

SCIENCE & TECHNOLOGY (PART 2)

SCIENCE & TECHNOLOGY (PART 2) **BOARD'S ACTIVITY SHEET (MARCH 2021)**

Time : 2 Hours]

[Total Marks : 40

[**NOTE** : This examination was not conducted due to Covid-19.]

SCIENCE & TECHNOLOGY (PART 2)
BOARD'S ACTIVITY SHEET (SEPTEMBER 2021)

(With Full Solution)

Time : 2 Hours]

[Total Marks : 40

Note : (i) All questions are compulsory.

(ii) Start every main question on a new page.

(iii) The numbers to the right of the questions indicate full marks.

(iv) In case of MCQs (Q. No. 1(A)) only the first attempt will be evaluated and will be given credit.

(v) For each MCQ, the correct alternative (A), (B), (C) or (D) with subquestion number is to be written as an answer.

For Eg. : (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) All chromosomes are arranged parallel to equatorial plane of cell in of mitosis.

(A) Prophase

(B) Metaphase

(C) Anaphase

(D) Telophase

(ii) In thermal power plants, the energy in the coal is converted into electrical energy through several steps.

(A) Solar

(B) Nuclear

(C) Thermal

(D) Chemical

(iii) Genetically modified crop has capacity to destroy bollworms.

(A) BT brinjal

(B) Golden rice

(C) BT cotton

(D) Maize

(iv) The disease related with the synthesis of insulin is

(A) Cancer

(B) Diabetes

(C) Viral infection

(D) Dwarfness

(v) helps to improve concentration in the studies.

(A) Meditation

(B) Music

(C) Dancing

(D) Laughing

Q. 1. (B) Answer the following :

5

- (i) Write the correlation :
Wisdom teeth : Vestigial organ :: Lungfish :
- (ii) Find odd one out :
Progesterone, estrogen, melanin, testosterone.
- (iii) State True or False :
In thermal power plants, the turbines work on solar energy.
- (iv) I have chitinous exoskeleton, I have three pairs of walking appendages,
what phylum do I belong to?
- (v) Write any two examples of man-made disaster.

Q. 2. (A) Give scientific reasons : (Any two)

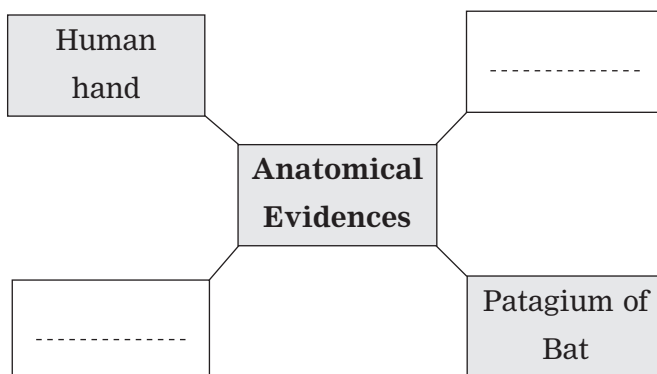
4

- (i) Cell division in one of the important properties of cells and organisms.
- (ii) Girls are facing the problem of stress due to gender inequality.
- (iii) Our body gets irritated when it comes in contact with jellyfish.

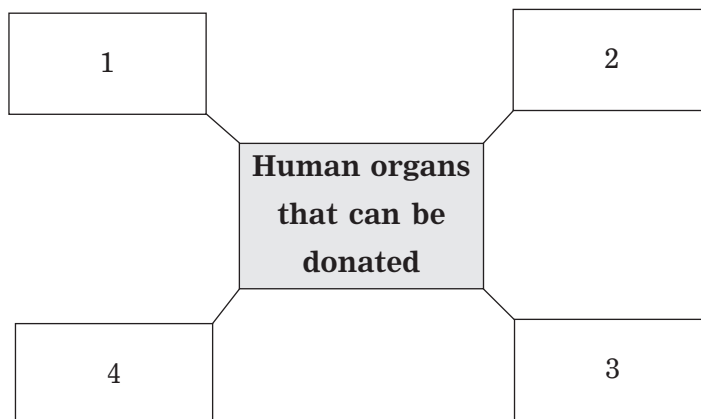
Q. 2. (B) Answer the following : (Any three)

6

- (i) Complete the following chart :

