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IIT-JEE-NEET-PHYSICS



SCIENCE PRACTICE PAPER

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CBSE-SCIENCE

PRACTICE PAPER 02

General Instructions :

- This question paper consists of 39 questions in 5 sections.
- All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- Section A consists of 20 objective type questions carrying 1 mark each.
- 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.
- 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.
- 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.

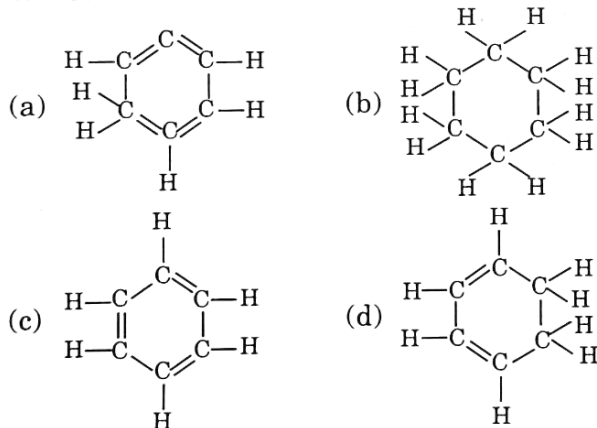
Time : 3 hrs.

Max. Marks : 80

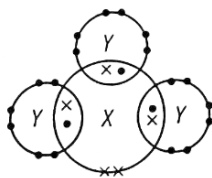
SECTION - A

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. Structural formula of benzene is



2. The diagram given below shows the electronic arrangement of the valence electrons in a molecule of compound XY_3 . Which of the following pairs of elements could be X and Y?



- | X | Y |
|----------------|----------|
| (a) Argon | Neon |
| (b) Nitrogen | Hydrogen |
| (c) Phosphorus | Fluorine |
| (d) Sulphur | Oxygen |

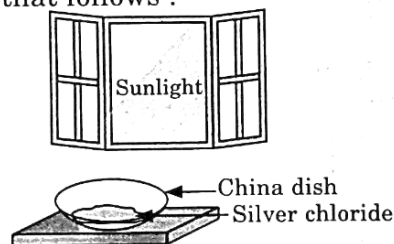
3. Which of the following statements is true for acids?

- Bitter and change red litmus to blue
- Sour and change red litmus to blue
- Sour and change blue litmus to red
- Bitter and change blue litmus to red

4. Which one of the following can be used as an acid-base indicator by a visually impaired student?

- Litmus
- Turmeric
- Vanilla essence
- Petunia leaves

5. Observe the given figure and answer the question that follows :

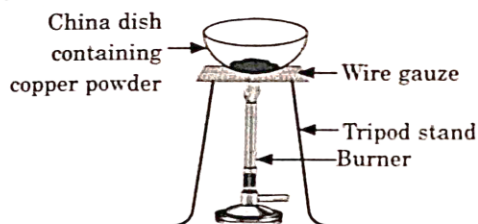


State True (T) or False (F) for the following statements.

- It is a photodecomposition reaction.
- Silver chloride turns grey in sunlight to form silver metal.
- It is an exothermic reaction.
- Silver bromide also behaves in the same way and used in black and white photography.

- | | (i) | (ii) | (iii) | (iv) |
|-----|-----|------|-------|------|
| (a) | T | T | T | T |
| (b) | T | F | T | F |
| (c) | T | F | F | T |
| (d) | T | T | F | T |

6. Observe the given figure and answer the question that follows :



Identify the correct statements.

- The surface of copper powder gets coated with black copper(II) oxide.
 - This is because oxygen is added to copper and copper oxide is formed.
 - If hydrogen gas is passed over this heated material (CuO), the black coating on the surface turns brown as the reverse reaction takes place and copper is obtained.
 - During this reverse reaction, the copper(II) oxide is losing oxygen and is being reduced and the hydrogen is gaining oxygen and is being oxidised.
- (i), (iii) and (iv)
 - (ii) and (iv)
 - (i) and (iii)
 - All the statements are correct.

7. During the experiment of heating the ferrous sulphate, four students recorded their observations as

- green colour changes to reddish brown colour
- brownish yellow gas is evolved
- blue colour changes to green colour
- smell of burning sulphur is observed.

Which of the above observations are correct?

