

PRACTICE PAPER

1*

Time allowed : 2 hours

Maximum marks : 40

General Instructions :

- (i) The question paper comprises four sections A, B, C and D. There are 17 questions in the question paper. All questions are compulsory.
- (ii) Section-A – question no. 1 to 9 - all questions and parts thereof are of one mark each. These questions contain multiple choice questions (MCQs), very short answer questions, assertion - reason type questions, case based questions. Answers to these should be given in one word or one sentence.
- (iii) Section-B – question no. 10 to 12 are short answer type questions, carrying 2 marks each. Answers to these questions should be in the range of 30 to 50 words.
- (iv) Section-C – question no. 13 to 15 are short answer type questions, carrying 3 marks each. Answers to these questions should be in the range of 50 to 80 words.
- (v) Section-D – question no. 16 and 17 are long answer type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.
- (vi) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
- (vii) Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION - A

1. An element 'X' belongs to 3rd period and group 17 of the periodic table. State its valency. Justify your answer with reason.

OR

Choose from the following :

${}_4\text{Be}$, ${}_9\text{F}$, ${}_{19}\text{K}$, ${}_{20}\text{Ca}$

- (a) The element having one electron in the outermost shell.
 - (b) Two elements of the same group
2. What do you mean by biological magnification?
 3. Characters that are transmitted from parents to offsprings during sexual reproduction show
 - (a) only similarities with parents
 - (b) only variations with parents
 - (c) both similarities and variations with parents
 - (d) neither similarities nor variations.
 4. Mendel crossed a pure recessive wrinkled seeded pea plant with a pure dominant round seeded plant. The first generation of hybrids from the cross should show
 - (a) 50% wrinkled seeded and 50% round seeded plants
 - (b) all round seeded plants
 - (c) 75% round seeded and 25% wrinkled seeded plants
 - (d) all wrinkled seeded plants.

OR

The crossing of a homozygous tall plant with a dwarf plant would yield plants in the ratio of

- (a) two tall and two dwarf
- (b) one homozygous tall, one homozygous dwarf and two heterozygous tall
- (c) all homozygous dwarf
- (d) all heterozygous tall.

5. In the given food chain suppose the amount of energy at fourth trophic level is 5 KJ, what will be the energy available at the producer level?

Grass → Grasshopper → Frog → Snake → Hawk

- (a) 5 KJ (b) 50 KJ (c) 500 KJ (d) 5000 KJ

For question numbers 6 and 7, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below :

- (a) Both A and R are true and R is correct explanation of the assertion.
 (b) Both A and R are true but R is not the correct explanation of the assertion.
 (c) A is true, but R is false.
 (d) A is false, but R is true.

6. **Assertion :** Test cross is a cross between an individual of unknown genotype and recessive parent.

Reason : Back cross is a cross which involves the same trait but sexes are reversed to those in the original cross.

7. **Assertion :** Detritivores are friends of nature.

Reason : Detritivores feed on dead bodies.

OR

Assertion : Food webs are never straight.

Reason : Each food web is formed by interlinking of food chains.

Answer Q. No. 8 and 9 contain five sub-parts each. You are expected to answer any four sub-parts in these questions.

8. **Read the following and answer any four questions from 8(i) to 8(v).**

As neutral atom carbon has electronic configuration $K L .$ To gain inert gas configuration carbon can either
 2, 4

donate 4 valence electrons (helium gas configuration) or gain 4 electrons (neon gas configuration), but it cannot do so. To acquire inert gas configuration carbon can only share its 4 valence electrons with other atoms forming covalent bonds. A covalent bond can be defined as a chemical bond formed between two atoms by mutual sharing of valence electrons so that each atom acquires the stable electronic configuration of the nearest noble gas. The concept of covalent bonds was given by Langmuir and Lewis to explain bonding in non-ionic compounds. The covalent bonds are of three types. If each atom contributes one electron, the covalent bond formed is called a single covalent bond and is represented by a single line (–) and if each atom contributes two electrons, the covalent bond formed is called a double bond and is represented by a double line (=) and if each atom contributes three electrons, the covalent bond formed is called a triple bond and is represented by a triple line (≡).

