

**Solution**

**SCIENCE-1**

**Class 10 - Science & Technology - II**

1. (i) Write the correct alternative:

i. **(b)** metaphase

**Explanation:**

metaphase

ii. **(d)** Radioactive

**Explanation:**

Radioactive

iii. **(c)** Mammalia

**Explanation:**

Mammalia

iv. **(b)** Heart

**Explanation:**

Heart

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. The given picture represents: Laughter Club

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

i. i. Cell division is the property due to which a new organism (unicellular) is formed from an existing one.

ii. In case of multicellular organisms, the growth of the organisms is dependent on cell division.

iii. It is also essential for restoration of emaciated body.

iv. Cell division is an important aspect of wound healing, formation of blood cells, and other such important life processes.

Hence, cell division is one of the important properties of cells and organisms.

ii. i. The sources of energy which are being produced continuously in nature and are inexhaustible, i.e., they are always available for use are called renewable sources of energy.

ii. Hydroelectric energy, solar energy, wind energy are produced from energy sources like water, sunlight and wind respectively that are produced continuously in nature and will not get depleted.

Thus, hydroelectric energy, solar energy and wind energy are called renewable energies.

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. i. Vestigial organs are degenerated or underdeveloped useless organs of organisms.

- ii. Appendix, muscle of the ear pinna, tail-bone (coccyx), body hairs, nictitating membrane (third eyelid) and wisdom tooth are the vestigial organs in human body. (Write any two names)
- ii. i. The forest protected or conserved in the name of God (on religious grounds) and considered to be sacred is known as sacred grove or Devrai.
  - ii. Sacred groves are in fact sanctuaries conserved by the society and not by the government forest department.
  - iii. It has special protection, as it has been conserved due to special religious importance.
  - iv. Sacred groves are present not only in Western Ghats of India but in the entire country.
- 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. i. Balanoglossus belongs to phylum Hemichordata.
  - ii. It possesses certain characteristics of both Chordates and Non-chordates.
  - iii. Absence of vertebral column or spinal cord and a worm-like body are the Non-chordate like characteristics seen in Balanoglossus.
  - iv. Presence of notochord, pharyngeal gill slits are some Chordate-like characters seen in Balanoglossus.

Hence, Balanoglossus is considered as a connecting link between Non-chordates and Chordates.
- v. Vitamins:
  - i. Vitamins are a group of heterogenous compounds which are essential for the proper operation of various life processes.
  - ii. The two types of vitamins are fat-soluble vitamins and water-soluble vitamins.

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.

(ii) i. The animals shown in the figure belong to Class Amphibia.

ii. Characteristics of class amphibia are as follows:

- a. Larvae of amphibians are strictly aquatic and perform aquatic respiration only. Adults can perform aquatic as well as aerial respiration.
- b. Exoskeleton is absent and skin is usually kept moist for respiration.
- c. They have two pairs of appendages and their digits are without claws.
- d. Neck is absent. Eyes are prominent with eyelids. External ear is absent, but tympanum is present.

[Any two characteristics]

(iii) Fuels obtained from biomass:

- i. Fuels can be obtained from biomass like plants and animals or municipal waste. These fuels are known as biomass fuels.

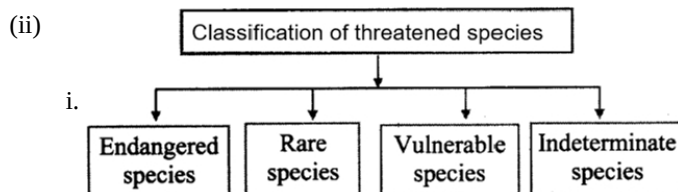
- ii. Biomass fuels may include biogas, ethanol, biodiesel, etc that are obtained by degradation of animal dung or municipal waste.
  - iii. Biomass like forest residues, crop residues, etc., can also be used for burning as fuel.
- (iv) i. The process shown in diagram is stem cell therapy.
- ii. Stem 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) Starfish can regenerate its broken body part.

Explanation:

- a. Regeneration is the natural process of replacing or restoring damaged or missing cells, tissues, organs, or even entire body parts of organisms.
  - b. Starfish belongs to the phylum Echinodermata, whereas the cockroach belongs to the phylum Arthropoda, and the frog and sparrow belong to the phylum Chordata.
  - c. Most of the organisms belonging to the phylum Echinodermata have good ability of regeneration.
- (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) i. Vestigial organs are degenerated or underdeveloped useless organs of organisms.
- ii. Vestigial organ in the human body include tailbone (coccyx), body hair, wisdom tooth, etc.
- [Any two]
- iii. Vestigial organs in humans that are functional in other animals are appendix and muscle of ear pinna.
    - a. **Appendix:** It is useful and fully functional in ruminants.
    - b. **Muscle of the ear pinna:** It is useful in monkeys.
- (viii) i. The energy generated from the power plant is electrical energy.
- ii. Natural gas is the source of the power plant.
  - iii. Power generation from natural gas is more eco-friendly than power generation from coal. As natural gas does not contain sulphur, burning of natural gas results in less pollution and is thus more eco-friendly.

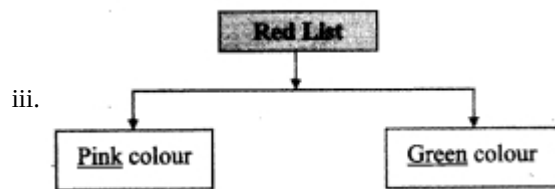
4. Answer any one of the following questions:

- (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 undergoes 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. Biodiversity can be conserved by following ways:
  - a. Conservation of all plants and animals.
  - b. Protection of rare species of organisms.
  - c. Projects for conservation of special species.
  - d. Establishment of national parks and sanctuaries.
  - e. Declaration of some regions as bioserves.

- f. Maintenance of records of traditional knowledge.
- g. Obey the rules that fall under Biodiversity Act.



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