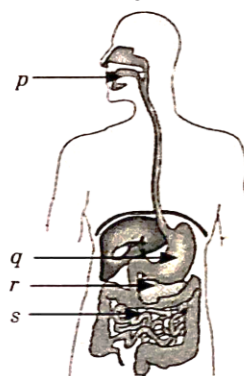
- (i) and (ii)
- (i) and (iv)
- (ii) and (iii)
- (iii) and (iv)

8. Which of the following is an incorrect comparison?

Features	Aerobic Respiration	Anaerobic Respiration
(a) Consumption of oxygen	Yes	No
(b) Efficiency of energy production	Low	High
(c) Glucose oxidation	Complete	Incomplete
(d) Products of respiration	Carbon dioxide and water	Lactic acid or ethanol

9. Refer to the given diagram of human digestive system. Following are three reactions that take place at different places in digestive tract during digestion of food.

- Starch + Water $\xrightarrow[\text{amylase}]{\text{salivary}}$ Maltose
- Protein + Water $\xrightarrow{\text{pepsin}}$ Polypeptides
- Starch + Water $\xrightarrow[\text{amylase}]{\text{pancreatic}}$ Maltose



Identify the parts in which the given digestive reactions (1 to 3) take place.

- 1 - p, 2 - q, 3 - r
- 1 - q, 2 - p, 3 - r
- 1 - p, 2 - s, 3 - q
- 1 - p, 2 - r, 3 - q

10. In human beings, the statistical probability of having a male child is

- 25%
- 50%
- 75%
- 60%

11. If a rat is given an injection of sodium iodide with radioactive iodine, then in which of the following most of iodine would be incorporated?

- Cartilage
- Thyroid
- Parathyroid
- Lymph nodes

12. Which of the following is/are used by females as a method of birth control?

- Loops
 - Female condoms
 - Copper - T
- (iii) only
 - (i) and (ii) only
 - (ii) and (iii) only
 - (i), (ii) and (iii)

13. Two electric bulbs one of 200 V, 40 W and the other 200 V, 100 W are connected in a house wiring circuit.

- They have equal currents through them.
- The resistance of the filaments in both the bulbs is same.
- The resistance of the filament in 40 W bulb is more than the resistance in 100 W bulb.
- The resistance of the filament in 100 W bulb is more than the resistance in 40 W bulb.

14. The magnetic field near a long straight wire is described by

- straight field lines parallel to the wire.
- straight field lines perpendicular to the wire.
- concentric circles centred on the wire.
- radial field lines starting from the wire.

15. The resistance of the metallic conductors

- increases with rise in temperature
- decreases with rise in temperature
- remains unchanged with change in temperature
- becomes zero at very high temperature.

16. Potential difference between a live wire and the neutral wire is

- 200 V
- 220 V
- 150 V
- 210 V

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

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

17. **Assertion :** Phosphoric acid is a weak acid.

Reason : Phosphoric acid when dissolved in water dissociates partially in a solution and produces very little H^+ ions.

18. **Assertion :** Pure lines are called true breeds.

Reason : True breeds are used for cross breeding.

19. **Assertion :** During aerobic respiration, glucose is completely breakdown into CO_2 and H_2O .

Reason : In aerobic respiration, 3-carbon molecule compound is converted into two carbon molecule compound.

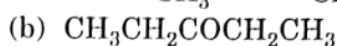
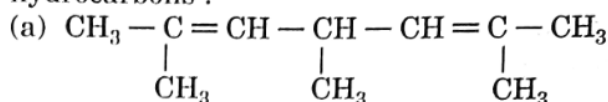
20. **Assertion :** In electric circuits, wires carrying currents in opposite directions are often twisted together.

Reason : If the wire are not twisted together, the combination of the wires forms a current loop. The magnetic field generated by the loop might affect adjacent circuits or components.

SECTION - B

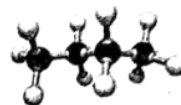
Question No. 21 to 26 are very short answer questions.

21. Give IUPAC names for the following hydrocarbons :



OR

A hydrocarbon has the molecular formula C_4H_{10} . Its molecular model is shown below:



- Draw the structural formula of this hydrocarbon.
- Name this hydrocarbon.

22. Give the difference between sensory and motor nerves.

23. What is emulsification ? Name the organ where fat is emulsified in the alimentary canal of human beings.

24. Enumerate three events that occur during photosynthesis.

25. Which colour of light bends least and which one the most while passing out from the prism? Also state the reason for the same.

OR

What is meant by scattering of light?

26. "To discard the household waste we should have two separate dustbins, one for the biodegradable waste and the other for the non-biodegradable waste." Justify this statement suggesting the proper way of disposal of these wastes.