- (i) Which of the following do not contain a double bond?

I. SO_2

II. NH_3

III. HCl

IV. O_2

(a) I and II only

(b) II and III only

(c) III and IV only

(d) I and IV only

- (ii) Which of the following contains a triple bond?

(a) N_2

(b) O_2

(c) CO_2

(d) H_2

- (iii) The shared pair of electrons is said to constitute a _____ bond between two hydrogen atoms.

(a) single

(b) double

(c) triple

(d) ionic

- (iv) Which of the following molecules has all its atoms joined together by double covalent bonds?

(a) Methane

(b) Water

(c) Carbon dioxide

(d) Nitrogen trichloride

(v) Chlorine forms a diatomic molecule, Cl_2 . The electron dot structure for this molecule is



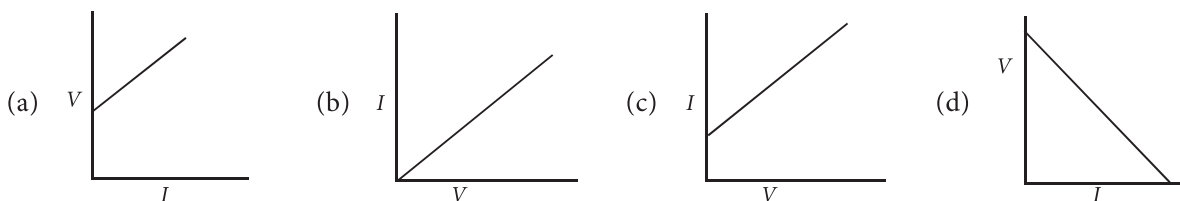
9. Read the following and answer any four questions from 9(i) to 9(v).

The relationship between potential difference and current was first established by George Simon Ohm called Ohm's law. According to this law, the current through a metallic conductor is proportional to the potential difference applied between its ends, provided the temperature remain constant *i.e.* $I \propto V$ or $V = IR$; where R is constant for the conductor and it is called resistance of the conductor. Although Ohm's law has been found valid over a large class of materials, there do exist materials and devices used in electric circuits where the proportionality of V and I does not hold.

(i) If both the potential difference and the resistance in a circuit are doubled, then

- (a) current remains same (b) current is doubled
(c) current is halved (d) current is quadrupled

(ii) For a conductor, the graph between V and I is there. Which one is the correct?



(iii) The slope of $V - I$ graph (V on x -axis and I on y -axis) gives

- (a) resistance (b) reciprocal of resistance
(c) charge (d) reciprocal of charge.

(iv) When battery of 9 V is connected across a conductor and the current flows is 0.1 A , the resistance is

- (a) $9\ \Omega$ (b) $0.9\ \Omega$ (c) $90\ \Omega$ (d) $900\ \Omega$

(v) By increasing the voltage across a conductor, the

- (a) current will decrease (b) resistance will increase
(c) current will increase (d) resistance will decrease.

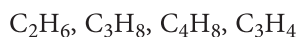
SECTION - B

10. Reproduction is one of the most important characteristic of living beings. Give three reasons in support of the statement.

11. The formula of a hydrocarbon is $\text{C}_n\text{H}_{2n-2}$. Name the family to which it belongs and also predict its nature. Name the second member of this family and also give its structural formula.

OR

(i) Which of the following compounds can have a double bond?



(ii) Write the molecular formula for an alkyne with 6 carbon atoms.

12. When a red flowered plant was crossed with white flowered plant, all F_1 progeny showed only red flowers. Define that law of Mendel which supports this result.

