# SCIENCE & TECHNOLOGY (PART 2)

## SOLUTION : PRACTICE ACTIVITY SHEET 3

**Q. 1. (A)**

(i) (C)

(ii) (C)

(iii) (B)

(iv) (D)

(v) (C).

**Q. 1. (B)**

(i) (1) Headache (2) Vision problems (3) Joint pains. *(Any two)*

(ii) Viral infection

(iii) Ketchup

(iv) False

(v) (1) Polysaccharides (2) glycolipids.

**Q. 2. (A)**

**(i)** When there is a disaster, we need to immediately help the victim. Till the medical help arrives, one should be in a position to treat the injured and save his or her life. In such cases, knowing firstaid is essential. Such kind of a need may arise in case of our parents, our siblings at home or with friends in school. Those who are injured should be treated at once. If we know about techniques of first aid, we can save such person before the medical help arrives. Therefore, it is essential to get the training of the first aid.

**(ii)** (1) Due to accidents or illness, some of the vital organs may get damaged and may not work to fullest capacity.

(2) In such cases, if organ transplantation is done, it will be very helpful for that needy patient.

(3) The dead person's organs can be used for organ transplantation and a life can be saved.

(4) Many government and social organizations are spreading awareness about such donations. Therefore, gradually the awareness about organ transplantation is increasing.

**(iii)** (1) Nuclear fission reaction is a type of chain reaction.

(2) In nuclear power plants these reactions are closely controlled.

(3) If these reactions are not managed properly, there can be more production of neutrons in an uncontrolled way.

(4) Each released neutron further causes fission of 3 Uranium (U-235) atoms, such uncontrolled reactions can cause hazardous accidents, hence it is absolutely necessary to control the fission reaction in nuclear power plants.

**Q. 2. (B)**

**(i)** (1) Fire : First and foremost is to save ourselves from fire. Then one can help others in rescue operations. Help others to extinguish fire. Call the fire department for immediate action.

(2) Snake bite : The tourniquet should be tied in the region above the snake bite. The wound should be made near the bite-wound so that the blood will ooze out and some venom can automatically flow out. The victim should be rushed to a qualified doctor for an injection of antivenin.

**(ii)** (1) Consuming liquor becomes an addiction for a long-term. Due to alcohol, the efficiency of nervous system and especially the brain is affected.

(2) Other vital organs such as kidneys and liver are adversely affected.

(3) Lifespan of an alcoholic decreases due to constant drinking and malnourishment.

(4) Especially in adolescent age if alcohol is consumed the brain functioning does not take place properly. The mental ability of memorization and learning becomes slow. There is lack of concentration in studies.

(5) The alcoholic person lacks the rational thinking and hence faces with social, mental and familial problems along with physical illness.

**(iii)** (1) Pesticides are toxic chemicals. By using them indiscriminately, they contaminate the water, soil and also crops.

(2) The D.D.T., chloropyriphos and malathion are very dangerous. They spread through the food chain causing biomagnification.

(3) Therefore, we shall not use such insecticides and pesticides. We shall use organic pesticides. Excessive use will be avoided.

(4) At the time of spraying, nose, eyes and skin will be covered and protected.

(5) Care will be taken not to allow children or domestic animals to come in contact with a pesticide.

**(iv)** (1) Fossil fuels like petrol, diesel or natural gas when burnt, emit toxic gases and soot particles. Thus, fossil fuels cause air pollution.

(2) Burning of fossil fuels cause increased levels of carbon dioxide, carbon monoxide and nitrogen dioxide. The increased carbon dioxide emission results in global warming. Nitrogen oxide results later in acid-rain.

(3) Soot particles generated through burning of fuels cause respiratory problems like asthma.

(4) Moreover, the fossil fuels are non-renewable and exhaustible fuels. They have to be explored from the deeper layers of the earth causing lots of environmental

problems. Green energy is sustainable, renewable and abundant. It never creates any environmental problems and is non-polluting.

Thus, energy obtained from fossil fuels is not at all a green energy.