SECTION - C

Question No. 27 to 33 are short answer questions.

- What type of bond holds the two fluorine atoms together in a fluorine molecule?
- Briefly describe how this bond is formed.
- Draw a 'dot-and-cross' diagram to show the bonding in a fluorine molecule.

28. Write chemical formulae of the following compounds.

- Washing soda
- Baking soda
- Bleaching powder

29. Differentiate between autotrophs and heterotrophs and give one example of each.

OR

List in tabular form three differences between arteries and veins.

30. A concave mirror has a focal length of 20 cm. At what distance from the mirror should a 4 cm tall object be placed so that it forms an image at a distance of 30 cm from the mirror? Also calculate the size of the image formed.

31. Differentiate between a glass slab and a glass prism. What happens when a narrow beam of (i) a monochromatic light and (ii) white light passes through (a) glass slab and (b) glass prism?

32. Give scientific reasons.

(a) Wires carrying electricity should not be touched when bare footed.

(b) We must not use many electrical appliances simultaneously.
(c) Electrical switches should not be operated with wet hand.

33. "Our food grains such as wheat and rice, the vegetables and fruits and even meat are found to contain varying amounts of pesticide residues." State the reason to explain how and why it happens.

SECTION - D

Question No. 34 to 36 are long answer questions.

34. Sample pieces of five metals, A, B, C, D and E are added to the tabulated solutions separately. The results observed are shown in the table given below:

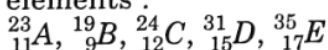
Metal	Solution				
	FeSO ₄	CuSO ₄	ZnSO ₄	AgNO ₃	Al ₂ (SO ₄) ₃
A	No change	×	×	A coating on metal	No change
B	Grey deposit	Brown coating	No change	A coating on metal	No change
C	No change	No change	No change	No change	No change
D	No change	—	No change	A coating on metal	No change
E	—	Brown coating	New coating	New coating	No change

Based on the observations recorded in the table answer the following questions:

- Which is the most reactive metal?
- Which is the least reactive metal?
- What would be observed if metal D was added to a solution of copper(II) sulphate?
- What would be observed if metal E was added to a solution of iron(II) sulphate?
- Arrange the metals A, B, C, D and E in order of decreasing reactivity.

OR

(a) How will you classify elements into metals and non-metals on the basis of their electronic configurations? Choose metal and non-metal out of following elements :

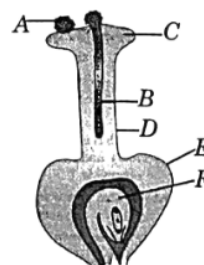


- What type of bond will be formed if
 - A combines with B
 - A combines with E
 - C combines with E
 - D combines with E?

35. Explain the process of fertilisation in flowering plants with the help of diagram.

OR

(a) Identify the labelled parts 'A', 'B', 'C', 'D', 'E' and 'F' in the given figure. Write the role of labelled parts 'B' and 'F'.

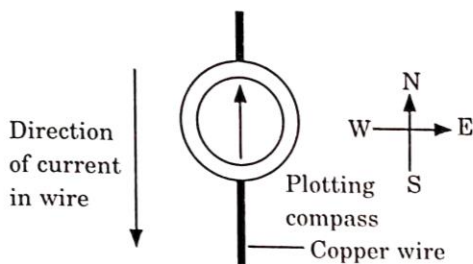


(b) What are sexually-transmitted diseases? How can the transmission of such diseases prevented?

36. What are magnetic field lines? List three characteristics of these lines. Describe in brief an activity to study the magnetic field lines due to a current carrying circular coil.

OR

Figure shows a small plotting compass placed above a copper wire. When there is no current in the wire, the plotting compass points towards the North.



- (i) A large current is switched on in the wire. The direction of the current is shown in Figure.
 - (a) State what happens to the compass needle.
 - (b) State what happens if the compass is placed under the wire.
- (ii) State and explain what is observed if there is 50 Hz alternating current in the wire.
- (iii) State the rule which gives the direction of magnetic field associated with a current-carrying conductor.

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. In fruitflies, the gene for wing shape has two alleles, an unusual allele for curled wings (c) and the normal allele for straight wings (C). The given phenotypes are observed for each genotype.

Genotype	Phenotype
CC	Normal, straight wings
Cc	Wings curled up at the ends, has difficulty flying
cc	Unable to hatch from egg

- (a) Which cross from the above given genotypes would produce 50% of normal, straight wings and 50% of curled wings living offsprings?
- (b) When two curly winged flies are crossed, they produce 150 eggs. What is the proportion of straight-winged flies and curly winged flies are expected among the live offspring?

