

PRACTICE PAPER

3*

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 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 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. What should be the characteristics of a heating element?
2. Write any one method to induce current in a coil.

OR

Why two magnetic lines of force never intersect each other?

3. Law of independent assortment can be proved on the basis of which of the following ratios?
(a) 1 : 3 : 1 (b) 2 : 1 : 1 (c) 9 : 3 : 3 : 1 (d) 2 : 1
4. Parturition is
(a) the complete development of fetus, from the initial stage of conception till the birth of the young one
(b) the act of expelling the full-term young one from the mother's uterus at the end of gestation
(c) the implantation of the embryo in the uterus
(d) none of these.

OR

Which among the following statements are true for sexual reproduction in flowering plants?

- (i) It requires two types of gametes.
- (ii) Fertilisation is a compulsory event.
- (iii) It always results in formation of zygote.
- (iv) Offspring formed are clones.
(a) (i) and (iv) (b) (i), (ii) and (iv)
(c) (i), (ii) and (iii) (d) (i), (iii) and (iv)
5. What will happen if deer gets extinct from the food chain given below?
Grass → Deer → Tiger
(a) The population of tiger increases.
(b) The population of grass decreases.
(c) The tiger will start eating grass.
(d) The population of tiger decreases and the population of grass increases

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 :** Carbon possesses property of catenation.

Reason : Carbon atoms form double as well as triple bonds during catenation.

7. **Assertion :** The transfer of pollen grains from the anther of a stamen to the stigma of a carpel is called pollination.

Reason : Insects help in cross-pollination.

OR

Assertion : One pollen mother cell forms four microspores.

Reason : Microspores are formed due to reduction division.

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).

Elements	Electronic configuration
<i>P</i>	2,1
<i>Q</i>	2,4
<i>R</i>	2,7
<i>S</i>	2,8,7
<i>T</i>	2,8,8
<i>U</i>	2,8,8,1

- (i) The formula of the compound formed between elements *P* and *S* is
 (a) PS (b) P_2S (c) PS_2 (d) PS_4
- (ii) What type of bonding would you expect in the compound formed between *P* and *S*?
 (a) Covalent bonding (b) Co-ordinate bonding
 (c) Ionic bonding (d) Hydrogen bonding
- (iii) The two elements that are in the same group of the periodic table are
 (a) *P* and *U* (b) *R* and *S* (c) *T* and *U* (d) both 'a' and 'b'.
- (iv) Which of the following elements can form positive ion?
 (a) *P* (b) *Q* (c) *R* (d) *S*
- (v) Which of the following pair can form negative ion?
 (a) *Q* and *R* (b) *S* and *T* (c) *R* and *S* (d) *T* and *U*

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

Energy flow is the key function of an ecosystem. It is determined by the two basic laws of thermodynamics. Flow of energy in our ecosystem is unidirectional. Green plants capture approximately about 1% of the solar energy incident on the earth to carry out the process of photosynthesis. In an ecosystem, transfer of energy follows 10 per cent law, *i.e.*, only 10% energy is transferred from one trophic level to another and remaining 90% of energy is lost in respiration.

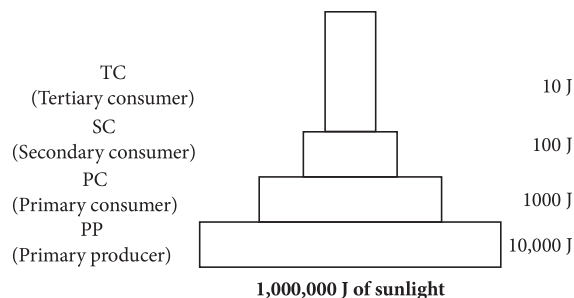
- (i) Read the given statements and select the incorrect one(s).
 I. At each trophic level organisms utilise energy in respiration.
 II. Only 10 percent of the solar radiations that fall on earth is used by green plants.
 III. Green plants are the ultimate source of entire energy as most of the food chain begin with them.
 IV. A food chain usually consist of 3–4 trophic levels.
 (a) I and II only (b) II and III only (c) IV only (d) I and III only

(ii) Refer to the given flow chart.

Plants \longrightarrow Rat \longrightarrow Snake
 20 units 2 units 0.2 unit

The given flow chart states that

- (a) flow of energy in an ecosystem is unidirectional
 (b) as we move along in a food chain the number of individuals at each trophic level decreases
 (c) only 10% of the total energy becomes available to next trophic level
 (d) both (a) and (c).
- (iii) Nearly 90% of the energy is wasted while moving from one trophic level to other. This energy is used in
 (a) digestion of food (b) respiration (c) overcoming entropy (d) all of these.
- (iv) Refer to the given pyramid.



