PACE
IIT & MEDICAL

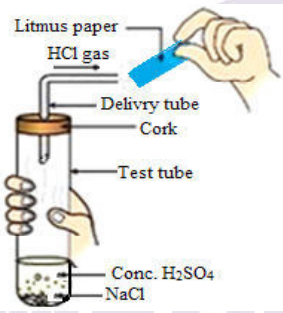
Sub : Science **Max Marks : 80**

Class : X (CBSE)

Pre. Answer Paper - 02

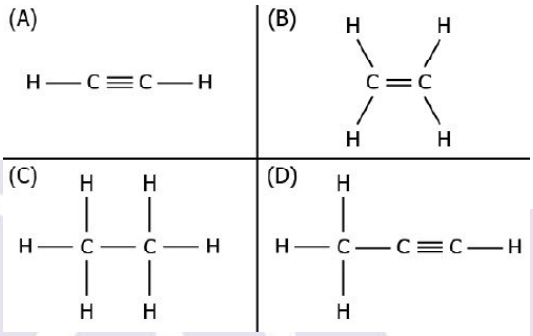
SECTION - A

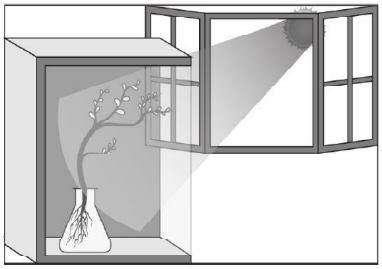
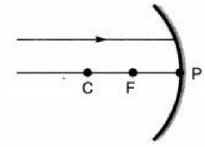
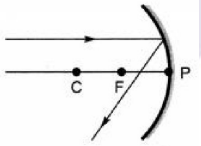
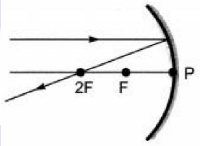
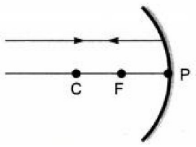
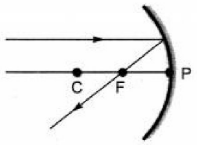
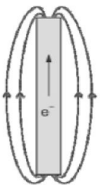
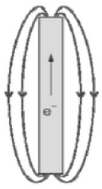
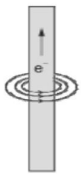
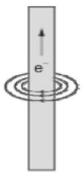
Select and write one most appropriate option out of the four options given for each of the questions 1 – 20

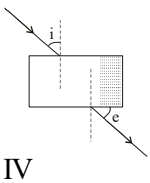
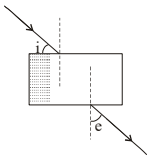
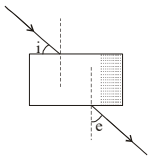
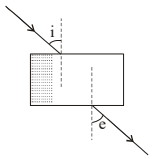
No.	Questions	Marks
1.	**The figure given below represents the experiment carried out between conc. Sulphuric acid and sodium chloride, which react with each other to form HCl gas. Blue litmus paper is brought near the mouth of the delivery tube to check the presence of HCl acid but no change is observed in the color of litmus paper because:**  Ans : a) The litmus paper used is dry	1
2.	**In the double displacement reaction between aqueous potassium iodide and aqueous lead nitrate, a yellow precipitate of lead iodide is formed. While performing the activity if lead nitrate is not available, which of the following can be used in place of lead nitrate?** Ans : b) Lead acetate	1
3.	**In the reaction which option in the given table correctly represents the substance oxidized and the reducing agent?** $CuO + H_2 \longrightarrow Cu + H_2O$ Ans :	1

Option	Substance Oxidized	Reducing Agent
a	H_2	H_2

4.	**Reaction between X and Y forms compound Z. X loses electron and Y gains electron. Which of the following properties is not shown by Z?** Ans : b) Has low melting point	1

