

Q.1. (A) Choose the correct option.

[5]

- i. d. Water reservoir possesses **potential** energy.
- ii. c. In mitotic division, nuclear membrane completely disappears in **metaphase**.
- iii. a. Genetic changes occur due to **radioactive** pollution.
- iv. b. In humans, sperm production occurs in the **testes** .
- v. c. **Manas** sanctuary of Assam is under threat due to dams and indiscriminate use of water.

(B) Answer the following sub-questions as per the given instructions.

[5]

- i.  Name the locomotory organ of the animal shown in the above figure.

Ans. The animal shown in the above figure is Starfish. Its locomotory organ is tube-feet.

- ii. Write the correct co-relation.

***Spirogyra* : Fragmentation : : *Planaria* :** _____

Ans. Regeneration. *Spirogyra* reproduces through fragmentation while *Planaria* reproduces through regeneration.

- iii. Write whether the following statement is True *or* False.
DNA fingerprinting is mainly useful in forensic sciences.

Ans. True.

- iv. Write the molecular formula.

4% acetic acid (Vinegar)

Ans. CH₃COOH.

- v. Which molecules are necessary for the formation of plasma membrane?

Ans. Phospholipid molecules are necessary for the formation of plasma membrane.

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

[4]

i. We feel tired after exercising.

Ans.

- (a) When we exercise, the muscle cells use up more oxygen which causes temporary shortage of oxygen.
- (b) In this situation, the muscle cells perform anaerobic respiration.
- (c) In anaerobic respiration, glucose is incompletely oxidized and the pyruvic acid produced undergoes fermentation to produce lactic acid.
- (d) Due to incomplete oxidation of glucose, less energy is produced. The lactic acid produced leads to muscle fatigue. Hence, we feel tired after exercising.

ii. Hydroelectric energy, solar energy, and wind energy are called renewable energies.

Ans.

- (a) Renewable energy is the energy which comes from natural resources like water, Sun, and wind.
- (b) This energy can be easily replenished without the help of human beings.
- (c) The sources of energy in hydroelectric energy, solar energy, and wind energy, are water, sunlight and wind, respectively, which are renewable.
- (d) Hence, hydroelectric energy, solar energy, and wind energy are called renewable energies.

iii. Microbial enzymes are used instead of chemical catalysts in chemical industry.

Ans. Nowadays, instead of chemical catalysts, microbial enzymes are used in chemical industries because of the following reasons:

- (a) Microbial enzymes are active at a low temperature, pH, and pressure. Therefore, their use saves energy and does not require erosion-proof instruments.
- (b) They carry out specific processes, hence unnecessary by-products are not formed. Thus, expenses on purification are minimized.

- (c) Use of microbial enzymes overcomes the necessity of waste elimination and decomposition.
- (d) Enzymes can be reused for the next cycle of reaction. Hence, they are eco-friendly also.

(B) Answer the following questions. (Any three) [6]

i. Distinguish between Aerobic respiration and Anaerobic respiration (any two points).

Ans.

Aerobic respiration	Anaerobic respiration
1. In aerobic respiration, energy production takes place in the presence of oxygen.	1. In anaerobic respiration, energy production takes place in the absence of oxygen.
2. Glucose is completely oxidized in this process.	2. Glucose is incompletely oxidized in this process.
3. High amount of energy is produced.	3. Less amount of energy is produced.
4. The final products are CO ₂ and water.	4. The final products are CO ₂ and either ethanol, lactic acid, or vinegar.
5. This normally takes place in higher plants and animals.	5. It takes place in organisms which cannot live in the presence of oxygen, e.g. some bacteria. Some higher plants, animals, and aerobic microorganisms also perform anaerobic respiration if there is a depletion of oxygen level in the surroundings. Our muscles also perform anaerobic respiration when we exercise.

(Note: Students can write any 2 points.)

ii. Write a short note on Sacred groves.

Ans.

- (a) Forests conserved in the name of God and considered to be sacred are called as sacred groves.
- (b) They are in fact 'sanctuaries' conserved by the society and not by the government forest department. As they have been conserved in the name of God, they have special protection.
- (c) These clusters of thick forests are present not only in the Western Ghats of India but also throughout the country.
- (d) More than 13,000 sacred groves have been reported in India.

iii. Explain the term. Modern technology of reproduction - IVF.

Ans.

- (a) In Vitro Fertilization (IVF) is one of the advanced medical techniques, with the help of which couples who cannot have children can have a child.
- (b) In this technique, fertilization of an oocyte with a sperm is brought about in a test tube and the embryo formed is implanted in the uterus of a woman at an appropriate time.
- (c) The IVF technique is used for having a child in case of those childless couples who have problems like less sperm count, and obstacles in the oviduct.

iv. How is *Balanoglossus* connecting link between chordates and non-chordates?