SECTION - C

13. Plastic cups were used to serve tea in trains in early days- these could be returned to the vendors, cleaned and reused. Later, *Kulhads* were used instead of plastic cups. Now, paper cups are used for serving tea. What are the reasons for the shift from plastic to *Kulhads* and then finally to paper cups?
14. How can three resistors of resistances $2\ \Omega$, $3\ \Omega$ and $6\ \Omega$ be connected to give a total resistance of
 (i) $4\ \Omega$
 (ii) $1\ \Omega$?

OR

What is (i) the highest, (ii) the lowest total resistance that can be secured by combinations of four coils of resistances $4\ \Omega$, $8\ \Omega$, $12\ \Omega$, $24\ \Omega$?

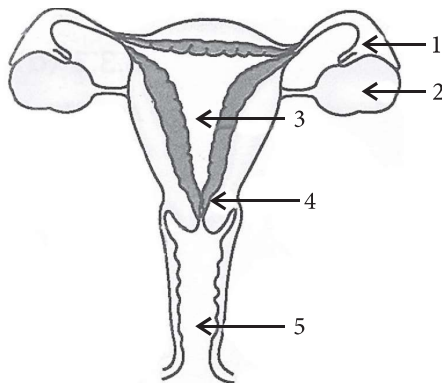
15. Four elements *P*, *Q*, *R* and *S* belong to the third period of the Modern Periodic Table and have respectively 1, 3, 5 and 7 electrons in their outermost shells. Write the electronic configurations of *Q* and *R* and determine their valencies. Write the molecular formula of the compound formed when *P* and *S* combine.

SECTION - D

16. (a) Describe asexual reproduction in *Amoeba*.
 (b) Explain human male reproductive system with the help of a diagram.

OR

- (a) Identify the given diagram. Name the parts 1 to 5.



- (b) What is contraception? List three advantages of adopting contraceptive measures.
17. Briefly explain an activity to plot the magnetic field lines around a straight current carrying conductor. Sketch the field pattern for the same, specifying current and field directions. What happens to the field,
 (i) if the strength of the current is decreased
 (ii) if the direction of the current is reversed?

OR

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

ANSWERS

1. As element X belongs to group 17, it will have 7 electrons in its outermost shell. Moreover, X belongs to period number 3 so, it will have 3 shells.

Electronic configuration of $X = 2, 8, 7$

Valency of element X

$$= 8 - (\text{Number of valence electrons})$$

$$= 8 - 7 = 1$$

OR

The electronic configurations of the given elements are :

$${}_4\text{Be} = 2, 2$$

$${}_9\text{F} = 2, 7$$

$${}_{19}\text{K} = 2, 8, 8, 1$$

$${}_{20}\text{Ca} = 2, 8, 8, 2$$

(a) Potassium (K) has one electron in its outermost shell.

(b) Be and Ca have two electrons in their outermost shells hence, they belong to same group.

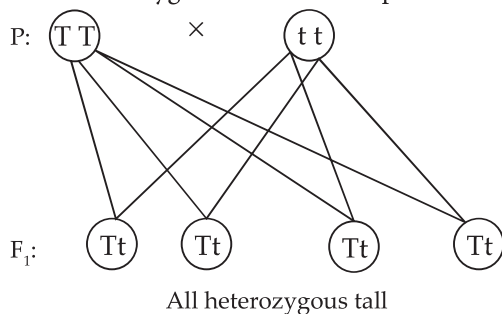
2. Biological magnification or biomagnification is the process of increase in amount of some toxic, non-biodegradable substances such as DDT and heavy metals in successive trophic levels of a food chain. It results in accumulation of highest concentration of these toxins in topmost trophic level.

3. (c) : When germ cells (gametes) from two individuals combine during sexual reproduction to form a new individual, it results in combination of characters of two different individuals. Hence, the offspring resembles parents in some characters as well as differs from them in some other characters *i.e.*, both similarities and variations are exhibited.