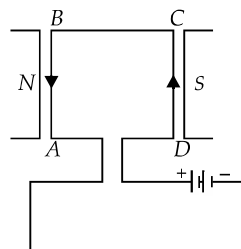
Which of the following best explains the phenomenon?

- (a) First law of thermodynamics (b) Second law of thermodynamics
 (c) Third law of thermodynamics (d) Both (a) and (b)
- (v) Which of the following correctly states the processes involved in energy transfer between the trophic levels?

	Between the sun and producer	Between producer and primary consumers	Between primary and secondary consumers
(a)	Feeding	Photosynthesis	Feeding
(b)	Feeding	Feeding	Decomposition
(c)	Photosynthesis	Feeding	Feeding
(d)	Photosynthesis	Feeding	Decomposition

SECTION - B

10. A rectangular coil $ABCD$ is placed between the pole pieces of a horse-shoe magnet as shown in figure.



What is the direction of force on each arm?

OR

How will the magnetic field be affected on

- (a) increasing the current through the conductor
 (b) reversing the direction of flow of current in the conductor?
11. Element X is located in Group VII and Period 5 of the periodic table.
- (a) How many shells in an atom of element X are filled with electrons?
 (b) How many electrons are there in the outermost shell of an atom of element X ?

12. (a) Define heredity.
 (b) What is the advantage of variations?

SECTION - C

13. (i) State four factors on which the strength of magnetic field produced by a current carrying solenoid depends.
 (ii) Draw circuit diagram of a solenoid to prepare an electromagnet.
14. Carbon and silicon combine with chlorine to form simple molecules.
 (a) Give the formulae and names of the molecules formed between
 (i) carbon and chlorine; (ii) silicon and chlorine.
 (b) What types of bonds are present in the compounds of these two elements?
 (c) Both the compounds are liquids at room temperature. Use structure and bonding to explain this observation.

OR

What are the two properties of carbon which lead to the huge number of carbon compounds we see around us?

15. (a) Define contraception. What are the different methods of contraception?
 (b) Give three examples of sexually transmitted diseases.

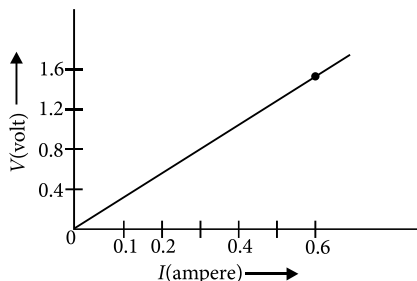
SECTION - D

16. (i) Write three points of difference between electric energy and electric power.
 (ii) Out of 60 W and 40 W lamps, which one has higher electrical resistance when in use?
 (iii) What is the commercial unit of electric energy? Convert it into joules.

OR

An electric circuit consisting of a 0.5 m long nichrome wire XY, and an ammeter, a voltmeter, four cells of 1.5 V each and a plug key was set up.

- (i) Draw a diagram of this electric circuit to study the relation between the potential difference maintained between the points 'X' and 'Y' and the electric current flowing through XY.
 (ii) Following graph was plotted between V and I values :



What would be the values of $\frac{V}{I}$ ratios when the potential difference is 0.8 V, 1.2 V and 1.6 V respectively?

What conclusion do you draw from these values?

17. (a) Suppose there is no meiosis and the gametes are formed by mitotic divisions. What kind of situation do you expect under such circumstances?
 (b) Can organism with fewer chromosomes reproduce more easily than organisms with more number of chromosomes?

OR

Crossing of a pea plant with homozygous purple flower and pea plant with homozygous white flowers, produces 50 plants with only purple flowers. On selfing of plants obtained after crossing of pea plants with homozygous purple flower and pea plants with homozygous white flower produced 470 plants with purple flowers and 160 with white flowers. Explain the genetic mechanism accounting for the given results.

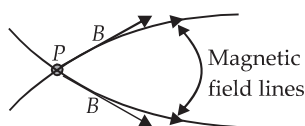
ANSWERS

1. A heating element should have the following characteristics :

- (a) It should have high resistivity.
 - (b) It should have high melting point, and should not burn/oxidise at higher temperature.
2. By keeping the magnet in a fixed position and moving the coil towards and away from the magnet, we can induce current in the coil.

OR

The direction of magnetic field (B) at any point is obtained by drawing a tangent to the magnetic field line at that point. In case, two magnetic field lines intersect each other at a point P as shown in figure, magnetic field at P will have two directions, shown by two arrows, drawn to each magnetic field line at P , which is not possible.



