SCIENCE & TECHNOLOGY (PART 2)

SOLUTION : PRACTICE ACTIVITY SHEET 2

Q. 1. (A)

(i) (A)

(ii) (B)

(iii) (A)

(iv) (B)

(v) (C).

Q. 1. (B)

(i) Estrogen. Progesterone.

(ii) Salaam Mumbai Foundation – (b) Freedom from tobacco (d) Help to improve student's lifestyle.

(iii) False.

(iv) Climatic disaster

(v) Rifamycin.

Q. 2. (A)

(i) (1) These days children stay in nuclear families. Due to need for earning and also due to her career choices, mother of the house is also away for long period of time.

(2) The grandparents or other elders are not in the home. This makes the children alone in the house.

(3) At school and during studies, there is fierce competition. The modern technology like internet or mobile phones are luring the children away from their regular exercises or outdoor games.

(4) The wrong kind of peer pressure introduces addictive substances at the young age.

(5) There is insecurity in the outside world for the young children.

(6) These facts create emotional burden on the young minds and thus they suffer from mental stress.

(ii) (1) *Peripatus* shows segmented body, thin cuticle, and parapodia-like organs.

(2) These characters are typical of Annelids.

(3) Similarly, it also shows tracheal respiration and open circulatory system which is a characteristic feature of Arthropods. (4) Since *Peripatus* shares both these characters, it is said to be a connecting link between Annelida and Arthropoda.

(iii) (1) Disaster can strike any time. The sudden disasters can be man-made with some bad intentions or may be accidental.

(2) When natural calamity strikes suddenly with a huge impact, large scale devastation of property and general environmental degradation occurs along with substantial mortality of people and animals.

(3) Therefore, it is most appropriate to have the preparedness to reduce the impact of any future disasters.

(4) We cannot control the onset of the natural disaster, but we can definitely reduce the harsh effects of the disaster by following disaster management plan.

Q. 2. (B)

(i) (1) Smoking is injurious to health, it can cause cancer. This fact will be told to my friend's younger brother. Similarly, his parents will be conveyed the message about his smoking.

(2) We will explain him ill-effects of over use of cellphone. We will also tell him that paying attention towards proper nutrition is important. If he does not obey, we will take help of parents.

(ii) (1) Fragmentation in spirogyra

(2) Budding in hydra

(iii) The largely spread fire of the dry grass, shrubs and trees in the forest due to heightened temperatures is called forest fire. The effect of forest fire on the environment is greatly devastating. Biodiversity is lost. Plants and animals die due to fire. The vegetation becomes dead as the plants turn into ash. The atmosphere is full of smoke and hence causes air pollution.

(iv)

Source	Microbe	Amino acid
Sugar molasses and salt	*Aspergillus niger*	Citric acid
Molasses, corn steep liquor	*Lactobacillus delbrueckii*	Lactic acid
Corn steep liquor	*Aspergillus itaconius*	Itaconic acid

(v) Chemical energy in coal → Thermal energy → Kinetic energy in steam → Kinetic energy in turbine → Electrical energy

Q. 3. **(i)** (1) Biotechnology : Technology that brings about artificial genetic changes and hybridization in organisms for human welfare is called biotechnology.

(2) Biotechnology is very useful in improving the yield and variety of agricultural products.

(3) Commercial use of biotechnology : Production of hormones, interferons, antibiotics and different vaccines.

(ii) Cheese is made from cow's milk throughout the world. The steps in the process of cheese manufacture are as follows :

(1) Chemical and microbiological testing of milk is done.

(2) Three types of bacteria, viz. *Lactobacillus lactis, Lactobacillus cremoris* and *Streptococcus thermophilus* along with some colour is added to the milk.

(3) It imparts sourness to the milk and it is converted into yoghurt like substance.

(4) The water from this yoghurt, i.e. whey is not removed to make the yoghurt denser.

(5) Enzyme, rennet or protease is added to the mixture to make it more denser.

(6) Later cutting the solid yoghurt into pieces, washing, rubbing, salting, and mixing of essential microbes, pigments and flavours is done in suitable steps.

(7) The pressed cheese is then cut into pieces and stored for ripening.

(iii) Stem cells are used for following purposes :

(1) In regenerative therapy stem cells are used.

(2) In case of diseased conditions like diabetes, myocardial infarction, Alzheimer's disease, Parkinson's disease, etc. stem cells can be used to replace the damaged or functionless cells.

(3) In conditions such as anaemia, thalassaemia, leukaemia, etc. there is always the need of newer blood cells. Here, stem cells can be used to restore the number of blood cells.

