

- Note:**
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 - (ii) Use of calculator is not allowed.
 - (iii) The numbers to the right of the questions indicate full marks.
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 - (v) For every MCQ, the correct alternative a, b, c, or d with sub-question number is to be written as an answer.
For e.g. i. a, ii. b, iii. c.
 - (vi) Scientifically correct, labelled diagrams should be drawn wherever necessary.

Q.1. (A) Choose the correct alternative. [5]

- i. According to Mendeleev's periodic law, properties of elements are periodic function of their _____.
 - a. atomic numbers
 - b. atomic masses
 - c. densities
 - d. boiling points
- ii. The vapour content in the air is measured using a physical quantity called _____.
 - a. absolute humidity
 - b. relative humidity
 - c. dew point
 - d. humidity
- iii. For the normal human eye, the near point is at _____ cm.
 - a. 10
 - b. 20
 - c. 25
 - d. 30
- iv. The astronomical object closest to us in our galaxy is _____.
 - a. Mars
 - b. Venus
 - c. Jupiter
 - d. Moon
- v. In the Wilfley table method, the particles of gangue are separated by _____ separation method.
 - a. magnetic
 - b. froth floatation
 - c. hydraulic
 - d. gravitational

(B) Answer the following. [5]

i. **Find the odd one out.**

Voltmeter, Ammeter, Thermometer, Galvanometer

ii. **Find the correlation and write in one sentence.**

Alkene : $C = C$:: Alkyne : _____

iii. **State true or false.**

The frequency of AC is 50 Hz.

iv. **Make pairs.**

Column A	Column B
1. The wavelength of red light	a. 600 nm
	b. 700 nm
	c. 500 nm

v. Name the first artificial satellite sent by Russia in space.

Q.2. (A) Give scientific reasons. (Any two) [4]

i. The weight of an object changes from place to place though its mass is constant.

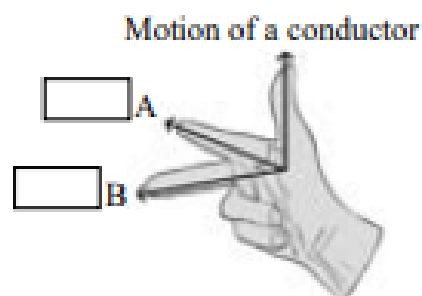
ii. Stars twinkle but we do not see the twinkling of planets.

iii. Elements belonging to the same group have the same valency.

(B) Answer the following. (Any three) [6]

i. How much heat energy is necessary to raise the temperature of 5 kg of water from 20°C to 100°C ?

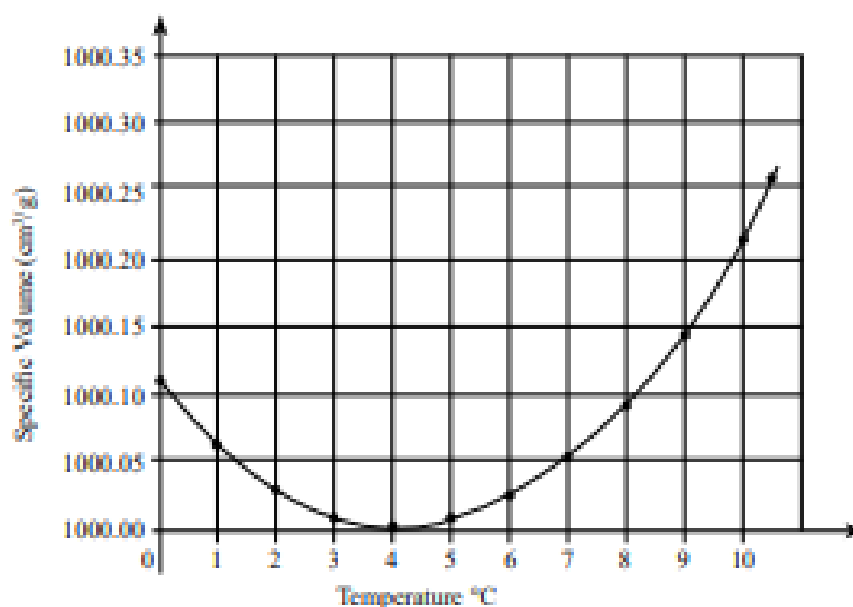
ii. Observe the given figure of Fleming's Right Hand Rule and write the labels of A and B correctly.



iii. **Observe the given graph and answer the following questions.**

a. Name the process represented in the figure.

b. At what temperature does this process take place?



iv. Complete the given chemical reaction.