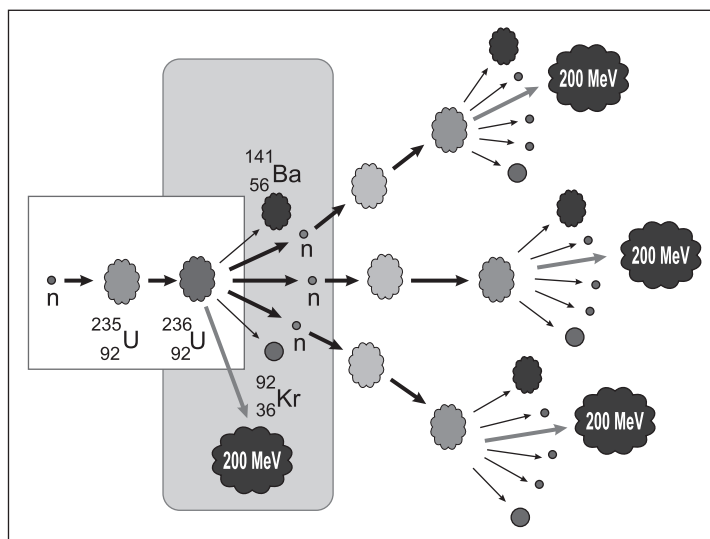


- (ii) Explain any two types of threatened species.
- (iii) Complete the following conceptual picture :



- (iv) Explain the concept of Bioinsecticides.
- (v) What is mock drill? Give an example.

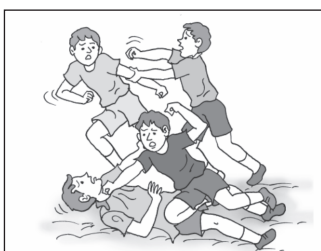
(i) Observe the given figure and answer the questions :



- (a) Which reaction is in this figure?
 - (b) Where is this process used?
 - (c) Which element is used in this reaction?
- (ii) What will you do?
- (a) Your friend's younger brother has started smoking.
 - (b) Your maid's husband has started drinking and beating her.
 - (c) Your younger brother plays games on cellphone while eating.
- (iii) What are fossils? Write their importance. Write the name of the method used to determine age of fossils.
- (iv) Name the largest phylum in animal kingdom. Write any *two* characters of that phylum.
- (v) Why is it necessary to ban the use of plastic bags?
- (vi) Which precautions will you take during spraying of pesticides?
- (vii) The following are some pictures of disasters. Which preliminary actions you will take during those disasters?



(a)



(b)



(c)

(viii) Distinguish between mitosis and meiosis. (3 points)

- (i) With the help of a neat labelled diagram, explain any *three* functions of parts of a flower.
 - (ii) Which are *three* endangered heritage places of India? Explain with reasons. Suggest any *two* measures for their protection.
-

SOLUTION : BOARD'S ACTIVITY SHEET (SEPTEMBER 2021)

Q. 1. (A)

- (i) (B)
- (ii) (D)
- (iii) (C)
- (iv) (B)
- (v) (A)

Q. 1. (B)

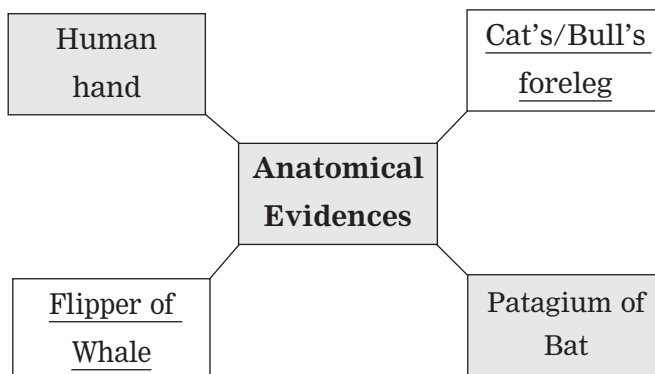
- (i) Wisdom teeth : vestigial organ : : Lungfish : Connecting link
- (ii) Melanin. (All the others are hormones concerned with reproductive functions of male and female.)
- (iii) False
- (iv) Phylum : Arthropoda, class : Insecta
- (v) War, Bomb explosion

Q. 2. (A)

- (i) (1) Cell division is very essential for all the living organisms.
(2) The growth and development is possible only due to cell division.
(3) The emaciated body can be restored only through the cell division which adds new cells.
(4) Offspring is produced only through the cell division that take place in parents.
(5) In asexual reproduction, mitosis helps to give rise to new generation.
(6) In sexual reproduction, meiosis helps to form haploid gametes.
(7) All such functions show that cell division is one of the important properties of cells and organisms.
- (ii) (1) In most of the households there are many bindings on girls and excessive freedom for boys.
(2) Boys do not participate in the domestic duties whereas girls have compulsion for the same.
(3) In society too, girls have to face the problems like teasing and molestation.
(4) This creates insecurity among the minds of girls.
(5) The social change has made women independent and equal but still the male dominated society and the gender inequality persists causing more stress for young girls.
- (iii) (1) Jellyfish is a coelenterate that has cnidoblasts bearing tentacles.
(2) These cnidoblasts inject toxins to paralyse the prey at the time of feeding.
(3) When jellyfish comes in contact with our body, this toxin is released causing reaction to our skin.
(4) Therefore, our body gets irritation when we come in contact with jellyfish.

