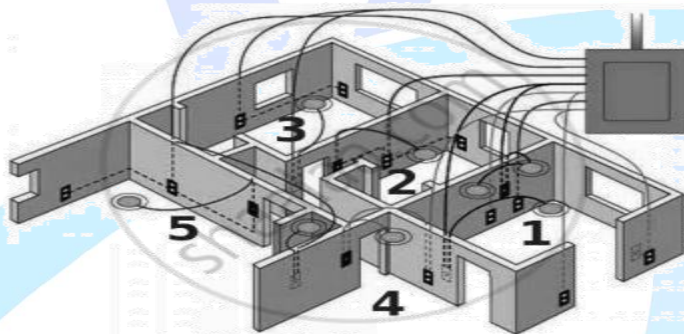
(b) (i) Menstruation occurs when the egg is not fertilized. Every month, uterus prepares itself to receive a fertilized egg.

In case, egg is not fertilised, this lining breaks and discharges out from the body through vagina along with unfertilized egg in the form of mucus and blood. This is called as mensuration. (2)

Condoms It is a fine rubber balloon-like structure worn over the penis sexual intercourse. Semen is collected and fails to get discharged into vagina.

This method also prevents the spread of STD's such as AIDS.

36. (a) (i) The given diagram represents the electrical setup of a household. The house has 5 usable spaces for electrical connections. The main supply provides a voltage of 200 V, and the total current supplied to the house is 22A.



1. What type of connection is used to connect all the spaces in the house to main supply?

2. Spaces 5 and 4 have equal resistances, while spaces 3 and 2 have resistances of 20Ω and 30Ω respectively. The resistance of space 1 is twice that of space 5. What is the combined resistance of space 5 Ω ?

(ii) A compass needle is placed near a current carrying wire. State your observations for the following cases and give reasons for the same in each case.

1. Magnitude of electric current in wire is increased.
2. The compass needle is displaced away from the wire.

Or

(b) (i) Draw a labelled diagram to show the pattern of magnetic field line

1. bar magnet
2. Current through a circular loop

(ii) Simran fixes a white sheet of paper on a drawing board. She places a bar magnet in the centre and sprinkles some iron fillings uniformly around the bar magnet.

Now give the reason for the each

- Iron filings are placed around a bar magnet.
- Magnetic field do not intersect each other.

Sol.- (a) (i) 1. All the space in the house from the mains are connected in parallel combination such that all the appliances in the spaces get their rated voltage to work efficiently. If any one appliance gets fused, it does not effect the other appliances. (2)

2. Let resistance of spaces 5 and 4 be $R \Omega$ respectively

Resistance of Space 1 = $2R\Omega$

Resistance of Space 2 = 30Ω

Resistance of Space 3 = 20Ω

Current, $I = 22 A$

$V = 220 V$

Total resistance = $V/I = \frac{220}{22} = 10 \Omega$

$$\therefore R_{eq} = 10 \Omega \Rightarrow \frac{1}{R_{eq}} = \frac{1}{10} \quad \text{..... (i)}$$

$$\text{Now, } \frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4} + \frac{1}{R_5}$$

$$\frac{1}{2R} + \frac{1}{30} + \frac{1}{20} + \frac{1}{R} + \frac{1}{R}$$

$$= \left(\frac{1}{2R} + \frac{2}{R} \right) + \left(\frac{2+3}{60} \right)$$

$$= \frac{5}{2R} + \frac{5}{60} = 5 \left(\frac{1}{2R} + \frac{1}{60} \right)$$

$$\therefore \frac{1}{R_{eq}} = 5 \left(\frac{1}{2R} + \frac{1}{60} \right) \quad \text{..... (ii)}$$

From Eqs. (i) and (ii), we get

$$\frac{1}{10} = 5 \left(\frac{1}{2R} + \frac{1}{60} \right)$$

$$\Rightarrow \frac{1}{2R} = \frac{1}{50} - \frac{1}{60} = \frac{6-5}{300} = \frac{1}{300}$$

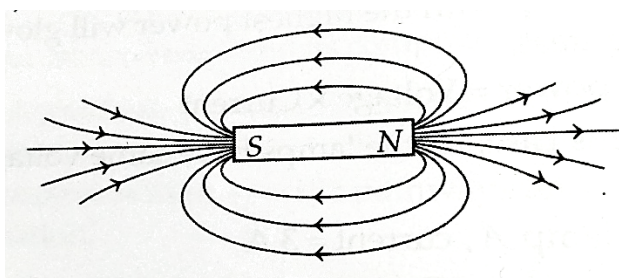
$$\Rightarrow R = \frac{300}{2} = 150\Omega$$