Name the type of reaction.

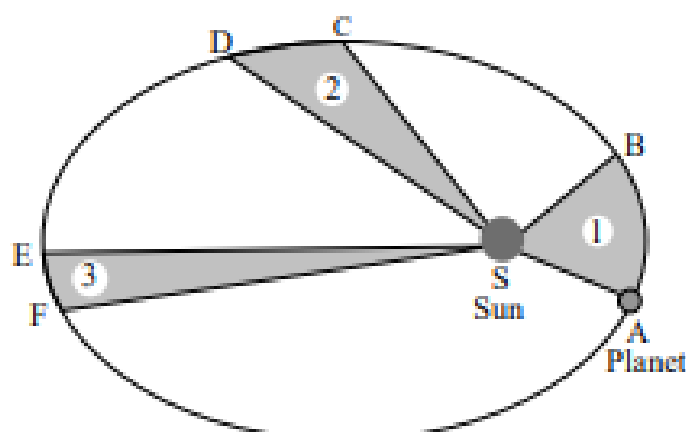
v. Write a short note on alloying.

Q.3. Answer the following questions. (Any five) [15]

i. An element has its electronic configuration as 2, 8, 2. Now, answer the following questions.

- What is the atomic number of this element?
- What is the group of this element?
- To which period does this element belong?

ii. Observe the given figure showing the orbit of a planet moving around the Sun and write the three laws related to it.



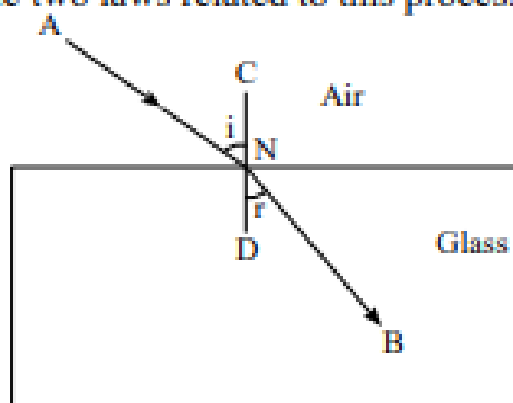
iii. **Read the given passage and answer the following questions.**

The home electrical connection consists of 'live', 'neutral' and 'earth' wires. The 'live' and the 'neutral' wires have potential difference of 220 V. The 'earth' is connected to the ground. Due to a fault in equipment, or if the plastic coating on the 'live' and the 'neutral' wires gives away, the two wires come in contact with each other and a large current flows through it producing heat. If any inflammable material (such as wood, cloth, plastic, etc.) exists around that place, then it can catch fire. Therefore, a fuse wire is used as a precautionary measure.

- Name the two wires having potential difference of 220 V.
- What is short circuit?
- Write the function of a fuse.