OR

(b) Normal straight winged flies are self crossed and they produce 120 eggs. What is the proportion of curly winged flies expected among the live offspring?

38. Oxidation has damaging effect on metals as well as on food. The damaging effect of oxidation on metal is studied as corrosion and that on food is studied as rancidity. The phenomenon due to which metals are slowly eaten away by the reaction of air, water and chemicals present in atmosphere, is called corrosion. For example, iron articles are shiny when new, but get coated with a reddish brown powder when left for sometime. This process is known as rusting of iron. Rancidity is the process of slow oxidation of oil and fat (which are volatile in nature) present in the food materials resulting in the change of smell and taste in them.

- (a) Which gas is present in chips packets?
- (b) Combination of phosphorus and oxygen is an example of which type of reaction?
- (c) Write two methods to prevent or slow down rancidity?

OR

(c) Write two necessary conditions for corrosion.

39. The size of image formed by a lens depends on the position of the object from the lens. A lens of short focal length has more power whereas a lens of long focal length has less power. When the lens is convex, the power is positive and for concave lens, the power is negative.

The magnification produced by a lens is the ratio of height of image to the height of object as the size of the image relative to the object is given by linear magnification (m).

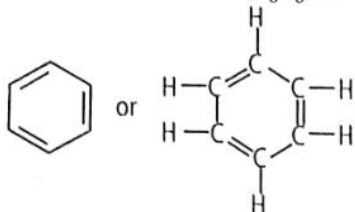
- (a) An object 4 cm in height is placed at a distance of 10 cm from a convex lens of focal length 20 cm. What is the position of image?
- (b) In the above question, what is the size of image?
- (c) An object is placed 50 cm from a concave lens and produces a virtual image at a distance of 10 cm in front of lens. Find the focal length of lens.

OR

(c) A convex lens forms an image of magnification -2 of the height of image is 6 cm, find the height of object.

ANSWERS

1. (c) : The structure of benzene (C_6H_6) is

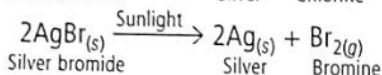
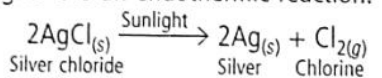


2. (c) : Since, the number of valence electrons in X is 5, it is phosphorus and the number of valence electrons in Y is 7, it is fluorine. Thus, the compound is PF_3 .

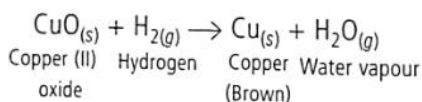
3. (c) : Acids are sour in taste and they turn blue litmus to red.

4. (c) : Vanilla essence is an olfactory indicator, so there is a change in smell and not colour, which can be easily detected by a visually impaired student.

5. (d) : White silver chloride turns grey in sunlight due to the decomposition of silver chloride into silver and chlorine by light. It is an endothermic reaction.



6. (d) : $2Cu_{(s)} + O_{2(g)} \xrightarrow{\text{heat}} 2CuO_{(s)}$
Copper Oxygen Copper (II)
oxide oxide
(Black)

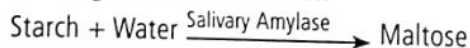


7. (b) : $2FeSO_{4(s)} \xrightarrow{\text{heat}} Fe_2O_{3(s)} + SO_{2(g)} + SO_{3(g)}$
Ferrous Ferric oxide Sulphur Sulphur
sulphate (Reddish dioxide trioxide
(Green) brown) (Smell of burning sulphur)

8. (b) : In comparison to aerobic respiration, anaerobic respiration produces very less amount of energy.

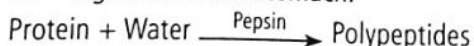
9. (a) : In humans, digestion takes place as follows:

I. Digestion in the mouth:



Saliva contains salivary amylase and starts the hydrolysis of starch (carbohydrate) to maltose.

II. Digestion in the stomach:



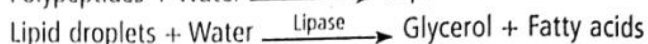
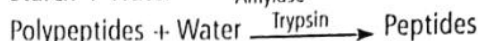
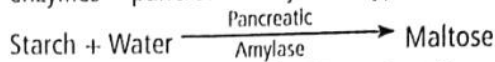
Enzyme pepsin starts the hydrolysis of large protein molecules into smaller chain of polypeptides.