$\therefore$ Net resistance of space 5 = $R = 150 \Omega$ (3)

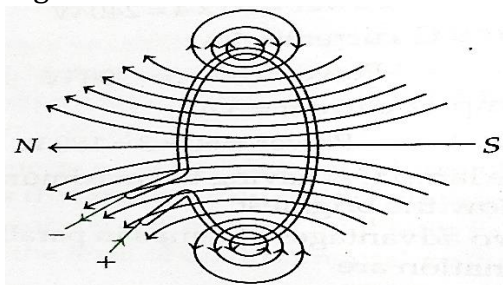
1. The deflection in the compass needle increases as magnetic field of the current carrying conductor is directly proportional to current flowing through it. $(1\frac{1}{2})$
2. The deflection in the needle decreases as the magnetic field is inversely proportional to the perpendicular distance from the wire. $(1\frac{1}{2})$

Or

- (i) 1. Magnetic lines of bar magnet



2. Magnetic field lines due to circular coil



- (ii) 1. When iron fillings are placed in a magnetic field around a bar magnet, they behave like tiny magnets.

The magnetic force experienced by these tiny magnets make them rotate and align themselves along the direction of magnetic field lines. (1 1/2)

2. The reason for magnetic field lines not intersecting each other is that the direction of the magnetic field at any point can only be a single direction. Therefore, magnetic field lines do not intersect each other.

Hence, option (a) is correct. (1 1/2)

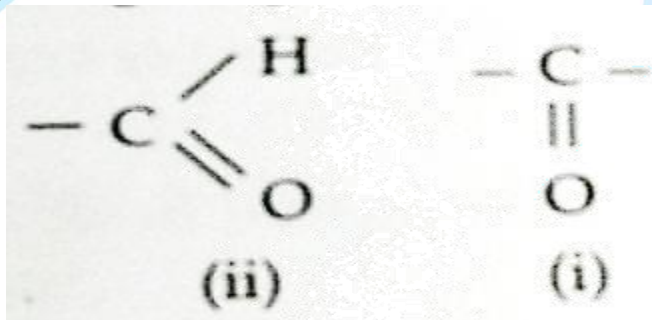
SECTION E

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. More than three million carbon compounds have been discovered in the field of chemistry. The diversity of these compounds is due to the capacity of carbon atoms for bonding with one another as well as with other atoms. Most of the carbon compounds are poor conductors of electricity and have low melting and boiling points

(a) Write the molecular formula of first two members of homologous series having functional group-Br. (1)

(b) Given below are the formulae of some functional groups. (1)



Write the name of the functional groups.

- (c) What would be observed on adding a 5% alkaline potassium permanganate drop by drop to some warm ethanol taken in a test tube? State the role of KMnO_4 in the reaction and write the chemical equation for the reaction involved. (2)

Or

- (d) Write the name of the compound formed when ethanol is heated at 443 K temperature with excess of conc. H_2SO_4 . What is the role of conc. H_2SO_4 in the reaction? Write the chemical equation for the reaction involved. (2)

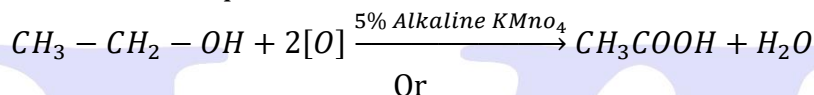
Sol.- (a) The molecular formula for two consecutive members of this series are CH_3Br (Bromomethane) and C_2H_5Br (Bromoethane).

(b) (i) $\begin{array}{c} \text{H} \\ \diagup \\ \text{C} \\ \diagdown \\ \text{O} \end{array} \rightarrow$ aldehyde function group

(ii) $\begin{array}{c} \text{O} \\ \parallel \\ \text{C} \\ \diagup \quad \diagdown \end{array} \rightarrow$ ketone functional group.

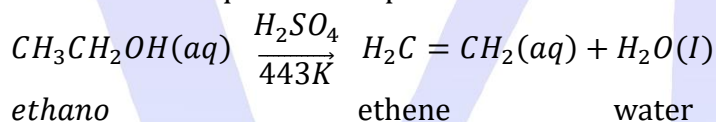
(c) When 5% alkaline potassium permanganate solution is added drop by drop to warm ethanol in a test tube, an oxidation reaction would be observed by us. Ethanol is oxidised to ethanoic acid in the presence of the strong oxidising agent alkaline potassium permanganate.