5.	**Which of the following statements about the given reaction are correct?** **$3Fe(s) + 4H_2O(g) \rightarrow Fe_3O_4(s) + 4H_2(g)$** **i) Iron metal is getting oxidised** **ii) Water is getting reduced** **iii) Water is acting as reducing agent** **iv) Water is acting as oxidising agent** **Ans :** c) (i), (ii) and (iv)	
6.	**Which of the following acids are edible?** **A) Citric acid** **B) Tartaric acid** **C) Hydrochloric acid** **D) Carbonic acid** **Ans :** b) (A), (B) and (D) are correct	1
7.	**The image represents the structure of a few hydrocarbon compounds.**  **Which of these compounds can be classified as alkynes?** **Ans :** c) both (A) and (D)	1
8.	**The anther contains** **Ans :** d) Pollen grains	1
9.	**The development of a seedling from an embryo under appropriate condition is called .....** **Ans :** b) Germination	1
10.	**Two pea plants one with round green seeds (RR yy) and another with wrinkled yellow (rrYY) seeds produce F1 progeny that have round yellow (RrYy) seeds. When F1 plants are self pollinated, the F2 progeny will have a new combination of characters. Choose the new combinations from the following:** **i) Round, yellow** **ii) Round, green** **iii) Wrinkled, Yellow** **iv) Wrinkled, green** **Ans :** b) (i) and (iv)	1
11.	**Raghav potted some germinated seeds in a pot. He put the pot in a cardboard**	1

	box that was open from one side. He keeps the box in a way that the open side of the box faces sunlight near his window. After 2-3 days he observes the shoot bends towards light as shown in image.  **Which type of tropism does he observe?** **Ans :** b) Phototropism	
12.	**Which option correctly shows the path that the sperms take when they are released from the male reproductive system?** **Ans :** d) testis → vas deferens → urethra → penis	1
13.	**Which of the following ray diagrams is correct for the ray of light incident on a concave mirror as shown in figure?**  A)  B)  C)  D)  **Ans :** d) Fig. D	1
14.	**Which of the following diagrams correctly shows the magnetic field produced by a current- carrying wire?** A)  B)  C)  D)  **Ans :** d) D	1
15.	**A student does the experiment on tracing the path of a ray of light passing through a rectangular glass slab for different angles of incidence. He can get a correct measure of the angle of incidence and the angle of emergence by following the labelling indicated in figure:**	1

Ans :	I)  II)  III)  IV)  d) IV	
16. **Ans :**	**The direction of force on a current carrying conductor in a magnetic field is given by.** a) Fleming's left hand rule.	1
	Q. no 17 to 20 are Assertion - Reasoning based questions. **These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:**	
17. **Ans :**	**Assertion (A) : Iron displaces copper from aqueous solution of copper sulphate** **Reason (R) : In a single displacment reaction, a more reactive metal displaces the less reactive metal from its aqueous salt solution.** a) Both A and R are true and R is the correct explanation of A	1
18. **Ans :**	**Assertion(A): The four chambered heart does not mix oxygenated and deoxygenated blood.** **Reason(R): Four chambered heart is found in mammals with advanced body functions** b) Both A and R are true and R is not the correct explanation of A	1
19. **Ans :**	**Assertion : Transpiration is a necessary evil.** **Reason : It causes water loss but help in absorption & upward movement of water & minerals.** a) Both A and R are true and R is the correct explanation of A	1
20. **Ans :**	**Assertion(A) : Danger signals are made of red colour.** **Reason (R) :Velocity of red light in air is maximum, so signals are visible even in dark.** c) A is true but R is false	1
	SECTION – B **Q. no. 21 to 26 are very short answer questions.**	
21. **Ans :**	**Write balanced chemical equation for the following reaction.** **i) Silver bromide on exposure to sunlight decomposes into silver and bromine.** **ii) Sodium metal reacts with water to form sodium hydroxide and hydrogen gas.** $2AgBr \xrightarrow{\text{Sunlight}} 2Ag + Br_2$ $2Na + 2H_2O \longrightarrow 2NaOH + H_2$ **OR** **Identify the type of reaction (s) in the following equation.** **i)** $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$ **ii)** $Pb(NO_3)_2 + 2KI \rightarrow PbI_2 + 2KNO_3$ **iii)** $CaO + H_2O \rightarrow Ca(OH)_2$	2

iv) $CuSO_4 + Zn \rightarrow ZnSO_4 + Cu$

Ans :
i) Oxidation reaction
ii) Double displacement reaction/precipitation reaction.
iii) Combination reaction.
iv) Displacement reaction.

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22. **a) Name the part of brain which controls** 2

i) Voluntary action, **ii) Involuntary action.**

b) What is the significance of the peripheral nervous system? Name the components of this nervous system and distinguish between the origin of the two.