**(v)**

| Binary fission | Multiple fission |
|---|---|
| (1) Two new individuals are formed from one old individual at one time. | (1) Many new individuals are formed from one old individual at one time. |
| (2) The division of nucleus and cytoplasm takes place initially. | (2) Only nucleus divides initially followed by division of cytoplasm. |
| (3) The axis of division can be transverse, longitudinal or any one axis as it is in simple binary fission. | (3) There is no exact axis for the fission. |
| (4) Formation of protective cyst does not take place. | (4) Protective covering is formed around dividing amoebulae which is called cyst. |
| (5) Binary fission can be done during favourable period. | (5) Multiple fission takes place only at the time of unfavourable period. |

***(Note : Any 2 points are expected.)***

**Q. 3.** **(i)** (1) The boy taking his lunch is shown in the picture 1. He is busy with his mobile while having his food. His nutrition may get affected due to such behaviour.

(2) In picture 2, addictions such as alcoholism, drug abuse and smoking are shown. Cigarette contains carcinogenic nicotine. Smoking, drug or alcoholism are addictions. The picture shows to stay away from addictions.

(3) In picture 3, a person is shown who may be suffering from mental problems. He is under severe depression and frustration. He should be helped for his mental health through doctors, counsellors, his family or friends.

**(ii)**

| Substance obtained by microbial processing | Roles |
|---|---|
| (1) Citric acid | – To impart acidity |
| (2) Ascorbic acid | – Antioxidants, vitamins |
| (3) Beta carotene | – Edible colours |
| (4) Glycolipid | – Emulsifiers |
| (5) Vanillin | – Essence |
| (6) Xylitol | – Artificial sweetener (low caloric) |

**(iii)** (1) Coelom means body cavity. It is situated between the body wall and the internal organs of the body.

(2) The coelom is formed during early embryonic life in case of multicellular animals. It is formed from either mesoderm or gut.

(3) Coelom when present in the body, those animals are called eucoelomate. Phylum Annelida onwards are eucoelomate animals. They are animals with true body cavity.

(4) Those animals in which coelom is absent is called acoelomate animals. Porifera, Cnidaria and Platyhelminthes are acoelomate animals.

(5) When coelom is not formed from mesoderm or gut, but formed from other tissues, it is called pseudocoelom. Only Aschelminthes animals have such coelom and hence they are called pseudocoelomate.

**(iv)** (1) Asymmetrical body : In asymmetrical body, there is no imaginary axis that can pass through body and divide it into two equal halves, e.g. Amoeba.

(2) Radial symmetry : In this type of body, if imaginary cut passes through central axis, in any plane of body, then it can give two equal halves.

(3) Bilateral symmetry : In such type of symmetry, there is only one imaginary axis that can pass through the body dividing it into two equal halves.

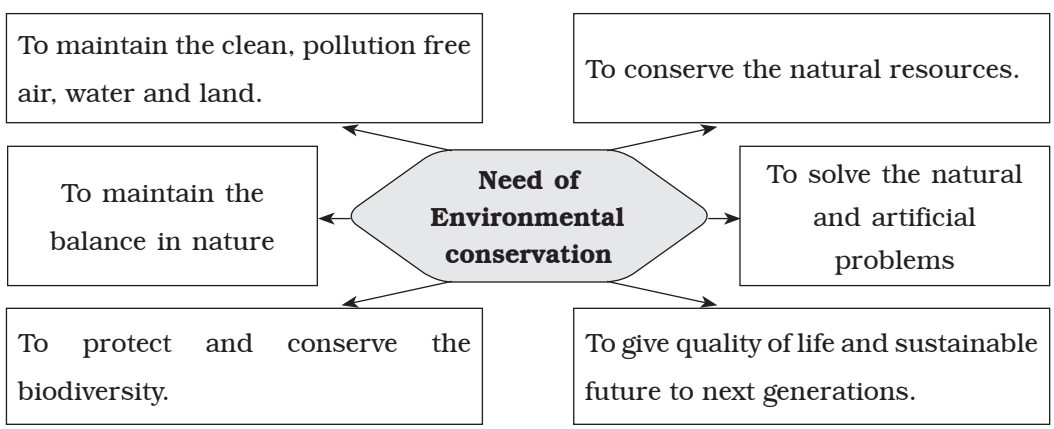
**(v)** Biodiversity is documented on the following three levels, viz. genetic diversity, species diversity and ecosystem diversity.