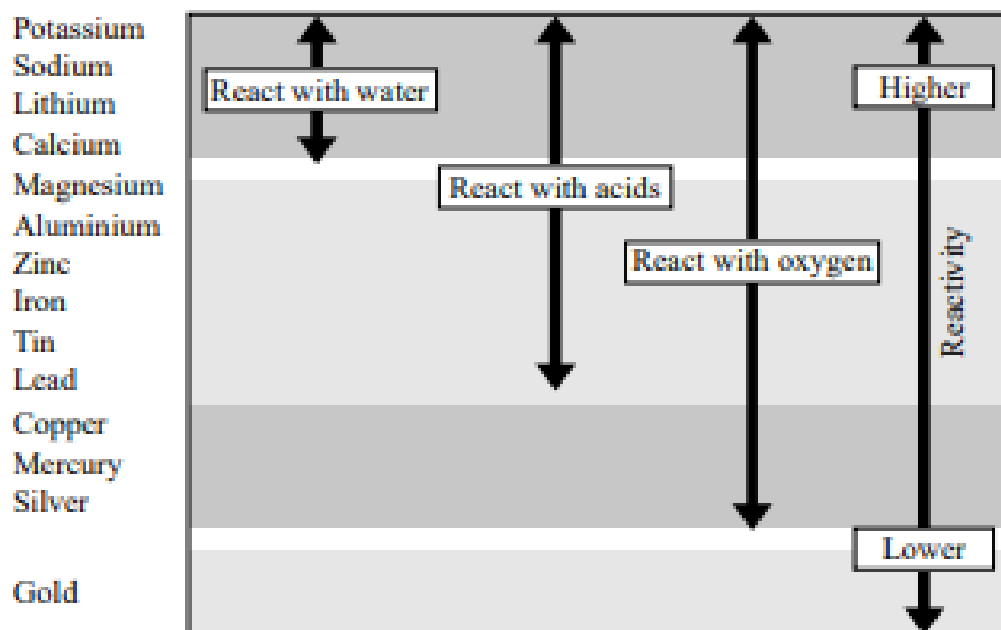
iv. **Observe the given figure and answer the following questions.**

- Name the process represented in the figure.
- State the two laws related to this process.



- What is an artificial satellite? Name any two types of artificial satellites and state their functions.**
- vi. **Answer the following questions.**
- Define hydrocarbons.
 - Name the types of hydrocarbons.
 - Name two carbon compounds used in day-to-day life.

vii. Observe the given figure of reactivity series of metals and answer the following questions.



Reactivity series of metals

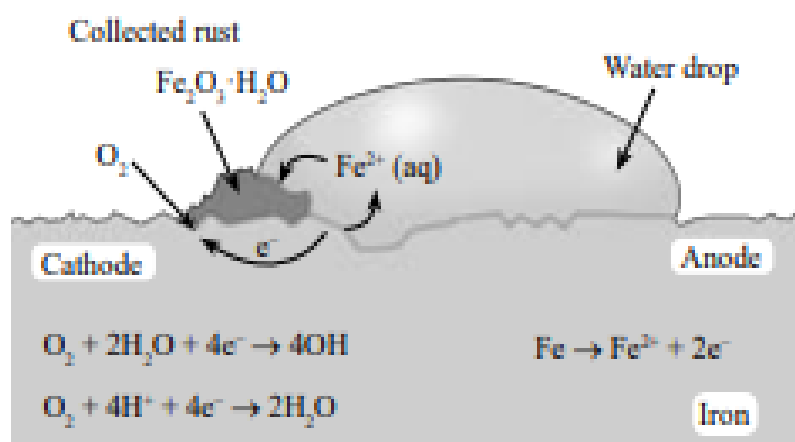
- Name two metals which react with water.
- Name two moderately reactive metals.
- Name the most highly reactive metal and the least reactive metal.

viii. Complete the following table.

Straight chain of carbon compounds	Structural formula	Molecular formula	Name
C	$ \begin{array}{c} \text{H} \\ \\ \text{H} - \text{C} - \text{H} \\ \\ \text{H} \end{array} $	CH ₄	Methane
C – C			Ethane
C – C – C		C ₃ H ₈	
C – C – C – C	$ \begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\ & & & \\ \text{H} - \text{C} & - \text{C} - & \text{C} - & \text{C} - \text{H} \\ & & & \\ \text{H} & \text{H} & \text{H} & \text{H} \end{array} $		

Q.4. Answer any one of the following. [5]

- i. Draw a scientifically correct labelled diagram of a human eye and answer the questions based on it.
- Name the type of lens in the human eye.
 - Name the screen at which the maximum amount of incident light is refracted.
 - State the nature of the image formed of the object on the screen inside the eye.
- ii. Observe the following picture and answer the questions.
- What is rust?
 - Write the chemical formula of rust.
 - Write the reaction of oxidation of iron at anode.
 - Write the reaction of oxidation of iron at cathode.
 - What is corrosion?