4. (b) : In first generation all plants will have one dominant allele and one recessive allele. Presence of dominant allele in all progenies will produce all round seeded plants in F_1 generation.

OR

(d) : The crossing of a homozygous tall plant with a dwarf would yield all heterozygous tall plants containing both the alleles. Tallness is a dominant trait over dwarfism. So even in heterozygous condition all plants are tall.



5. (d) : In the given food chain, if the amount of energy at fourth trophic level is 5 KJ, then 5000 KJ will be the energy available at the producer level. As only 10% of energy is transferred to next higher trophic level, hence, 500 KJ energy will be stored in body of grasshopper and 50 KJ in frog. 5 KJ energy will be present in the body of snake and 0.5 KJ in hawk.

6. (c) : Back cross is a cross which is made between a hybrid and one of its parents. In plant breeding, such crosses are performed to improve the variety of crop plants.

Cross between an individual of unknown genotype and recessive parent is called test cross.

7. (a) : Detritivores or scavengers are animals which feed on dead bodies of other organisms. They are helpful in quick disposal of the dead bodies, therefore, are friends of nature.

OR

(a)

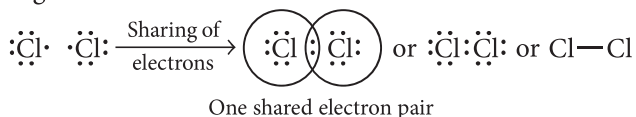
8. (i) (b) : Both NH_3 and HCl have single bonds only.

(ii) (a) : $\text{N} \equiv \text{N}$

(iii) (a)

(iv) (c) : $\text{O} = \text{C} = \text{O}$

(v) (c) : In chlorine molecule, both chlorine atoms contribute one electron and thus share single electron pair to form single covalent bond. As shared pair is shared by both atoms, they acquire inert gas configuration of argon atom in valence shell.



9. (i)(a) : $V = IR$

So, $V' \rightarrow 2V$, $R' \rightarrow 2R$

$$I' = \frac{2V}{2R} = I$$

(ii) (b) : $V \propto I$. So, the graph is a straight line and passing through origin.

(iii) (b) : Slope of $V-I$ graph = $\frac{I}{V} = \frac{1}{R}$.

(iv) (c) : Given: $V = 9\text{ V}$, $I = 0.1\text{ A}$

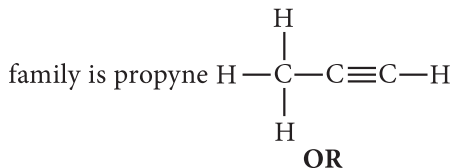
$$R = \frac{V}{I} = \frac{9}{0.1} = 90\ \Omega$$

(v) (c) : On increasing the voltage, the resistance remain same, so current will increase.

10. Reproduction is one of the most important characteristics of living beings because :

- it is essential for existence and continuity of a species.
- it helps to pass genetic information to next generation.
- it brings variations in next generation which is the basis for evolution.

11. The hydrocarbon belong to alkyne family. It is unsaturated in nature. The second member of this



(i) The compound having a double bond is called an alkene. The general formula of alkenes is C_nH_{2n} . Therefore, C_4H_8 is an alkene.

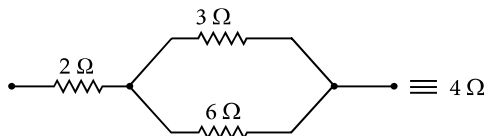
(ii) Hexyne, C_6H_{10} .

12. The first law of Mendel or law of dominance support the given result. It states that out of the two alternative factors or alleles, only one expresses itself in offspring which is known as dominant allele and other one which does not show its effect on the offspring in first generation is termed as recessive allele.

13. Plastic cups are non-biodegradable and harm the environment. They were thus replaced by *Kulhads*. Making *Kulhad* made of clay on a large scale resulted in the loss of top fertile soil.

Now, disposable paper cups are used because - the paper can be recycled, it is biodegradable and is eco-friendly material which does not cause environmental pollution.