Enzyme rennin coagulates milk by converting the soluble milk protein, caseinogen into insoluble casein.

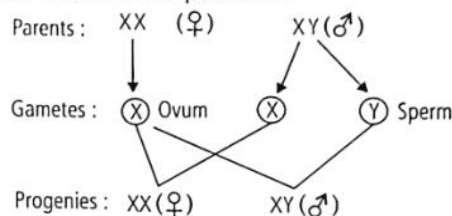
III. Digestion in duodenum:

(i) Emulsification of lipids.

(ii) Pancreas secretes pancreatic juice, this juice contains enzymes – pancreatic amylase, trypsin and lipase.



10. (b) : Human female (XX) produces all gametes (ova) with X-chromosomes, while human male (XY) produces 50% gametes (sperms) with X-chromosome while 50% gametes with Y-chromosome. If sperm having X chromosome fertilises the ovum with X chromosome then a female child is produced, otherwise a male child is produced.



11. (b)

12. (d)

13. (c) : In house wiring circuit devices are connected in parallel, hence they have same voltage.

$$P = \frac{V^2}{R}; R \propto \frac{1}{P}; R_{40 \text{ watt}} > R_{100 \text{ watt}}$$

14. (c)

15. (a) : Resistance of a metallic conductor increases with increase (or rise) in temperature.

16. (b)

17. (a)

18. (b) : Pureline is a strain of genetically true breeding individuals. Members of pure line are homozygous for one or more characters. In homozygous form, both the factors express the same effect. They are used for cross breeding in order to get the desired improvement in crops.

19. (c) : In aerobic respiration, 3-carbon compound pyruvate is converted into carbon dioxide and water.

20. (a) : If the wires are twisted together, they can be modelled as a single wire carrying current in the opposite directions. In this model, no magnetic field is induced in the wires which does not affect adjacent circuits.

21. (a) 2, 4, 6-Trimethyl-2, 5-heptadiene

(b) Pentan-3-one

OR

(a) $CH_3 - CH_2 - CH_2 - CH_3$

(b) n-Butane

22. The main difference between sensory nerve and motor nerve is that the sensory nerve takes the information from receptors and transmits it to brain and motor nerve transmits the information for action to be taken from brain to the effector organs i.e., muscles.

23. The process of breakdown of fat droplets into smaller globules is called emulsification. This increases further digestion of fat by increasing lipase action on fat. It produces a fine emulsion of fats in the aqueous intestinal contents. The small fat droplets provide larger surface area to lipase. Fats are largely emulsified in the small intestine.

24. During photosynthesis. The following events occur in chloroplast :

- Absorption of light energy by the chlorophyll pigment.
- Conversion of light energy into chemical energy and splitting of water molecules into hydrogen and oxygen.
- Reduction of carbon dioxide into carbohydrates.

25. Red light has the maximum wavelength and violet light has the minimum wavelength, so in any medium, red light bends least while violet light, bends the most.

$$\text{As, wavelength} \propto \frac{1}{\text{deviation (or bending)}}$$

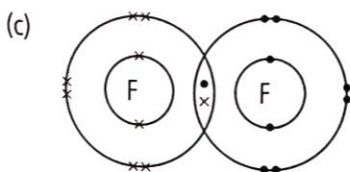
OR

It is the phenomenon of change in the direction of light on striking a scatterer.

26. To discard the household waste we should have two separate dustbins, one for the biodegradable waste and the other for the non-biodegradable waste. Segregation of biodegradable and non-biodegradable waste is utmost important for their proper disposal, as different methods are adopted for their disposal. Biodegradable wastes can be composted whereas non-biodegradable wastes can be recycled or landfilled.

27. (a) Covalent bond

(b) The two fluorine atoms share one pair of electrons, so that both atoms achieve a noble gas configuration.



28. (a) Washing soda : Sodium carbonate decahydrate ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$).

(b) Baking soda : Sodium hydrogencarbonate, (NaHCO_3).

(c) Bleaching powder : Calcium oxychloride, (CaOCl_2).