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(vi) Scientifically correct, labelled diagrams should be drawn wherever necessary.

Q.1. (A) Write the correct option and write its alphabet for the following questions. [5]

- i. c. Glycolysis and Fermentation are two steps of anaerobic respiration. [1]
- ii. a. Coal is used in thermal power plant. [1]
- iii. d. Chemically, vinegar is 4% acetic acid . [1]
- iv. c. Government of India has encouraged the pisciculture for improving the production by launching NKM-16. [1]
- v. b. Alcohol consumption mainly affects nervous system. [1]

(B) Answer the following questions. [5]

- i. Write the scientific name of human being.

Ans. *Homo sapiens* [1]

- ii. Find the odd man out.

Actin, Ossein, Myosin, Aldosterone

Ans. Aldosterone [1]

iii. State whether true or false.

The power available from the solar cell is AC.

Ans. False. [1]

iv. I have calcareous spines and I move with tube feet, which phylum do I belong to?

Ans. Echinodermata. [1]

v. Write any one example of natural disasters.

Ans. Earthquake, Drought, Flood, Volcano.

[Any one, 1 mark]

Q.2. (A) Give scientific reasons. (Any two) [4]

i. Water is an essential nutrient.

Ans.

- (a) There is about 65 – 70% water in our body.
- (b) Each cell contains 70% water weight by weight.
- (c) Blood-plasma also contains 90% of water.
- (d) Functioning of cells and thereby whole body disturbs even if there is a little loss of water from the body.

Hence, water is an essential nutrient. [2]

ii. Tobacco chewing is injurious to health.

Ans.

- (a) Tobacco contains a harmful substance called nicotine. It affects the nervous and circulatory systems. [1]
- (b) It causes mouth and lung cancer. [1]

iii. It is absolutely necessary to control the fission reaction in nuclear power plants.

Ans.

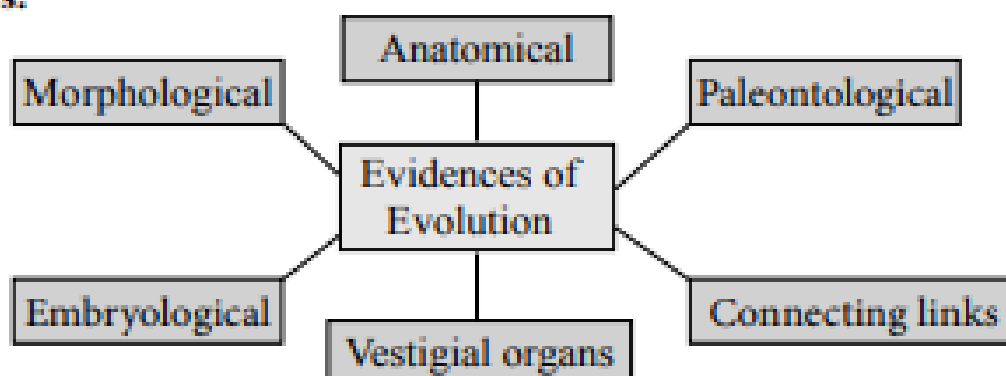
- (a) After each fission reaction of Uranium-235, three neutrons are released along with an energy of 200 MeV.
 - (b) These three neutrons, in turn, cause fission of three other Uranium-235 atoms, thus releasing more energy.
 - (c) If this chain reaction is allowed to continue, it may get out of control as energy is released very quickly which may result in a nuclear explosion.
 - (d) Hence, it is necessary to control the fission reaction in nuclear plants. [2]
-

(B) Answer the following questions. (Any three) [6]

i. Complete the following chart.

(Note: Refer Aug 2022 question paper for incomplete chart.)

Ans.



(Note: Students can write any four points.)

[Any four points, 1/2 mark each]

ii. What is environment? Write two types of environment.

Ans.