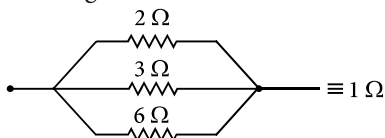
14. (i) Following combination will give a total resistance of 4Ω



$$R_{eq} = 2 + \frac{3 \times 6}{3 + 6} = 2 + 2 = 4 \Omega$$

Thus, the resistances of 3Ω and 6Ω are connected in parallel and this combination is combined with 2Ω resistance in series.

(ii) By connecting all the three resistances in parallel.



$$\frac{1}{R_{eq}} = \frac{1}{2} + \frac{1}{3} + \frac{1}{6} = \frac{3+2+1}{6} = \frac{6}{6}$$

$$\Rightarrow R_{eq} = 1 \Omega$$

OR

(i) Highest resistance = $R_1 + R_2 + R_3 + R_4$
 $= 4 \Omega + 8 \Omega + 12 \Omega + 24 \Omega$
 $= 48 \Omega$

(ii) If R is the lowest resistance, Then

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4} = \frac{1}{4} + \frac{1}{8} + \frac{1}{12} + \frac{1}{24}$$

$$= \frac{6+3+2+1}{24} = \frac{12}{24} = \frac{1}{2}$$

$$\Rightarrow R = 2 \Omega$$

So, the lowest resistance of the combination = 2Ω

15. P, Q, R and S all belong to 3rd period so, all of them will have 3 shells and the number of electrons in their outermost shell is 1, 3, 5 and 7 respectively.

Electronic configuration of $P = 2, 8, 1$

Thus, valency of $P = 1$

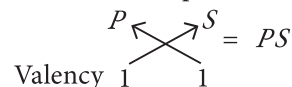
\therefore Electronic configuration of $Q = 2, 8, 3$ and its valency = 3

Similarly, electronic configuration of $R = 2, 8, 5$ and its valency = $8 - 5 = 3$

Electronic configuration of $S = 2, 8, 7$

Thus, valency of $S = 8 - 7 = 1$

Molecular formula of the compound :



16. (a) In *Amoeba*, asexual reproduction occurs by binary fission. During this, the nucleus divides into two equal halves. The nuclear division is followed by the appearance of a constriction in the cell membrane. The membrane then grows transversely inwards (*i.e.*, centripetally) from near the middle of dividing cell which separates the cytoplasm into two equal parts, each with one nucleus. The two daughter cells separate and behave as two independent organisms.

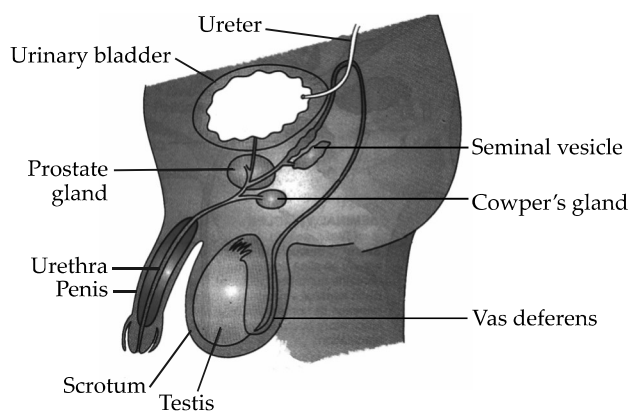
(b) Human male reproductive system: It consists of testes, scrotum, vas deferens, urethra and penis.

(i) Testes: The human male possesses two testes, which are the primary reproductive organs, lying outside the abdominal cavity. The two testes are the male gonads, which are the sites where male gametes, *i.e.*, sperms are made. The testes also produce the male sex hormone-

testosterone. The testes of man produce sperms from puberty onwards, throughout his life.