29. Differences between autotrophs and heterotrophs are as follows :

S.No.	Autotrophs	Heterotrophs
(i)	These organisms are able to form organic substances from simple inorganic substances such as CO_2 and water.	They cannot produce organic compounds from inorganic sources and therefore completely rely on consuming other organisms for their food requirement.
(ii)	They have chlorophyll to trap solar energy.	Chlorophyll is absent, so they cannot trap solar energy.
(iii)	They can be chemoautotroph and photoautotroph.	They can be saprophytic, parasitic and holozoic in mode of nutrition.
(iv)	Autotrophs are placed at the bottom of the food chain as producers.	Heterotrophs are placed above autotrophs in the food chain as consumers.
(v)	Green plants, some bacteria and some protists like <i>Euglena</i> are examples of autotrophs.	<i>Mushrooms, Euglena</i> , cow, goat, etc., are examples of heterotrophs.

OR

Differences between arteries and veins are as follows :

S. No.	Arteries	Veins
(i)	Arteries are the blood vessels which carry blood away from the heart for distribution to the body.	Veins are blood vessels which bring blood from the body back to the heart.
(ii)	Walls are thick and valves are absent.	Walls are thin and valves are present to prevent back flow of blood.
(iii)	Blood passing through narrow lumen of arteries is mostly oxygenated and has a considerable pressure.	The blood passing through wide lumen of veins is deoxygenated (except in pulmonary veins) and has low pressure.

30. Given, $f = -20$ cm, $v = -30$ cm, $u = ?$

$$\text{Using } \frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$

$$\frac{1}{u} = \frac{1}{f} - \frac{1}{v} = \frac{1}{-20} - \frac{1}{-30} = \frac{-3+2}{60} \Rightarrow u = -60 \text{ cm}$$

\therefore Object placed at 60 cm from the mirror.

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

$$\Rightarrow h' = \frac{-(-30)}{-60} \times 4 = -2 \text{ cm}$$

\therefore The size of the image is 2 cm.

31. Glass slab :

(1) It is a substance made of glass having three dimension and has cuboidal structure.

(2) It does not deviate the path of light falling on it but produces a lateral displacement of the light ray after refraction. The incident and emergent ray are parallel to each other.

Glass prism :

(1) A prism is a structure made of glass with two triangle bases and three rectangular lateral surfaces. These surfaces are inclined to each other.

(2) A prism deviates the path of light ray falling on it. Here the incident ray and emergent ray are not parallel to each other.

(i) When a narrow beam of monochromatic light falls on a

(a) Glass slab, it gets refracted at its surface and the emergent ray is laterally displaced from the incident ray.

(b) Prism, it gets refracted at the surface and the light gets deviated from its initial path. The angle between the incident ray and emergent ray is known as angle of deviation.

(ii) When a white light passes through a

(a) Glass slab, the light does not undergo dispersion as its two refracting surfaces are parallel to each other. The white light is laterally displaced from its initial path.

(b) Prism, the white light undergoes dispersion and splits into its constituent colours along with deviation from its initial path.

32. (a) When we touch the live wire bare footed, our body is directly in contact with the earth. So, current passes through the body to the earth. As our body is good conductor of electricity, we get a severe shock. Hence, we should not handle live wires bare footed.

(b) When many high power rating appliances are switched on simultaneously, a large amount of current flows through the main circuit and current may exceed the bearing capacity of the connecting wires. This causes overloading, which may cause fire. Hence, we must not use many electrical appliances simultaneously.

(c) Water is a good conductor of electricity as it contains salt and impurities. When we touch the switch with wet hand, it is possible that electric current will pass through our body and we get a severe shock.

33. Pesticides are poisonous chemical substances which are sprayed over crop plants to protect them from pests and

diseases. These chemical pesticides are non-biodegradable and mix up with soil and water. From soil and water, these pesticides are absorbed by the growing plants along with water and other minerals. When herbivorous animals feed on these plants, the poisonous pesticides enter their bodies through the food chain. Similarly, when the carnivorous animals eat these herbivores, the pesticides get transferred to their bodies. Therefore, the plant products such as food grains, vegetables and fruits as well as meat of animals contain varying amounts of pesticide residues in them depending upon the trophic level they occupy in a food chain.

34. (a) The most reactive metal is *E*.

(b) The least reactive metal is *C*.

(c) No change will occur.

(d) '*E*' is more reactive than *Zn*, hence it can displace *Fe* from FeSO_4 , a grey coating on metal will be formed.

(e) $E > B > D > A > C$

OR

(a) Elements which contain 1 to 3 electrons in their outermost valence shells are metals. Elements containing 4 to 7 electrons in the valence shell are non-metals.