Ans :
a) i) Voluntary actions - Cerebellum
ii) Involuntary actions - Medulla

b) The communication between the Central Nervous System (CNS) and the other parts of the body is facilitated by the Peripheral Nervous System (PNS). Cranial nerves arise from the brain; spinal nerves arise from the spinal cord.

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23. **What is reproduction? Mention the importance of DNA copying in reproduction.** 2

Ans :
Reproduction is the process of producing new individuals of the same species by existing organisms of a species i.e. parents.

Importance of DNA copying in reproduction, are as follows :

i) DNA copying is called DNA replication. In this process one copy each of replicated DNA will be passed to daughter cells.

ii) Variations may be introduced during DNA copying. This inbuilt tendency for variation during reproduction forms the basis of evolution.

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24. **How do guard cells regulate opening and closing of stomatal pores?** 2

Ans :
The opening and closing of stomatal pore is a function of guard cells. Stomata act as turgor operated valves. The guard cells are thicker on the inner side and thinner on the outer side. The guard cells swell when water flow into them the surrounding epidermal cells. They get curved out due to thick inner walls and produce a pore in between. Similarly, the pore closes when guard cells lose water to their surrounding cell & shrink back to their original position.

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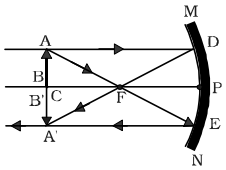
25. **Draw a ray diagram of image formed by a concave mirror when the object is placed at the centre of curvature of the mirror.** 2

Ans :



OR

A convex lens of power 4D is placed at a distance of 40 cm from a wall. At what distance from the lens should a candle be placed so that its image is formed on the wall?

Ans :
SI unit is dioptre

$f = \frac{1}{P} = \frac{1}{4D} = \frac{1}{4}m = 25cm$, $v = 40cm$

$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ $\qquad$ $\frac{1}{u} = \frac{1}{v} - \frac{1}{f}$

$\frac{1}{u} = \frac{1}{40} - \frac{1}{25}$ $\qquad$ $= \frac{25 - 40}{1000}$

$= \frac{-\cancel{15}^{3}}{\cancel{1000}_{200}}$ $\qquad$ $\frac{1}{u} = -\frac{3}{200}$

$\Rightarrow \quad u = \frac{-200}{3}cm$

So candle should be placed 200/3 cm from the lens.

26. **What does a trophic level represent in a food chain? State the position of autotrophs and herbivores in a food chain.** 2

Ans : The trophic level of an organism is the place it has in a food chain. A food chain is mostly made up of three trophic levels. However, some trophic levels have four trophic levels.

i) Primary producers which are plants that are autotrophs and belong to the first trophic level.

ii) Primary consumers are animals that belong to second trophic level and feed on plants. They are called herbivores.

SECTION - C

Q.no. 27 to 33 are short answer questions.

27. **Write balanced chemical equations for the following chemical reactions:** 3

a) Hydrogen + Chlorine → Hydrogen chloride

b) Lead + Copper chloride → Lead chloride + Copper

c) Zinc oxide + Carbon → Zinc + Carbon monoxide.

Ans : a) $H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)}$

b) $Pb_{(s)} + CuCl_{2(aq)} \rightarrow PbCl_{2(aq)} + Cu_{(s)}$

c) $ZnO_{(s)} + C_{(s)} \rightarrow Zn_{(s)} + CO_{(g)}$

28. **Classify the following salts as acidic, basic or neutral.** 3

a) NaCl b) Na_2SO_4 c) $CaCl_2$

d) K_2CO_3 e) K_2SO_4 f) KCl

Ans : a) Acidic salt – $CaCl_2$ b) Basic salt – K_2CO_3, K_2SO_4 c) Neutral salt – Nacl, Na_2SO_4, KCl

29. **Name three different glands associated with the digestive system in humans. Also name their secretions.** 3

Ans : **Three glands associated with the digestive system are as follows:**

1) Salivary glands in the mouth produce saliva. Saliva contains an enzyme called salivary amylase which digests the starch present in food into sugar.

2) Liver is the largest gland which secretes bile and pours its secretion in the duodenum (part of the small intestine). Bile makes the acidic food coming from the stomach alkaline so that pancreatic enzymes can act on it. Bile salts also break the fats present in the food into small globules.

3) Pancreas is also a large gland that secretes pancreatic juice into the duodenum. Pancreatic juice contains pancreatic amylase which breaks down the starch.

Trypsin digests the protein.