Ans. *Balanoglossus* belongs to phylum Hemichordata.

- (a) Chordates have a notochord, but non-chordates don't. *Balanoglossus* (Hemichordates) has a notochord, but only in the proboscis region.
- (b) Chordates have pharyngeal gill slits, but nonchordates don't. *Balanoglossus* has pharyngeal gill slits.
- (c) Thus, *Balanoglossus* shows characteristics of both chordates and nonchordates.
- (d) Hence, it is considered as a connecting link between non-chordates and chordates.

v. Explain Darwin's theory of natural selection.

Ans.

- (a) Darwin proposed the theory of natural selection which explains the survival of the fittest.

- (b) According to him, all organisms reproduce prolifically. All the organisms compete with each other in a life-threatening manner.
- (c) In this competition, only those organisms sustain which show the modifications essential for winning the competition. Nature selects only those organisms which are fit to live and the rest perish.
- (d) These sustained and selected organisms reproduce and thereby give rise to new species with their own specific characters.

Q.3. Answer the following questions. (Any five)

[15]

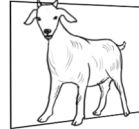
i.



(a)



(b)



(c)

Identify and explain the above different types of symmetry.

Ans.

- (a) Figure (a) shows Asymmetrical body. In case of such a body, there is no imaginary axis of the body through which we can get two equal halves. Example, amoeba.
- (b) Figure (b) shows Radial symmetry. In this type of body, if an imaginary cut passes through central axis or any plane of the body, it gives two equal halves. Example, starfish.
- (c) Figure (c) shows Bilateral symmetry: In this type of body, there is only one imaginary axis that divides the body into two equal halves. Example, insects, humans, animals.

ii. Write any six factors affecting social health.

Ans. Social health is the ability of a person to establish harmonious relationship with other persons. Following are the factors that affect social health. (a) Education (b) Financial status (c) Social and physical conditions of the surrounding (d) Social environment of the surrounding (e) Residential area (f) Water (g) Toilets (h) Political conditions (i) Playgrounds (j) Gardens (k) Social treatment (l) Social safety (m) Transport facilities (n) Education and job opportunities (o) Satisfying basic needs of persons – food, clothing, shelter, and medicines.

(Note: Students can write any 6 factors.)

iii. Complete the following chart.

(Refer December 2020 Question paper for incomplete chart)

Ans.

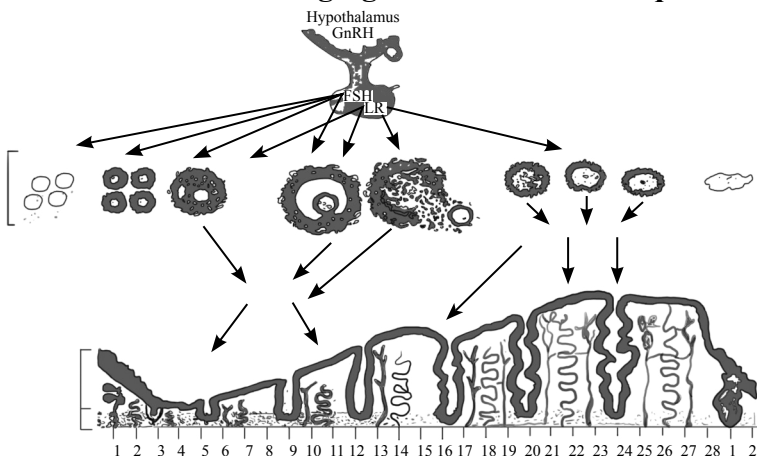
	Substance obtained by microbial processing	Roles
a.	Citric acid	To impart acidity
b.	Ascorbic acid	Antioxidants, vitamins
c.	Beta carotene	Edible colours
d.	Glycolipids	Emulsifiers
e.	Vanillin	Essence
f.	Xylitol	Artificial sweetener (low calorie)

iv. Explain the *three* different levels of Biodiversity.

Ans. Biodiversity occurs at three different levels:

- Genetic diversity: Occurrence of diversity among the organisms of the same species is called genetic diversity. Example, each human being is different.
- Species diversity: Occurrence of innumerable species in nature is called species diversity. For example, various types of plants, animals, and microbes.
- Ecosystem diversity: Many ecosystems are present in each region. Each ecosystem has its own characteristic animals, plants, microbes, and abiotic factors.

v. Observe the following figure and answer the questions.



a. Identify the process in the above figure. After how many days will it repeat again?