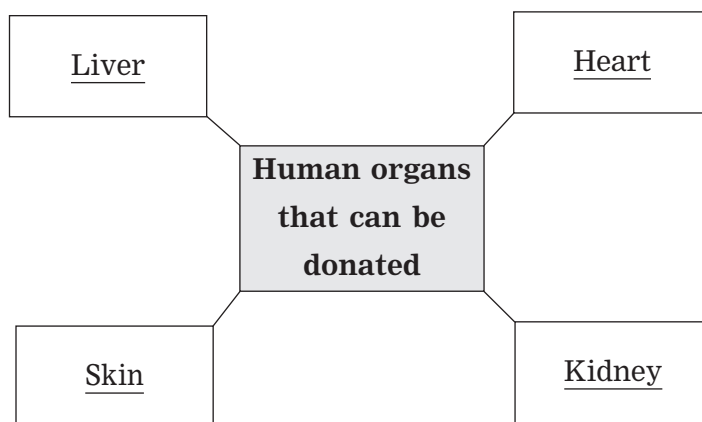
Q. 2. (B)

(i)



- (ii)** (1) Threatened species are of four main types i.e. endangered species, rare species, vulnerable species and indeterminate species.
- (2) **Endangered species** : Number of organisms belonging to such type of species is declining and habitat is shrinking at great speed. If conservative measures are not implemented, such species will be extinct in near future. E. g. Lesser florican.
- (3) **Rare species** : Number of organisms belonging to this type is considerably declined. Their organisms are endemic and also on the verge of extinction. e.g. Red Panda.

(iii)



- (iv)** (1) Bioinsecticides are chemicals that are obtained from bacterial, viral and fungal toxins.
- (2) Such toxins are incorporated into plants through biotechnological methods.
- (3) These toxins are harmful for pest species, therefore insects and other pest do not feed on such plants.
- (v)** (1) Mock drill is the practice to check whether there is preparedness for dealing with the sudden attack of disaster.
- (2) For this purpose, virtual or apparent situations that simulate the disaster are created.

- (3) The reaction time for any type of disaster is checked by such activity. In the presence of trained personnel, the execution of the rescue plans are observed.
- (4) People also understand their responsibilities at the time of actual disaster.
- (5) The experts also check execution of plan designed for disaster redressal.
- (6) By such mock drills, the efficacy of the system can be understood. In future, when actual calamity strikes, there is already preparation for disaster redressal. Therefore, mock drill is useful.
- (7) E.g. In case of possible fire, the school can have mock drill with the help of fire fighters.

Q. 3.

- (i) (a) The reaction shown in nuclear fission or chain reaction.
 (b) This reaction is used in nuclear power plants where electricity is generated.
 (c) Uranium-235 is used in the nuclear fission reactions.
- (ii) (a) 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.
 (b) We shall try to tell maid's husband about the ill-effects of alcoholism and will help him for de-addiction. We also ask maid to be self-reliant and able to protect herself. In order to stop social, mental and societal problems, help of police can also be taken.
 (c) 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.
- (iii) (1) Fossils offer palaeontological evidence for the evolutionary process.
 (2) Due to some natural calamities the organisms get buried during ancient times.
 (3) The impressions and remnants of such organisms remain preserved underground. The hot lava also traps some organisms or their impressions. All such formations form fossils.
 (4) Study of fossils help the researcher to understand the characteristics of the organisms that existed in the past.
 (5) Carbon dating method helps in finding out exact age of the fossil. According to the structure of earth's crust the fossils are obtained at specific depths.
 (6) The oldest ones are obtained at the depth while the relatively recent ones occupy the upper surface. Thus fossils of invertebrates were seen in very old Palaeozoic era. Later were seen fossils of Pisces, Amphibia and Reptilia.

The Mesozoic era was dominated by reptiles while Coenozoic era showed presence of mammals.

(7) In this way, study of fossils unfold the evolutionary secrets.

(iv) (1) Arthropoda is the largest phylum in animal kingdom.

(2) **Characteristics of Arthropoda :**

(1) Eucoelomate, triploblastic bilaterally symmetrical and segmented body.

(2) Body covered over by chitinous exoskeleton. Jointed appendages present.

(v) Plastic is a non-biodegradable substance. It cannot be degraded back into its original constituents. It remains just like that for many hundreds of years. It causes solid waste pollution in any environment wherever it is thrown indiscriminately. If burnt, it releases very toxic gases. If dumped in landfills it obstructs the other decomposition processes.