Lipase which breaks down the emulsified fats.

Pancreatic juice acts on an alkaline medium.

OR

a) Name two different ways in which glucose is oxidised to provide energy in various organisms.

b) Write any two differences between the two ways of oxidation of glucose in organisms.

Ans : a) Aerobic and anaerobic.

b) Differences

Aerobic Respiration		Anaerobic Respiration	
1.	Oxygen. There is complete breakdown of respiratory substrate with the help of oxygen, the products being CO_2 and H_2O.	1.	There is incomplete breakdown of respiratory substrate due to non-use of oxygen with atleast one product being organic.
2.	Energy. It forms 38 ATP molecules per glucose molecule.	2.	It forms only two ATP molecules per glucose molecule.

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30. A concave mirror is used for image formation for different positions of an object. 3

What inferences can be drawn about the following when an object is placed at a distance of 10 cm from the pole of a concave mirror of focal length 15 cm?

a) Position of the image

b) Size of the image

c) Nature of the image

Draw a labelled ray diagram to justify your inferences.

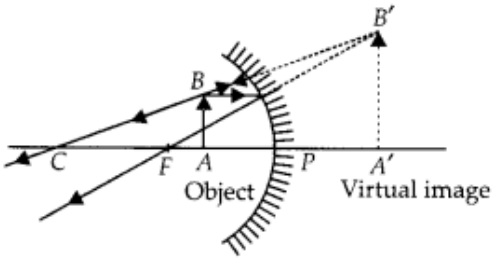
Ans : Given, f = -15 cm, u = -10 cm.

Thus the object is placed between the principal focus and pole of the mirror.

a) The position of the image will be behind the mirror.

b) The size of the image will be highly enlarged.

c) The nature of the image will be virtual and erect.



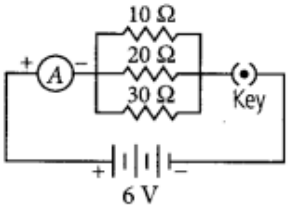
31. **Draw a schematic diagram of a circuit consisting of a battery of 3 cells of 2 V each, a combination of three resistors of $10\,\Omega$, $20\,\Omega$ and $30\,\Omega$ connected in parallel, a plug key and an ammeter, all connected in series. Use this circuit to find the value of the following:** 3

a) Current through each resistor

b) Total current in the circuit

c) Total effective resistance of the circuit.

Ans : The circuit diagram is as shown below.



a) Given, voltage of the battery = 2V + 2V + 2V = 6 V

Current through 10Ω resistance,

$$I_1 = \frac{V}{R} = \frac{6}{10} = 0.6A$$

Current through 20Ω resistance,

$$I_2 = \frac{V}{R} = \frac{6}{20} = 0.3A$$

Current through 30Ω resistance,

$$I_3 = \frac{V}{R} = \frac{6}{30} = 0.2A$$

b) Total current in the circuit, $1 = I_1 + I_2 + I_3$

$= 0.6 + 0.3 + 0.2 = 1.1$ A

c) Total resistance of the circuit,

$$\frac{1}{R_P} = \frac{1}{10} + \frac{1}{20} + \frac{1}{30} = \frac{11}{60}$$

$$R_p = \frac{60}{11} = 5.4\,\Omega$$

32. **Define alternating current and direct current.** 3

Explain why alternating current is preferred over direct current for transmission

over long distances.

Ans : **Alternating current (A.C.) :** An electric current whose magnitude changes with time and direction reverses periodically is called alternating current.

Direct current (D.C.) : An electric current whose magnitude is either constant or variable but the direction of flow in a conductor remains the same is called direct current.

A.C. can be transmitted to distant places without much loss of electric power than D.C. That is why A.C. is preferred over D.C. for transmission of current over a long distances.

OR

i) Alternating current has a frequency of 50 Hz. What is meant by this statement? How many times does it change its direction in one second? Give reason for your answer.

ii) Mention the frequency of D.C that is given by a cell.

Ans : i) The frequency of household supply of A.C. in India is 50 Hz. This means, A.C. completes 50 cycles in one second. Thus, A.C. changes direction $2 \times 50 = 100$ times in one second.

ii) Frequency of D.C. is zero as its direction does not change with time.

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33. **What is biological magnification? Will the levels of this magnification be different at different levels of the ecosystem?** 3

Ans : The phenomenon of progressive increase in concentration of certain harmful non-biodegradable chemicals such as DDT at different levels of food chain is called biological magnifications.