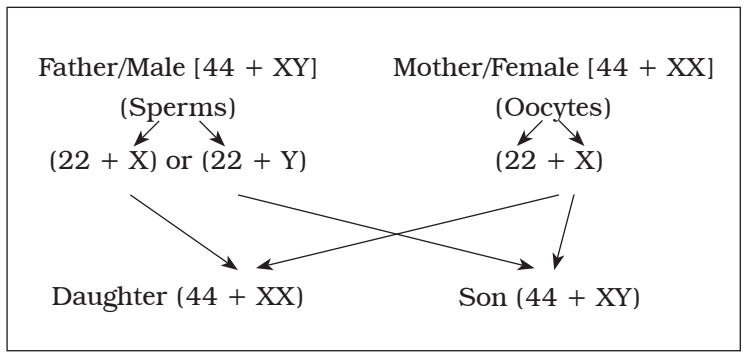
(4) In techniques of organ transplantation, stem cells can be used and they can help in the transplantation of new organs such as kidney and liver. The defective organs can be replaced by those that are produced with the help of stem cells and transplanted.

(iv) (1) Embryological evidences of evolution are shown in this picture.

(2) The similarities in the initial embryonic stages of different vertebrates shows that there was a common origin of all of them. Thus embryological evidences prove that there was common vertebrate ancestor.

(3) Palaentological evidence such as vestigial organs and connecting links are another examples of evolutionary evidence.

(v) (1) It is clearly seen from the diagram that there are two types of sperms produced by males. One sperm has a X chromosome while the other has a Y chromosome, apart from autosomes. The mother on the other hand has all X bearing oocytes. Thus the sperm that fertilizes the oocyte decides the sex of the child.



(2) If X bearing sperm fertilizes the oocyte, daughter is born and when Y bearing sperm fertilizes the oocyte, son is born.

(3) Thus father or male partner is responsible for the determination of the sex.

(vi)

Endangered Heritage Places of the Country	Threatened/endangered species of an animal	Reasons
Western ghat	Asian Lion	Mining industry
Manas sanctuary	Rhino	Dams and indiscriminate use of water
Sunderbans sanctuary	Tiger	Deforestation, excessive fishing

(vii) (1) The symbol (1) tells us to save electricity. If electricity is carefully used we can save our natural resources.

(2) The symbol (2) is for giving message "reduce, reuse and recycle'. This is an important mantra for the proper utilization of natural resources.

(3) The symbol (3) advocates the use of solar energy.

(viii) (1) The diagram shows electricity generated from natural gas.

(2) The energy is generated from natural gas.

(3) Power generation from natural gas is more eco-friendly. Natural gas does not contain sulphur and hence its burning does not cause major pollution by forming sulphur dioxide. The efficiency of power generation by natural gas is also high.

Q. 4. **(i)** (1) The specimen is octopus.

Kingdom : Animalia

Division : Non-chordata

Phylum : Mollusca

Example : Octopus

(2) The specimen is starfish.

Kingdom : Animalia

Division : Non-chordata

Phylum : Echinodermata

Example : Star fish

(3) The specimen is wall lizard.

Kingdom : Animalia

Phylum : Chordata

Sub Phylum : Vertebrata

Class : Reptilia

Example : Wall Lizard

(4) The specimen is Balanoglossus.

Kingdom : Animalia

Phylum : Hemichordata

Example : Balanoglossus

(5) The specimen is Bat.

Kingdom : Animalia

Phylum : Chordata

Class : Mammalia

Example : Bat

(ii) (1) First of all the dietary carbohydrates are digested in the digestive system with the help of various enzymes and converted into glucose. Similarly, proteins are converted into amino acids and fats are broken down into fatty acid and glycerol (alcohol).

(2) Oxidation of carbohydrates takes place during cellular respiration. Glucose is oxidized by three steps during aerobic respiration, viz. glycolysis, tricarboxylic acid cycle or Krebs cycle and electron transfer chain.

(3) From one molecule of glucose two molecules of each pyruvic acid, ATP, $NADH_2$ and water are formed during glycolysis. Pyruvic acid which is formed in this process is converted into Acetyl-Coenzyme-A along with release of two molecules each of $NADH_2$ and CO_2.

(4) In the next step, i.e. in TCA cycle, molecules of Acetyl-Co-A enter the mitochondria and a cyclic chain of reactions take place. Acetyl part of Acetyl-Co-A is completely oxidized through this cyclical process. The molecules CO_2, H_2O, $NADH_2$, $FADH_2$ are released in this process.

(5) In third step, i.e. in ETC reaction, $NADH_2$ and $FADH_2$ formed during first two steps are used for obtaining ATP molecules. 3 molecules of ATP are obtained from each $NADH_2$ molecule and 2 molecules of ATP from each $FADH_2$.

(6) Thus, one molecule of glucose upon complete oxidation in presence of oxygen yields 38 molecules of ATP. This is how from carbohydrates, energy is obtained.

(7) If carbohydrates are insufficient in diet, then proteins or lipids are used for energy production. Fatty acids derived from fats and amino acids derived from proteins are converted into Acetyl-Co-A. Acetyl-Co-A once again can yield energy through TCA cycle.