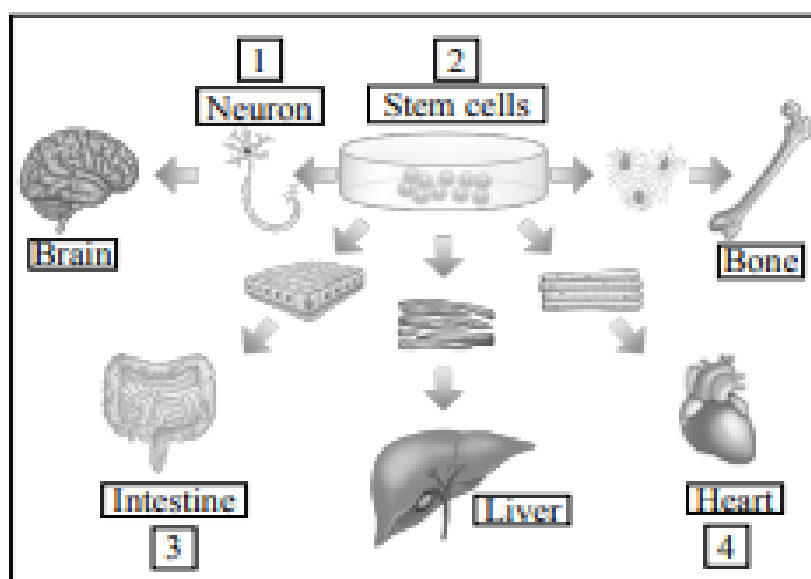
(a) Physical, chemical and biological factors affecting the living organisms in any possible way is collectively called environment. [1]

(b) There are two main types of environment - natural environment and artificial environment. [1]

iii. Observe the given diagram and write proper names in the blocks.

(Note: Refer Aug 2022 question paper for the diagram.)

Ans.



iv. Which precautions should be followed to maintain the reproductive health?

Ans.

- (a) While one takes good care of his/her physical health, reproductive health is usually ignored.
- (b) During the menstrual cycle, a lot of bleeding occurs. Due to this, private organs (genitals) need to be maintained clean from time to time, otherwise problems may arise.
- (c) Men also need to maintain the cleanliness of their genitals to avoid problems.
- (d) Proper hygiene must be observed to prevent sexual diseases caused by bacterial infections, such as syphilis and gonorrhoea.
- (e) After childbirth, in order to let the uterus recover to normal health, the woman must take enough rest and avoid carrying heavy objects. [2]

v. Distinguish between butterfly and bat with the help of two distinguishing characteristics.

Ans.

Butterfly	Bat
Butterflies are non-chordates.	Bats are chordates.
They belong to phylum Arthropoda.	They belong to phylum Chordata, subphylum Vertebrata, class Mammalia.
The exoskeleton is made up of chitin.	The exoskeleton is in the form of scanty hairs.
Butterflies do not have any digits with nails or claws.	Bats have digits with nails.

[Any 2 points, 1 mark each]

Q.3. Solve the following questions. (Any five) [15]

i. Redraw the table taking into account the relation between entries in the three columns.

Column-I	Column-II	Column-III
Coal	Kinetic energy	Nuclear power plant
Uranium	Thermal energy	Wind electricity plant
Wind	Nuclear energy	Thermal plant

Ans.

Column-I	Column-II	Column-III
Coal	Thermal energy	Thermal plant
Uranium	Nuclear energy	Nuclear power plant
Wind	Kinetic energy	Wind electricity plant

[1 mark each]

ii. (a) **Identify the class of the animals shown in the figure.**



(b) **Write two characteristics of that class.**

Ans.

(a) The animals shown in the figure belong to Class Amphibia. [1]

(b) (1) During larval life, these animals are strictly aquatic and perform only aquatic respiration.

(2) During adult life, they can live both in water and on land, performing aquatic and aerial respiration, respectively.

(3) They have two pairs of appendages. Digits are without claws.

(4) The exoskeleton and neck are absent. The external ear is also absent, but tympanum is present.