If thrown in water bodies, it causes harm to aquatic life. Cattle graze on plastic unknowingly and are killed by it as it clogs inside their alimentary canal. The gutters and rain water drains get clogged due to plastic bags and this causes cities to submerge in water during heavy rains. Nowadays, the fishermen get more than half of plastic if they cast their net in the sea. People use the plastic bags indiscriminately without any thought towards their environmental impact. There are better alternatives for plastic bags such as cloth bags which can be reused again and again. Therefore, it is absolutely necessary to ban the use of plastic bag.

(vi) (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.

(vii) In the pictures given, following disasters are shown :

(a) There is gas leakage from the LPG cylinder.

(b) Two groups of children are fighting with each other.

(c) There is heavy downpour due to cloud bursting which has led to waterlogging in the town.

Disaster	Preliminary actions taken during disasters
(a) Gas leakage	If the gas is already leaked in the house, we shall move out immediately along with pets if any.
(b) Fight between the two groups	If the fight is taking place, we shall try to separate the two. We shall check-up if anyone is injured. If injured, we shall give him first aid. We will also counsel them that they should not fight like this.
(c) Downpour due to cloud bursting	By heavy rains, the transportation comes to halt. The water enters the houses in low lying areas. We shall help the people to deal with this disaster. Help can be given for draining the water. Municipal bodies open the storm water drains in such cases. With the help of elders, we shall spread the message of warning in such places. We will not play in the clogged water, but will help the people who are in need.

(viii) Distinguish between Mitosis and Meiosis

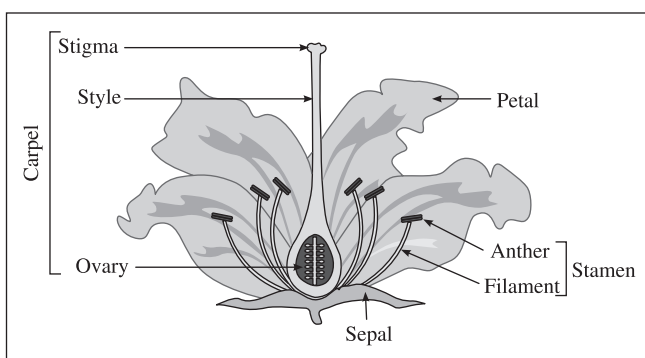
Mitosis	Meiosis
1. In mitosis the chromosome number does not change. Diploid cells remain diploid, without change.	1. In meiosis, the chromosome number is reduced to half. The diploid cells become haploid.
2. One cell gives rise to two daughter cells in mitosis.	2. One cell gives rise to four daughter 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 : Students should write the required points according to the marks allotted for question.)

Q. 4.

(i)



L.S. of a flower showing different parts

- (1) The structural unit of sexual reproduction in plants is flower. There are total four floral whorls. Of these two are accessory floral whorls while two are essential floral whorls.
- (2) Calyx and corolla are accessory whorls. They are protective in nature.
- (3) Members of calyx are known as sepals. They are usually green in colour. They protect the inner whorls.
- (4) The members of corolla are called petals. They can be of different colours.
- (5) Androecium and gynoecium are essential whorls as they participate in sexual reproduction.
- (6) The male whorl androecium is made up of stamens. Each stamen has a filament with anther located at the upper end. In the anther there are four locules. Inside the locules the meiosis takes place forming pollen grains. During suitable time, the pollen grains are released from anther lobes.
- (7) Gynoecium is made up of carpels, either in separate form or are united. Each carpel is formed of ovary at the basal end, hollow 'style' and the stigma at the tip of style. There are one or many ovules inside the ovary.
- (8) In bisexual flowers both androecium and gynoecium are located in the same flower. e.g. Hibiscus.
- (9) In unisexual flowers, androecium is present in male flowers and gynoecium is present in the female flowers. e.g. Papaya.

- (ii) (1) Three endangered heritage places of India are as follows : (a) Western Ghats (b) Manas sanctuary – Assam (c) Sunderban sanctuary – West Bengal.
- (2) In Western Ghats, mining industry and exploration for natural gas is taking place. Due to many development projects this place has become endangered. Asiatic lion and wild bison are under threat due to disturbed habitats in this region.
- (3) In Manas sanctuary, there is construction of dams and indiscriminate use of water. Rhinoceros and tigers are endangered in this area.
- (4) In Sunderban, the environment is threatened due to dams, deforestation, excessive fishing, trenches dug for fishing, etc. In addition to this, there is sea level rise in this area due to global warming causing threat for tigers.
- (5) **Measures :** (i) To curtail the developmental projects, environmental impact assessment should be done before taking up such projects.
(ii) Afforestation and stopping destruction of environment.
-

* * *