(1) Genetic Diversity : Diversity seen among the organisms of same species due to genetic differences is called genetic diversity. E.g. The individual human beings are different from each other. No two animals or plants are exactly alike.

(2) Species Diversity : The difference between the different species is the species diversity. e.g. All the species of plants, animals and microbes which are seen in any natural environment.

(3) Ecosystem Diversity : In one region there may be different ecosystems, such diversity in the ecosystems is called ecosystem diversity. Ecosystems are natural or artificial. Every region shows different types of ecosystems such as aquatic, terrestrial, desert or forest ecosystems. Each ecosystem has its own habitats with resident flora and fauna.

**(vi)**




**(vii)** (1) Carbohydrates are converted to glucose after the process of digestion is completed. The oxidation of glucose for releasing energy is called glycolysis which takes place in cytoplasm.

(2) Glycolysis can occur in presence of oxygen or without oxygen too. The first type of glycolysis takes place in aerobic respiration and the second type is in anaerobic respiration.

(3) In aerobic respiration, there is step-wise oxidation of glucose molecule forming two molecules each of pyruvic acid, ATP, $NADH_2$ and water.

(4) Later the pyruvic acid formed in this process is converted into molecules of Acetyl-Coenzyme-A along with two molecules of $NADH_2$ and two molecules of $CO_2$.

(5) During anaerobic respiration along with glycolysis there is fermentation too. This is incomplete oxidation of glucose and thus it results in formation of lesser energy.

(6) The process of glycolysis was discovered by Gustav Embden, Otto Meyerhof and Jacob Parnas. Therefore, in their honour, glycolysis is also called Embden-Meyerhof-Parnas pathway (EMP pathway). For the discovery they had performed experiments on muscles.

**(viii)**

| Mitosis | Meiosis |
|---|---|
| (1) In mitosis, the chromosome number does not change. Diploid cells remain diploid, without change. | (1) In meiosis, the chromosome number is reduced to half. The diploid cells become haploid. |
| (2) One cell gives rise to two daughter cells in mitosis. | (2) One cell gives rise to four daughter cells in meiosis. |
| (3) Karyokinesis of mitosis has four stages, viz. prophase, metaphase, anaphase and telophase. | (3) Meiosis has two major stages, viz. meiosis–I and meiosis–II. Each is further subdivided into prophase, metaphase, anaphase and telophase. |
| (4) Prophase of mitosis is not lengthy. | (4) Prophase of meiosis–I is very lengthy. |
| (5) Genetic recombination does not happen in mitosis as there is no crossing over. | (5) Genetic recombination takes place in homologous chromosomes as there is crossing over during prophase–I. |
| (6) Mitosis is essential for growth and development. | (6) Meiosis is essential for formation of gametes in sexual reproduction. |
| (7) Mitosis takes place both in somatic cells and germinal cells. | (7) Meiosis takes place in only germinal cells. It does not take place in somatic cells. |

***(Note : Any 3 points are expected.)***

**Q. 4. (i)** (1) Testis : Production of sperms and male hormone–testosterone.

(2) Scrotum : Protection and temperature control of testis.

(3) Seminal vesicles : Secretion of seminal fluid which forms major portion of semen. Nourishment of sperms.

(4) Uterus : Growth and development of foetus during pregnancy. Helping in parturition (childbirth) by contractions.

(5) Fallopian tubes : Transporting the released oocyte after ovulation to the uterus. Providing space for fertilization of oocyte by sperm. Conception is possible only when sperm and oocyte meet in the fallopian tube.

**(ii)** (1) Genes present in the form of DNA along with RNA control the structure and functioning of the body.

(2) The information of protein synthesis is stored in the DNA which is utilised as per the requirement of the body. Later the proteins are synthesised by DNA through the RNA.

(3) The sequence of nucleotides on DNA is copied on mRNA. The nucleotide sequence on mRNA is thus complementary to DNA.

(4) RNA has uracil instead of thymine which is present in DNA.

(5) Central dogma is the concept that proteins are synthesised by DNA through the RNA.

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