[1 mark each, for any two characteristics]

iii. **Which precautions are necessary for proper decomposition of domestic waste?**

Ans. The precautions to be taken for proper decomposition of domestic waste are:

(a) Wet and dry waste should be properly segregated.

(b) Bio-medical waste, e-waste, etc. should not be mixed with wet waste.

(c) After segregation, the waste should be disposed of carefully.

(d) Medical waste should be incinerated to prevent the spread of infection.

(e) Dry waste and e-waste should be sent for recycling.

- (f) Wet waste should be completely free of any non biodegradable matter. This can then be converted to compost.

[Any 3 points, 1 mark each]

iv. Write the importance of medicinal plants.

Ans.

- (a) India has been gifted with a great biodiversity.
- (b) Indian citizens have established a humble and strong relation with the nature.
- (c) We have a great tradition of ayurveda that cures diseases with the help of natural resources.
- (d) In the past, medicinal plants were collected from forests. However, forest depletion has made them rare. Hence, they are being cultivated. Some examples of medicinal plants and their uses are as follows: adulsa - used for cough, aloe vera - used for healing wounds and taken orally to reduce cholesterol, tulsi - for cold and flu, neem - to cure diabetes and gastric problems.
- (e) Apart from medicinal uses, these plants are also used in pest control, perfumes, food products, natural dyes, etc.

[Any 3 points, 1 mark each]

v. What will you do? Why?

- a. You are spending more time on Internet/mobile games, phone, etc.**

Ans.

- (1) I will try to reduce the time I spend on the Internet, cell phone, and games. For this, I will indulge in other activities like singing, dancing, meditation, or playing a sport.
- (2) I will do so because –
 - a. spending excessive time on the Internet and cell phone is like an addiction. It may make me self-centred and less sensitive towards others and thus hinder me from developing harmonious relationship with others.
 - b. It may also cause physical problems like tiredness, headache, insomnia, forgetfulness, joint pains, etc.
 - c. Problems in vision may also arise due to radiation of cell phones.

[Any 1 point, 1 mark]

- b. You have to use free space around your house for good purpose.**

Ans. The free space around my house can be utilized for good purpose in many ways as follows:

- (1) I will start a small library with lots of books and good magazines. Children can come, read, and spend their time fruitfully.

- (2) I can convert that space into a play area.

I can play various sports with my friends, which is a good way to keep ourselves occupied and free from addiction, stress, and other social illnesses.

- (3) I can convert it into a small garden and grow some plants and take care of those plants. *[Any 1 point, 1 mark]*

- c. Your brother studying in Std. XII has developed stress.**

Ans.

- (1) Competition is one of the main factors contributing to stress. I will advise my brother to relax a bit, and take breaks between studies; to take a walk, watch a favourite show or listen to songs so that he gets relief from stress.

- (2) At the same time, I would also motivate him to put in his best effort, telling him that marks are important, but what is more important is the effort one puts in.

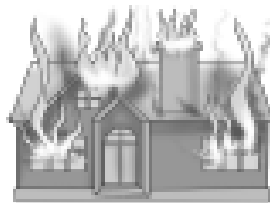
- (3) I will advise him to do meditation for improving his concentration in studies. *[Any 1 point, 1 mark]*

- vi. The following are some pictures of disasters. Which precautions would you take during these disasters?**

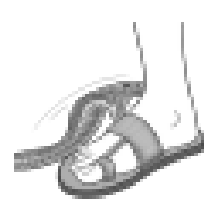
a.



b.



c.



- (a) This picture depicts an earthquake.

Precautions to be taken:

- (1) If you are inside a room, stand in a doorway or crawl under heavy furniture (a desk or table). Stay away from windows. Stay inside the room till it is safe to exit .

- (2) Stay away from cupboards, shelves, etc. which can fall on you.
- (3) Do not use the elevators.
- (4) Stay away from glass panes or doors as they may shatter and cause injury.
- (5) If you are outdoors, move to a clear area away from trees, electrical wires, buildings, poles, etc.
- (6) Do not panic.