3. (c) : In Mendel's dihybrid cross, with yellow round and green wrinkled seeds 9 : 3 : 3 : 1 ratio was obtained showing four phenotypes. Yellow colour was originally present with round seeds but in F_2 generation it was assorted independently of round seed character and expressed with wrinkled seeds. Same is the case with green colour. Thus, it shows independent assortment of characters.

4. (b)

OR

(c) : Clones are identical to parent plant and are formed in case of asexual reproduction.

5. (d) : In this food chain, if deer would be missing than the population of tiger will decrease as they will not get food (deer) and the population of producers or grass will increase as it will not be eaten up by deer and so can proliferate well.

6. (b) : Catenation property of carbon is primarily due to its small size, electronic configuration and unique strength of carbon-carbon bonds.

7. (b)

OR

(a) : The sporogenous cells of anther may directly function as a microspore mother cells (also called pollen mother cells or PMCs) or they may undergo a few mitosis to add up to their number before entering meiosis. Each PMC, by a meiotic division, gives rise to

a group of four haploid microspores. The aggregates of four microspores are referred to as microspore tetrads.

8. (i) (a) : PS

(ii) (c) : Ionic bonding

(iii) (d) : P and U (one valence electron); R and S (seven valence electrons)

(iv) (a) : P (due to one valence electron)

(v) (c) : Because they have 7 valence electrons.

9. (i) (b) : 1% of solar radiation is captured by plants. Sun is the ultimate source of all energy.

(ii) (d)

(iii) (d)

(iv) (d) : The given pyramid is pyramid of energy that shows the two basic laws of thermodynamics.

(v) (c) : Light energy from the sun is converted to chemical energy in producers *via* photosynthesis. This chemical energy is then transferred to primary consumer, then subsequently to secondary consumer *via* feeding.

10. In figure, the current in the coil is in direction DCBA. By Fleming's left hand rule, in the arm AB, the force is outward at right angle to the plane of the coil. On the arm BC no force acts. On the arm CD, the force is inwards perpendicular to the plane of the coil. On the arm DA, no force acts.

OR

(a) If the current is increased, the magnetic field strength also increases.

(b) If the direction of current is reversed, the direction of magnetic field also get reversed.

11. (a) Period number = number of occupied shells = 5

(b) Group number = number of valence electrons = 7

12. (a) Heredity is the inheritance of characters from one generation to the next.

(b) Variations arise during sexual reproduction. The great advantage of variation is that it increases the chances of survival in a changing environment.

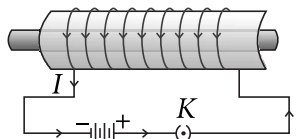
13. (i) Strength of magnetic field produced by a current carrying solenoid depends upon the following factors:

(a) number of turns in the coil

(b) amount of current flowing through it

(c) radius of coil

(d) material of core of the solenoid.



(ii) A strong magnetic field produced inside a solenoid can be used to magnetise a piece of magnetic material, like soft iron, when placed inside the coil. The magnet so formed is called an electromagnet.

14. (a) (i) Tetrachloromethane, CCl_4
 (ii) Silicon tetrachloride, SiCl_4
 (b) Covalent bonding between atoms within the molecule and van der Waals' forces between the molecules.
 (c) The weak van der Waals' forces between molecules require only a small amount of energy to break the bonds. Hence, they have low melting and boiling points.

OR

(i) Catenation : Carbon has the unique property of self linking which is known as catenation. In fact, any number of carbon atoms can be linked to one another by covalent bonds. This is on account of the stability of C — C bonds since the size of the carbon atom is quite small.

(ii) Linking of carbon with other atoms : Carbon is tetravalent in nature and can readily unite with atoms like hydrogen, oxygen, nitrogen, sulphur, etc. by electron sharing.

15. (a) The methods or devices of birth control which deliberately prevent fertilisation are referred to as contraception. Different types of contraceptive methods are :

- (i) Barrier methods; (ii) Chemical methods ; (ii) IUCD
 (iv) Natural methods (v) Surgical methods.
 (b) Gonorrhoea, Syphilis and AIDS.