The concentration of harmful chemicals will be different at different trophic levels. It will be lowest in the first trophic level and highest in the last trophic level of the food chain.

SECTION - D

Q.no. 34 to 36 are Long answer questions.

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34. **a) In the formation of compound between two atoms A and B, A loses two electrons and B gains one electron.** 5

i) What is the nature of bond between A and B?

ii) Suggest the formula of the compound formed between A and B.

b) On similar lines explain the formation of $MgCl_2$ molecule.

c) Common salt conducts electricity only in the molten state. Why?

d) Why is melting point of NaCl high?

Ans : a) i) Ionic bond

ii) $(A^{2+})\left(:\overset{\cdot\cdot}{\underset{\cdot\cdot}{B}}:^{-}\right)_2$, i.e. AB_2

b) $Mg \longrightarrow Mg^{2+} + 2e^-$

$2Cl + 2e^- \longrightarrow 2Cl^-$

$(Mg^{2+})\left(:\overset{\cdot\cdot}{\underset{\cdot\cdot}{Cl}}:^{-}\right)_2$

c) Na^+ and Cl^- are free to move in molten state but not in solid state.

d) It is due to strong force of attraction between Na^+ and Cl^-.

OR

a) Name the main ore of mercury. How is mercury obtained from its ore? Give balanced chemical equation.

b) What is thermite reaction? How is it used to join the railway tracks or cracked

machine parts?

c) Name the method used to extract metals of high reactivity.

Ans : a) Cinnabar

Mercury is obtained from its ore by roasting.

$$HgS + O_2 \longrightarrow Hg + SO_2$$

b) When aluminium is heated with Fe_2O_3 to get molten iron, it is called thermite reaction.

$$Fe_2O_3 + 2Al \longrightarrow Al_2O_3 + 2Fe + Heat$$

Molten iron is used to weld broken railway tracks.

c) Electrolytic reduction

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35. **a)Write the functions of the following in human female reproductive system.** 5

i) Ovary ii) Oviduct iii) Uterus.

Ans : **Functions :** i) **Ovary :** Ovary perform dual functions of production of female gamete or ovum and the secretion of female sex hormones, estrogen and progesterone.

ii) **Oviduct :** It carry ova or eggs from the ovary to the uterus. It is site of fertilization.

iii) **Uterus :** It is a hollow pear shaped organ within which the embryo develops. It is muscular.

b)How does the embryo get nourishment inside the mother's body? Explain in brief.

Ans: The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta. This is a disc which is embedded in the uterine wall and transfer glucose and oxygen from the mother to the embryo.

OR

a) How many eggs are produced every month by either of the ovaries in a human female ? Where does fertilization take place in the female reproductive system?

b) What happens in case of egg released by the ovary is not fertilized ?

Ans : a) One egg is produced every month by one of the two ovaries in a human female. Fertilization occurs inside the fallopian tube (ampulla isthmus junction).

b) If the egg is not fertilized, it lives for one day and is then expelled. This also sets in motion the menstrual cycle. After about 12 days the corpus luteum (empty Graafian follicle) degenerates. In the absence of hormones progesterone and estrogen, the glandular part of endometrial lining is peeled off along with discharge of blood and mucus. The process is called menstruation. It lasts for 3-5 days.

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36. **What is solenoid? Draw the pattern of magnetic field lines of** **5**

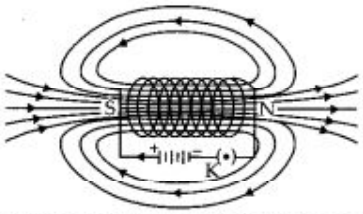
(i) a current carrying solenoid and

(ii) a bar magnet.

List two distinguishing features between the two fields.

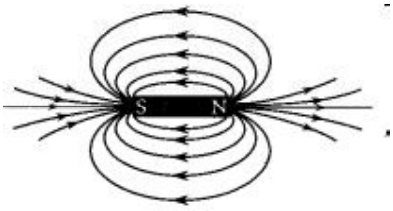
Ans: (i) Solenoid : A coil of many circular turns of insulated copper wire wrapped in the shape of cylinder is called solenoid.

The pattern of magnetic field lines inside the solenoid indicates that the magnetic field is the same at all points inside the solenoid. That is, the field is uniform inside the solenoid.