(ii) **Scrotum** : It is a pouch of skin that is divided internally into right and left scrotal sacs by a muscular partition. The two testes lie in respective scrotal sacs. The scrotum acts as a thermoregulator and provides an optimal temperature for the formation of sperms. The sperms develop at a temperature 1–3°C lower than the normal internal body temperature.

Side view of human male reproductive system is given as :



(iii) **Vas deferens** : This is a straight tube, about 40 cm long, which carries the sperms to the seminal vesicles. The sperms are stored temporarily in the seminal vesicle, where mucus and a watery alkaline fluid containing the sugar-fructose, mix with the sperms.

(iv) **Urethra** : It is about 20 cm long tube that arises from the urinary bladder to carry urine. It runs through the penis and opens to the outside through male genital pore. The contents of two seminal vesicles and sperms from vas deferens also join the urethra. Thus, urethra carries urine from the bladder, as well as sperms from the, vasa deferentia, through the penis.

(v) **Penis** : It is a long and thick muscular organ made up of mostly erectile tissue. At the time of sexual excitement, the erectile tissue gets filled with blood causing the penis to become erect. It is inserted into the vagina of the female where sperms are ejaculated for the purpose of reproduction.

OR

(a) The given diagram is the sectional view of human female reproductive system.

The labelled parts are:

1. Funnel of fallopian tube or oviduct
2. Ovary

3. Uterus or womb
4. Cervix
5. Vagina

(b) **Contraception** is the avoidance of pregnancy. There are several methods of contraception such as:

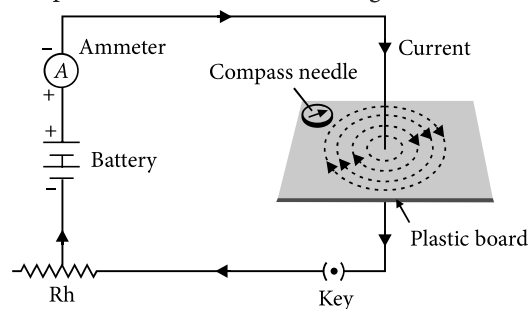
- (i) Barrier methods (condoms, diaphragm, etc.)
- (ii) Chemical methods (spermicide creams and jellies)
- (iii) Intrauterine Contraceptive Devices (IUCDs) (Lippes loop, CuT, etc.)
- (iv) Natural methods (rhythm method, coitus interruptus)
- (v) Surgical methods (vasectomy, tubectomy)

Three advantages of adopting contraceptive methods are:

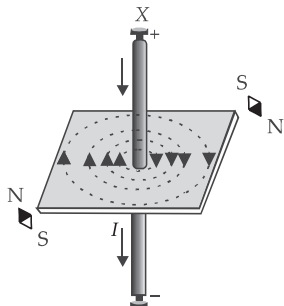
- (i) They prevent frequent or unwanted pregnancies.
- (ii) They prevent the transfer of sexually transmitted diseases (STDs).
- (iii) They help to regulate the population growth.

17. The pattern of magnetic field lines around a straight conductor carrying current can be described by the following activity :

Insert vertically a long straight wire carrying an electric current so that it passes through the centre of a horizontal piece of plastic board as shown in figure.



- Take care that the plastic board is fixed and does not move up and down. Now, sprinkle some iron filings onto the plastic board to show the shape of the field.
- You will notice that the iron filings get arranged around the wire in the shape of circles. This is due to the reason that the magnetic field lines around the current carrying straight conductor are circular. Thus iron filings also align along these field lines in same nature.
- On reversing the direction of flow of current, we observe that the iron filings arrange themselves in circles around the wire showing that the magnetic field lines are still circular in nature.



The direction of the magnetic field can be obtained by using a compass.

- (i) When the strength of the current through the wire is decreased, field also gets reduced.
- (ii) When the direction of the current is reversed, field also gets reversed in direction.

OR

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

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

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

- (i) direction of the current through the conductor and
- (ii) direction of the magnetic field in which the conductor is placed.

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

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