16. (i) Differences between electric energy and electric power :

	Electrical Energy	Electric Power
(i)	The work done or energy supplied by the source in maintaining the flow of electric current is called electrical energy. It appears in the form of heat is given by $H = VI t = \frac{V^2 t}{R} = I^2 R t$	The time rate at which electrical energy is consumed or dissipated by an electrical device is called electric power and is given by $P = VI = \frac{V^2}{R} = I^2 R$

(ii)	It is equal to the product of power and time, $E = P \times t$	It is equal to the rate of doing work, $P = \frac{W}{t}$
(iii)	Its SI unit is joule (J) $1 \text{ J} = 1 \text{ W} \times 1 \text{ s}$	Its SI unit is watt (W) $1 \text{ W} = 1 \text{ J s}^{-1}$

(ii) For the same applied voltage, $P \propto \frac{1}{R}$ or $R \propto \frac{1}{P}$ i.e.,

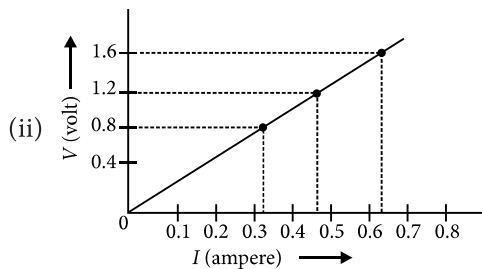
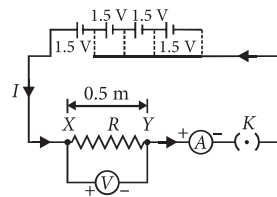
less the power of electrical device, higher is its electrical resistance. Therefore, a 40 W lamp has higher electrical resistance when in use.

(iii) Commercial unit of electrical energy : Kilowatt hour

$$1 \text{ kW h} = 1000 \text{ W h} = 1000 \frac{\text{J}}{\text{s}} \times 3600 \text{ s} \\ = 3600000 \text{ J} = 3.6 \times 10^6 \text{ J}$$

OR

(i) Electric circuit to study the relation between potential difference and the current.



The values of $\frac{V}{I}$ ratios when the potential differences across nichrome wire are 0.8 V, 1.2 V and 1.6 V, are

For $V = 0.8 \text{ V}$, $I = 0.32 \text{ A}$

$$\therefore \frac{V}{I} = \frac{0.8}{0.32} = 2.5$$

For $V = 1.2 \text{ V}$, $I = 0.48 \text{ A}$

$$\therefore \frac{V}{I} = \frac{1.2}{0.48} = 2.5$$

For $V = 1.6 \text{ V}$, $I = 0.64 \text{ A}$

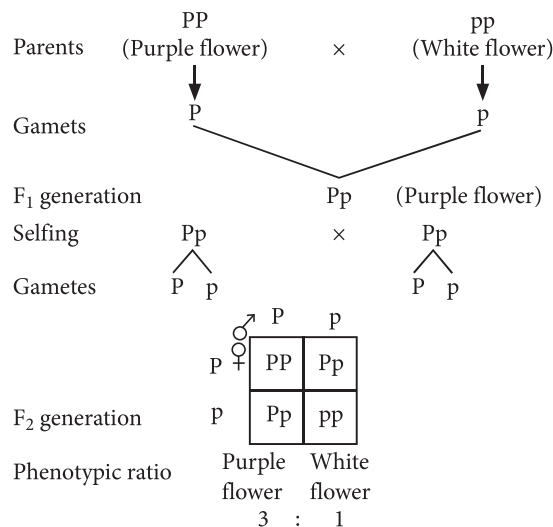
$$\therefore \frac{V}{I} = \frac{1.6}{0.64} = 2.5$$

The values of $\frac{V}{I}$ ratios are 2.5, 2.5, 2.5, that means the ratio of potential difference applied to the wire and current passing through it is a constant.

17. (a) Normally the two haploid gametes fuse to form one diploid zygote. The zygote develops into a mature organism. At maturity, the organism develops sex organs and gametes are formed from diploid cells by meiosis resulting in the formation of haploid gametes. This process continues generation after generation. Now if there is no meiosis at the time of gamete formation the gametes formed as a result of mitosis will be diploid. The two diploid gametes will fuse to form a $4n$ zygote which develops in tetraploid organism. Again this $4n$ organism will develop $4n$ gametes which fuse to form $8n$ zygote. The number of chromosomes will continue to double after each generation and a time will come when there will be only DNA on earth.

(b) No, the process of reproduction is not dependent on the number of chromosomes in the organism.

OR



In this breeding experiment, ratio of purple and white flowers is approximately 3 : 1 in F₂ generation. So, the ratio is according to Mendelian monohybrid cross. The cross further explains the following facts:

- F₁ is represented only by dominant trait, *i.e.*, purple flowered plants.
- Both the traits, *i.e.*, purple and white flower colour appear in F₂ generation.



Visit <https://telegram.me/booksforcbsc> for more books.