Electronic configurations of elements :

${}^{23}_{11}\text{A}$ ($Z = 11$) : 2, 8, 1

${}^{19}_9\text{B}$ ($Z = 9$) : 2, 7

${}^{24}_{12}\text{C}$ ($Z = 12$) : 2, 8, 2

${}^{31}_{15}\text{D}$ ($Z = 15$) : 2, 8, 5

${}^{35}_{17}\text{E}$ ($Z = 17$) : 2, 8, 7

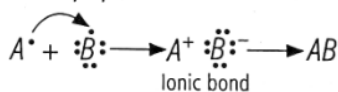
Hence, *A* and *C* are metals, whereas *B*, *D* and *E* are non-metals.

(b) Type of bonds formed:

(i) *A* is metal and *B* is non-metal, so the bond formed will be ionic.

$A = 2, 8, 1$

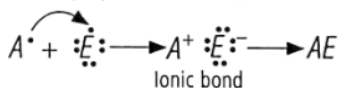
$B = 2, 7$



(ii) *A* is metal and *E* is non-metal, so the bond formed will be ionic.

$A = 2, 8, 1$

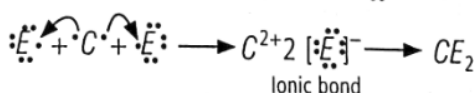
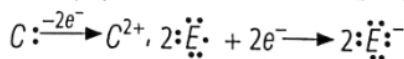
$E = 2, 8, 7$



(iii) *C* is metal and *E* is non-metal, so the bond formed will be ionic.

$C = 2, 8, 2$

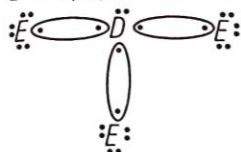
$E = 2, 8, 7$



(iv) D is a non-metal and E is also a non-metal, so the bond formed will be covalent.

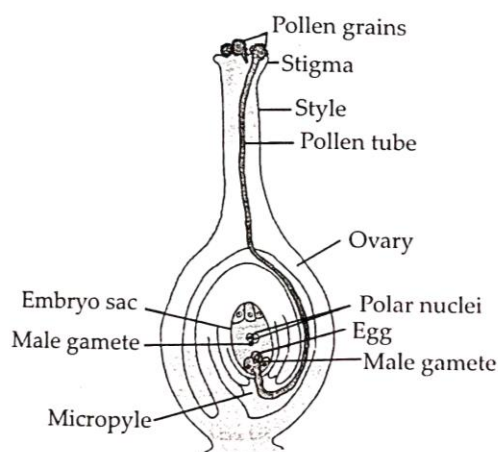
$D = 2, 8, 5$

$E = 2, 8, 7$



$\equiv DE_3$
Covalent bond

35. Pollination results in the deposition of related pollen grains over the receptive stigma of the carpel. They absorb water, swell and then germinate to produce pollen tubes. One pollen tube grows into the stigma, passes through the style and then move towards the ovarian cavity. Two non-motile male gametes are formed inside the tube during its growth through the style. After reaching the ovary, pollen tube enters the ovule through the micropyle. The tip of the tube finally pierces the egg apparatus end of the embryo sac. After penetration, the tip of pollen tube ruptures releasing two male gametes into the embryo sac. The mature embryo sac consists of an egg apparatus (one haploid egg and two synergids), two polar nuclei and three antipodal cells. The fertilisation in a flowering plant is shown as follows :



During the act of fertilisation, one male gamete fuses with the egg to form the diploid zygote. The process is called syngamy (or generative fertilisation). The diploid zygote finally develops into embryo. The other male gamete fuses with the two polar nuclei to form the triploid ($3n$) primary endosperm nucleus. The process is called triple fusion (or vegetative fertilisation). This mechanism involving two acts of fertilisation in an embryo sac is called double fertilisation. After fertilisation, zygote develops into embryo, ovule develops into seed and the ovary develops into the fruit.

OR

- (a) $A =$ Pollen grain
 $B =$ Pollen tube
 $C =$ Stigma

$D =$ Style

$E =$ Ovary

$F =$ Ovule

Role of B : Pollen tube acts as a carrier of male gametes to the ovule.

Role of F : Ovule becomes seed after fertilisation.

(b) The infectious (communicable) diseases, which are spread from an infected person to a healthy person by sexual contact are called sexually transmitted diseases. These include bacterial infections such as gonorrhoea and syphilis, and viral infections such as warts and HIV-AIDS. Using a barrier, called a condom, for the penis and vagina during sex helps to prevent transmission of many of these infections to some extent.