Field lines of the magnetic field through and around a current-carrying solenoid

(ii) Magnetic field lines around a bar magnet.



Following are the distinguishing features between the two fields.

(a) A bar magnet is a permanent magnet whereas solenoid is an electromagnet, therefore field produced by solenoid is temporary and stay till current flows through it.

(b) Magnetic field produced by solenoid is more stronger than magnetic field of a bar magnet.

OR

A current carrying conductor is placed in a magnetic field. Now answer the following.

(i) List the factors on which the magnitude of force experienced by conductor depends.

(ii) When is the magnitude of this force maximum?

(iii) State the rule which helps, in finding the direction of motion of conductor.

(iv) If initially this force was acting from right to left, how will the direction of force change if:

(a) direction of magnetic field is reversed?

(b) direction of current is reversed?

Ans: (i) When a current carrying wire is placed in a magnetic field, it experiences a magnetic force that depends on

(a) current flowing in the conductor

(b) strength of magnetic field

(c) length of the conductor

(d) angle between the element of length and the magnetic field.

(ii) Force experienced by a current carrying conductor placed in a magnetic field is largest when the direction of current is perpendicular to the direction of magnetic field.

(iii) The rule used in finding the direction of motion of the conductor placed in a magnetic field is Flemings left hand rule.

Fleming's left hand rule is as follows:

Stretch out the thumb, the forefinger, and the second (middle) finger of the left hand so that these are at right angles to each other. If the forefinger gives the direction of the magnetic field (N to S), the second (middle) finger the direction of current then the thumb gives the direction of the force acting on the conductor.

(iv) (a) Direction of force will be reversed when direction of magnetic field is reversed,

	i.e., now force on conductor will act from left to right. (b) Direction of force will be reversed, if the direction of current is reversed, i.e., the force on the conductor will act from left to right.	
	SECTION - E **Q.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.	**Case Study :** pH is quite useful to us in ---------- base like baking soda.	
a) **Ans :**	**What happened when black copper oxide placed in a beaker is treated with dilute HCl?** When black copper oxide placed in a beaker is treated with dilute HCl its colour changes to bluish green.	1
b) **Ans :**	**Which acids is present in bee sting?** Methanoic acid is present in bee sting.	1
c) **Ans :**	**P is an aqueous solution of acid and Q is an aqueous solution of base. When these two are diluted separately, then what happened?** P is an aqueous solution of acid and Q is an aqueous solution of base. When these two are diluted separately pH of P increases while that of Q decreases till neutralisation. **OR** **Sting of ant can be cured by rubbing the affected area with soap .Give reason** Sting of ant can be cured by rubbing the affected area with soap because it contains sodium hydroxide which neutralises the effect of formic acid	2
38.	**Case Study :** The male reproductive system consist ---------- sperms are now in fluid.	
a) **Ans :**	**Name the sex hormone associated with males.** Testosterone	1
b) **Ans :**	**What is the function of prostate gland and seminal vesicles?** Prostate gland and seminal vesicles add their secretions so that sperms are now in fluid.	1
c) **Ans :**	**Give reason:Testes are located outside the abdominal cavity in scrotum.** Testes are located outside the abdominal cavity in scrotum because sperm formation requires a lower temperature than normal body temperature. **OR** **Give reason:Testes secrete the male sex harmone.** Testes secrete the male sex harmone because role of secretion of male sex hormone brings changes in appearance seen in boys at the time of puberty.	2
39.	**Case Study** An insulated copper wire wound ----------current in the solenoid.	
a) **Ans :**	**Define solenoid.** An insulated copper wire wound on a cylindrical cardboard tube such that its length is greater than its diameter is called a solenoid.	1

b)	**A long solenoid carrying a current produces a magnetic field B along its axis. If the current is double and the number of turns per cm is halved, then what is the new value of magnetic field ?**	1
Ans :	The new value of magnetic field is B	
c)	**Compare the magnetic field produced by the solenoid and by the bar magnet.**	2
Ans :	The magnetic field produced by a current-carrying solenoid is similar to the magnetic field produced by a bar magnet.	
	OR	
	List factors on which the strength of the magnetic field lines produced by a solenoid depends.	
Ans :	Strength of magnetic field produced by solenoid depends on following factors: i) Current passing through the wire ii) Number of loops of the coil of solenoid iii) Nature of core material used for making the solenoid	

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