The chemical equation for the above reaction is as follows.



(d) When ethanol is heated to 443 K in the presence of hot concentrated H_2SO_4 , which functions as a catalyst in this reaction, an unsaturated molecule, ethene ($CH_2 = CH_2$) is produced.

The chemical equation is represented as



In the formation of ethene, sulphuric acid functions as a catalyst and a dehydrating agent as it removes water from ethanol.

38. Human digestive system is a tube running from mouth to anus. Its main function is to breakdown complex molecules present in the food which cannot be absorbed as such into smaller molecules.

These molecules are absorbed across the walls of the tube and the absorbed food reaches each and every cell of the body where it is utilised for obtaining energy.

(a) Name the glands present in the buccal cavity and write the components of food on which the secretion of these glands act upon (1)

(b) Two organs have a sphincter muscle at their exit. Name them. (1)

(c) What will happen if

(i) mucus is not secreted by the gastric glands?

(ii) villi are absent in the small intestine? (2)

Or

(c) "Bile juice does not contain any enzyme. Yet, it has important roles in digestion." Justify the Statement (2)

Sol. (a) Salivary gland are present in the buccal cavity.

The secretions of these glands act upon the starch components of the food.

(b) Two organs that have sphincter muscle at their exit are stomach and anus.

(c) (i) The mucus secreted by the gastric glands protect the stomach from the action of HCl. In the absence of mucus, the stomach acid will result in erosion of the inner wall that will lead to acidity and ulcers in stomach.

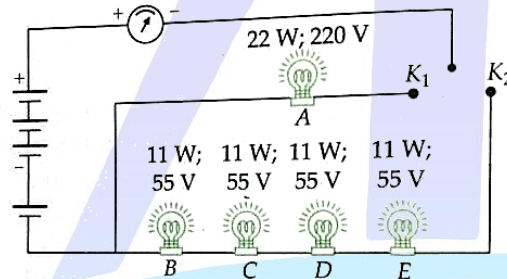
(ii) The villi present in the intestine increases the surface area for absorption of food. In the absence of villi the digested food. In the absence of villi the digested food will not be

absorbed properly into the blood, thus the nutrients would not reach every cell of body. This could lead to several nutritional deficiencies and disorders.

Or

- (c) Bile juice is produced by the liver and stored in the gall bladder. It does not contain any enzyme yet it has important roles in digestion which are as follows
- The bile juice contains bile salts which break the fats presents in the food into small globules making it easy for enzymes to act and digest them.
 - Bile juice neutralizes the acidity of the food coming from the stomach. This allows pancreatic enzymes to work efficiently since pancreatic juices requires alkaline environment to function.

39. In a domestic circuit five LED bulbs are arranged as shown. The source voltage is 220 V and the power rating of each bulb is marked in the circuit diagram. Based on the following circuit diagram, answer the following questions:



- State what happens when
 - key K_1 is closed?
 - key K_2 is closed?
- Find the current drawn by the bulb B when it glows.
- Calculate
 - the resistance of bulb B, and
 - total resistance of the combination of four bulbs B, C, D and E.

Or

- What would happen to the glow of all the bulbs in the circuit when keys K_1 and K_2 both are closed the bulb C suddenly get fused? Give reason to justify your answer.

Sol.- (a) (i) When Key K_1 is closed,

$$I = \frac{P}{V} = \frac{22}{220} = 0.1 \text{ A, current will flow in the circuit. Only bulb A will glow.}$$

(ii) When key K_2 is closed,

$$I = \frac{P}{V} = \frac{11}{55} = 0.2 \text{ A, current will flow in the circuit and bulbs B, C, D and E will glow.}$$

(b) Current drawn by the bulb B is same as current flows. Which is 0.2 A obtained when K_2 is closed.

(c) (i) The resistance of bulb B is

$$R = \frac{V}{I} = \frac{55}{0.2} = 275 \Omega$$

(ii) Since the power rating and voltage is same across all four bulbs B, C, D and E, resistance will be same as 275 Ω .

All bulbs are connected in series, so total resistance will be

$$275+275+275+275=1100\Omega$$

Or

- (c) When keys K_1 and K_2 both are closed, then all the bulbs A, B, C, D and E will glow and when the bulb C suddenly gets fused then current will not flow in the lower part of circuit consisting bulb C . Bulb A will glow this time only.

