

Solution

SCIENCE-2

Class 10 - Science & Technology - II

1. (i) Write the correct alternative:

i. **(a)** Metaphase

Explanation:

Metaphase

ii. **(c)** Eagle

Explanation:

Eagle

iii. **(c)** Mammalia

Explanation:

Mammalia

iv. **(d)** Pseudomonas

Explanation:

Pseudomonas

v. **(d)** Leakage of toxic gases

Explanation:

Leakage of toxic gases

(ii) Answer the following questions as per the given instructions:

i. War

ii. **(a)** True

Explanation:

True

iii. Bat belongs to class Mammalia.

iv. Coal is used as fuel in thermal power plant.

v. Full form of WHO is World Health Organisation.

2. (i) Give scientific reasons. (Any 2)

i. i. Respiration is an energy yielding process and takes place by the oxidation of foodstuffs.

ii. Higher plants and animals require oxygen in order to respire aerobically.

iii. However, in conditions where oxygen is depleted, these organisms perform anaerobic respiration to obtain energy.

iv. Glucose is incompletely oxidized and a comparatively lesser amount of energy is obtained through anaerobic respiration.

Therefore, sometimes, higher plants and animals too perform anaerobic respiration.

ii. i. Large amount of energy is generated in a matter of seconds in a fission reaction. If the fission reaction is not controlled, it can prove fatal.

ii. Uncontrolled fission reaction may lead to the emission of harmful radiations.

iii. It can also lead to the meltdown of the nuclear power plant.

Thus, it is absolutely necessary to control the fission reaction in nuclear power plants.

iii. i. Androecium is a male reproductive whorl of a flower and its members are called as stamens.

ii. Gynoecium is a female reproductive whorl of a flower and its members are called as carpel.

iii. Stamen gives rise to male gametes.

iv. Stigma becomes sticky during pollination.

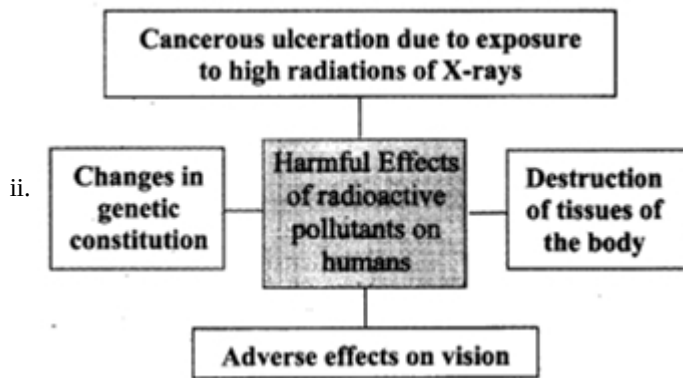
v. Fertilization takes place by fusion of male and female gamete.

Thus, A flower is the structural unit of sexual reproduction in plants.

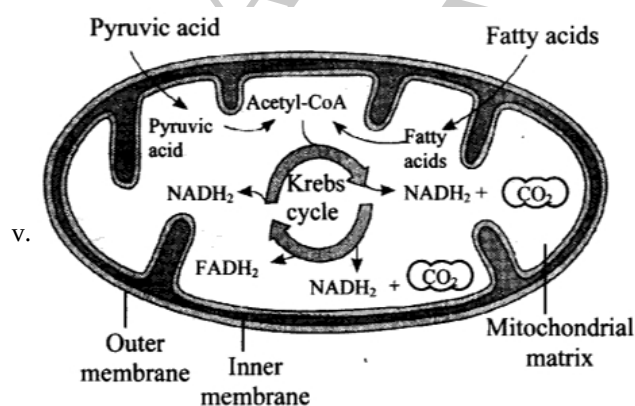
(ii) Answer the following questions (Any 3)

i. Objections raised against Darwin's theory of natural selection:

- a. Natural selection is not the only factor responsible for evolution.
- b. In his theory, Darwin did not explain the inheritance of useful and useless modifications.
- c. No explanation regarding slow and abrupt changes was provided in this theory.



- iii.
 - i. Childless couples can have a child with the help of advance medical techniques like surrogacy, sperm bank and IVF.
 - ii. Women having problems with implantation of the embryo in the uterus can have a child with the help of surrogacy technique. In this technique, oocyte is collected from the concerned woman and fertilized in a test tube with the help of sperms collected from her husband. Embryo formed from fertilization is implanted in another woman (surrogate mother), having a normal uterus.
 - iii. In sperm banks, semen is collected from the sperm donors after their physical and medical checkup and stored. Semen sample from the sperm bank is used to fertilize the oocyte of the female partner of the concerned couple. The resultant embryo is implanted in the uterus of the same woman. Couples, in which males have problems in sperm production, can have a child with the help of this technique.
 - iv. Childless couples having problems like less sperm count, obstacles in oviduct, etc., can use IVF technique. In this technique, fertilization is brought about in the test tube and the embryo formed is implanted in the woman's uterus at an appropriate time.
- iv. The advantages of animal classification are as follows:
 - i. Classification facilitates the identification of animals with great accuracy.
 - ii. The study of animals becomes convenient.
 - iii. It helps in understanding the relationship of animals with other living organisms.
 - iv. It helps to understand the habitat of each animal along with its role in nature.
 - v. By studying few animals from a group, we can gain a better understanding about the entire group.
 - vi. It helps in understanding different adaptations shown by animals.
 - vii. It gives an idea about evolution of animals.