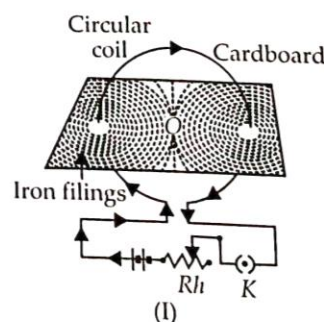
36. Magnetic field lines : These are the imaginary close curves which are used to represent the magnetic field around the magnet.

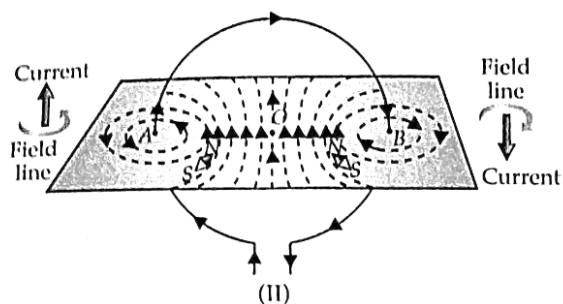
The properties of the magnetic field lines are listed below:

- (a) Magnetic field lines start at the north pole and end at the south pole.
(b) Magnetic field lines do not intersect each other, because there can't be two directions of the magnetic field at any one point.
(c) The degree of closeness of the field lines depends upon the strength of the magnetic field. Stronger the field, closer are the field lines.

In order to find the magnetic field due to a coil, it is held in a vertical plane and is made to pass through a smooth cardboard in such a way that the centre (O) of the coil lies at the cardboard. A current is passed through the coil and iron filings are sprinkled on the cardboard. These iron filings arrange themselves in a pattern similar to one shown in the figure (I). This pattern represents the magnetic field lines due to the coil.

In order to find the direction of magnetic field lines, we plot the magnetic field with the help of a compass needle. The pattern of magnetic field lines so obtained is shown in figure (II).





OR

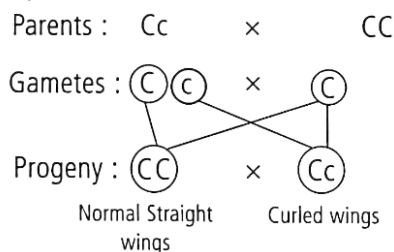
(i) (a) The compass needle will deflect to the left and point West.

(b) The compass needle will deflect to the right and point East.

(ii) The alternating current will change the direction of the current 50 times per second. Hence, the compass needle will deflect to the left and then to the right and then back to the left 50 times per second.

(iii) Maxwell's right hand thumb rule or corkscrew rule gives the direction of magnetic field associated with a current carrying conductor.

37. (a) When Cc is crossed with CC, it will result into 50% normal, straight wings and 50% curly wings living offspring. This can be explained as follows:



(b) When two curly winged flies are crossed 25% of the total number of eggs will not hatch (genotype cc). 50% of the offspring will be curly-winged (Cc) and 25% of the offspring are straight-winged (CC).

OR

(b) When two normal straight winged flies (CC) are self crossed, the progeny will contain all normal straight winged flies (CC) and hence no curly winged flies are obtained.

38. (a) Nitrogen gas is present in chips packet.

(b) $4P + 3O_2 \longrightarrow 2P_2O_3$, $4P + 5O_2 \longrightarrow 2P_2O_5$

It is an oxidation reaction.

(c) (i) Food materials should be packed in air tight container.

(ii) Food should be refrigerated.

OR

(c) (i) Air/oxygen (ii) Moisture

39. (a) Given, $f = 20$ cm, $u = -10$ cm

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

$$\frac{1}{20} = \frac{1}{v} - \left(-\frac{1}{10}\right) \Rightarrow v = -20 \text{ cm}$$

(b) As, $m = \frac{v}{u} = \left(\frac{-20}{-10}\right) = 2$

$$\therefore m = \frac{h_2}{h_1}$$

$$2 = \frac{h_2}{4} \Rightarrow h_2 = 8 \text{ cm}$$

(c) Here $u = -50$ cm, $v = 10$ cm, $f = ?$

Using, $\frac{1}{f} = \frac{1}{10} - \frac{1}{-50} \Rightarrow f = -12.5 \text{ cm}$

OR

(c) Here, $m = -2$

$$h_2 = -6 \text{ cm}$$

$$h_1 = ?$$

$$\text{As, } m = \frac{h_2}{h_1} \Rightarrow -2 = \frac{-6}{h_1} \Rightarrow h_1 = 3 \text{ cm}$$