[Any 1 point, 1 mark]

(b) This picture depicts fire.

Precautions to be taken :

- (1) Immediately exit the house and call the nearest fire station.
- (2) When evacuating the house, see that there is no fire on the other side of the exit.
- (3) If there is a smoke in the air, stay as low as possible to reduce inhalation exposure.
- (4) Move towards the refuge area and wait for further instructions. Do not panic.
- (5) Be aware of the others in danger and see if assistance can be sent to them.
- (6) Do not waste time in collecting personal materials, but exit the area as quickly as possible.

[Any 1 point, 1 mark]

(c) This picture is of snakebite.

Precautions to be taken:

- (1) Move the person beyond the striking distance of the snake.
- (2) Make the person lie down, keep him/her calm and at rest. Keep the person still so as to prevent the poison from spreading.
- (3) Cover the wound with a loose and clean bandage.
- (4) Remove shoes if the leg or foot is bitten.
- (5) Immediately take the affected person to the nearest hospital or medical centre.

[Any 1 point, 1 mark]

vii. Explain the concept of connecting links with two examples.

Ans.

- (a) Some plants and animals show some morphological characters by which they can be related to two different groups; hence they are called connecting links. Connecting links prove that organisms have evolved. [1]

Examples:

- (1) Duck-billed platypus lays eggs like reptiles, but shows relationship with mammals too due to the presence of mammary glands and hair.
- (2) Lungfish performs respiration with lungs (like amphibians), but it is a fish.
- (3) In *Peripatus*, characters like segmented body, thin cuticle, and parapodia-like organs are present as in annelids.

[Any two examples with explanation, 1 mark each]

viii. 1. Write two sources of lipids.

Ans. Sources of lipids are oil, butter, ghee. [1]

2. How much energy is obtained from lipids?

Ans. 9 kcal energy is obtained per gram of lipids. [1]

3. What is produced after digestion of lipids?

Ans. After digestion, lipids are converted into fatty acids and alcohol. [1]

Q.4. Solve the following questions. (Any one) [5]

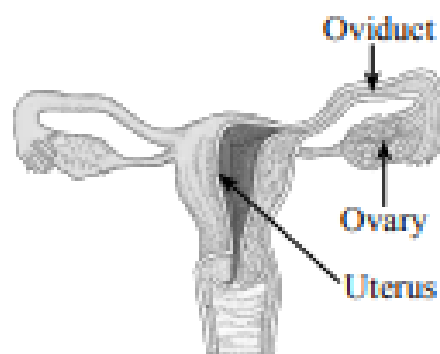
i. Draw a neat and labelled diagram of female reproductive system and give the functions of:

a. Oviduct

b. Ovary

c. Uterus

Ans.



[diagram + labels, 1 + 1 marks]

- a. Oviduct – carries the oocyte to the uterus.
- b. Ovary – produces oocytes and female hormones.
- c. Uterus – Growth and development of the foetus takes place in the uterus.

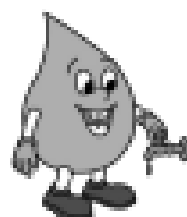
[1 mark for each function]

ii. Explain the meanings of the following symbols.

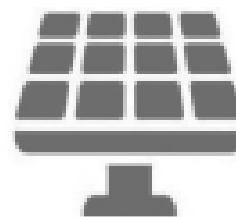
(A)



(B)



(C)



(D)



(E)



Ans.

- (A) This symbol indicates Reduce, Reuse, Recycle. This symbol is used on objects to indicate that they can be reused and recycled so as to avoid excessive use of natural resources.
- (B) This symbol is for 'Save water' symbol. This symbol is used to indicate - save water, preserve water and avoid wastage of water.
- (C) This is a symbol of a solar panels. It highlights the use of renewable and non-polluting source of energy, such as solar energy.
- (D) This symbol signifies Green energy and use of electricity produced from renewable and environment-friendly sources of energy.
- (D) This is a bicycle symbol. It means save fuel and avoid air pollution.

[1 mark each]