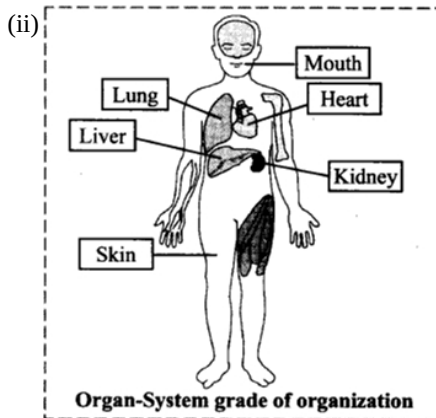
Mitochondrion and Krebs cycle

3. Answer the following questions (Any 5):

(i) Factors affecting the environment:

- i. The factors affecting the environment are natural and artificial factors.
- ii. When natural or artificial factors affect the environment, they create an imbalance in the ecosystem and can affect the existence of biotic factors in the environment.
- iii. Natural factors such as earthquakes, volcanoes, droughts, etc. can adversely affect the environment.

- iv. Also, artificial or man-made factors like environmental pollution caused due to population explosion, fast industrialization, and indiscriminate use of natural resources, deforestation and unplanned urbanization can harm the environment.
- v. Biotic and abiotic factors are related to each other in an ecosystem, and if any of the factors is changed or removed, it can affect the entire ecosystem and further affect the environment.



- (iii)
 - i. Milk is used to produce cheese. In cheese production, microbes like *Lactobacillus lactis* and *Streptococcus thermophilus* are mixed with milk.
 - ii. Enzyme rennet obtained from alimentary canal of cattle used traditionally in the production of cheese.
 - iii. An enzyme protease obtained from fungi is used to produce vegetarian cheese.
- (iv)
 - i. The process shown in diagram is stem cell therapy.
 - ii. Stem cells can be transformed into other types of cells. The organs generated using stem cells can be used for organ transplantation.
 - iii. Stem cells may develop into neurons, brain, intestines, liver, heart and bone.
- (v) The characteristics of reptilia are:
 - i. They are poikilothermic (cold-blooded) animals.
 - ii. They locomote by creeping, as their body cannot be lifted up.
 - iii. Digits are provided with claws.
 - iv. Their skin is dry and scaly.
 - v. Neck is present between the head and trunk.
 - vi. External ear is absent.

[Any three characteristics]
- (vi)
 - i. The given figure shows the process of waste disposal in modern landfill site.
 - ii.
 - a. In this method of waste disposal, large pits are dug in an open area.
 - b. These pits are lined with plastic sheets to prevent soil pollution caused by leaching of toxic and harmful substances into the soil.
 - c. The compressed degradable waste is dumped into the pit and covered with layers of soil, sawdust, leafy waste, specific biochemicals and sometimes the bioreactors are mixed for better aeration. This completely filled pit is sealed with soil slurry.
 - d. Microbes present in soil and other layers decompose the waste. As a result, best quality compost is obtained after few days which can be removed and such sites can be reused.
- (vii) Some of the main objections raised against Darwin's theory of natural selection are as follows:
 - i. Natural selection is not the only factor responsible for evolution.
 - ii. In his theory, Darwin did not explain the inheritance of useful and useless modifications.
 - iii. No explanation regarding slow and abrupt changes was provided in this theory.
- (viii)
 - i. With respect to point *B*, potential energy of half of the water in dam can be converted into electrical energy.
 - ii. As height increases, potential energy increases. Thus, at point *A*, potential energy of water will be maximum. If a canal/penstock carrying water from dam starts at point *A*, this maximum potential energy will be converted into kinetic energy, due to which turbines will rotate with more speed. Thus, more electrical energy will be generated.
 - iii. As height decreases, potential energy decreases. Thus, at point *C*, potential energy of water will be minimum. If a canal/penstock carrying water from dam starts at point *C*, this minimum potential energy will be converted into kinetic energy, due to which turbines will rotate with less speed. Thus, less electrical energy will be generated.

4. Answer any one of the following questions:

- (i)
 - i. The tissues of degenerating endometrium along with unfertilized ovum and blood are discarded out through vagina. This bleeding continues approximately for 4-5 days. This period is known as period of menstruation.
 - ii. Ovulation usually occurs on 14th day of menstrual cycle.
 - iii. Reproductive organ that undergo changes during menstrual cycle: Uterus.
 - iv. Period of regeneration of endometrium: After the period of menstruation, i.e., on 5 th day of menstrual cycle.
 - v. Period of secretions of glands in endometrium: It is the phase between ovulation and beginning of the next menses. This phase is the longest phase. It lasts for 14 days i.e., from 15th to 28th day of the cycle.
- (ii) I would like to play the role in spreading awareness about the conservation of environment. By spreading awareness we can change the mind set and approach of people towards environment.
 - i. Prevention
 - a. I will try to prevent possible harms to environment
 - b. I will not use plastics to prevent pollution caused by it.
 - ii. Control
 - a. I will use water and other natural resources in only limited required quantity.
 - b. I will stop the harmful activities like throwing garbage on road or public places.
 - iii. Production
 - a. I will work for revival of environmental factors.
 - b. I will try to develop projects for conservation of special species.
 - iv. Awareness
I will spread awareness through education, guidance, participation in various activities.
 - v. Conservation
 - a. I will help in conserving the available resources.
 - b. I will protect plants and animals in my locality.

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