Ans. The figure shows menstrual cycle in females. It repeats at an interval of 28-30 days.

b. Write the names of hormones involved in this process.

Ans. The hormones involved in this process are:

- (a) Follicle stimulating hormone (FSH)
- (b) Luteinizing hormone (LH)
- (c) Estrogen and
- (d) Progesterone.

vi. What are the advantages of hydroelectric power generation?

Ans.

- (a) Since no fuel is burnt in hydroelectric power generation, there is no pollution resulting from combustion of fuels.
- (b) If there is sufficient water storage in the dam, it is possible to generate electricity when needed.
- (c) Although water reservoir is used for power generation, it can be replenished during rainy season leading to uninterrupted power generation.

vii.

a. Define vestigial organs.

b. Write names of any *two* vestigial organs in human body.

c. Explain how one human vestigial organ is functional in another animal.

Ans.

- (a) Degenerated or underdeveloped useless organs of organisms are called vestigial organs.
- (b) Appendix and wisdom teeth are two examples of vestigial organs in human body.
- (c) Some vestigial organs in human body which are functional in other organisms are as follows:
 - Appendix – functional in ruminants
 - Muscles of ear pinna – functional in monkeys for movement of pinna

- Tailbone (coccyx) – functional in arboreal (tree living) animals and monkeys
 - Body hair – functional in some animals to protect the body and maintain body temperature
- (**Note:** *Students can write any one example.*)

viii. What will you do in the following cases and why?

a. Child of your neighbour is addicted to tobacco chewing.

Ans.

- (a) I will make the child aware of the health risks associated with chewing of tobacco.
- (b) I will show him pictures of effects of tobacco addiction.
- (c) I will try to help the child to get out of this addiction, because it may permanently damage his/her nervous/muscle system/heart, etc. Tobacco can even cause cancer.

b. You have to use free space around your home for good purpose.

Ans.

The free space around my house can be utilized for good purpose in many ways as follows:

- (a) I will start a small library with lots of books and good magazines. Children can come, read, and spend their time fruitfully.
- (b) I can convert that space into a play area. I can play various sports with my friends, which is a good way to keep ourselves occupied and free from addiction, stress, and other social illnesses.
- (c) I can convert it into a small garden and grow some plants and take care of those plants.

c. Your friend has developed the hobby of snapping selfies.

Ans.

- (a) I will discourage my friend from doing so, as this hobby can turn into addiction and can harm him/her.
- (b) People indulging in selfies are not aware about the world around and about the risks involved. This is called selficide.
- (c) Taking selfies can make one self-centred. Hence, to protect my friend from being so, I will help my friend overcome this addiction.

Q.4. Solve the following. (Any one)

[5]

- i.**
a. What is meant by disaster management? 1

Ans. (a) Disaster management is the action implemented through proper planning, organized activity, and coordination in order to reduce the impact of a disaster.

- b. Classify the following activities into pre-disaster management and post-disaster management.** 2

- i. Identifying the pro-disaster areas
- ii. Quick establishment of help centre
- iii. Participation of preferably local people saved from the disaster in arranging the help to victims
- iv. Getting special training for disaster management

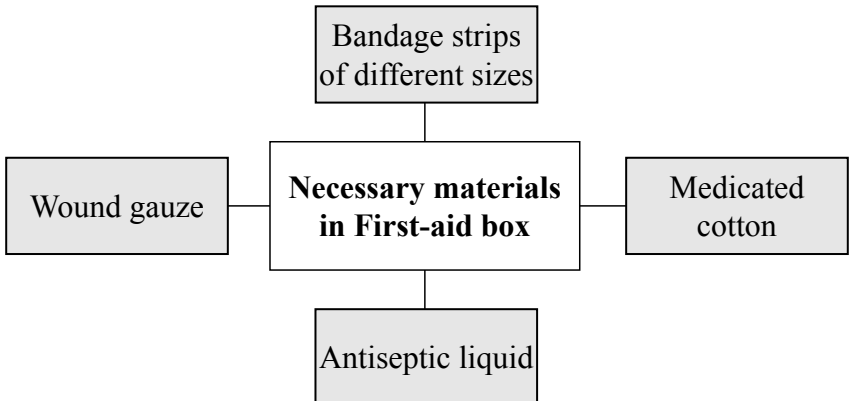
Ans.

Pre-disaster Management	Post-disaster Management
i. Identifying the pro-disaster areas	ii. Quick establishment of help centre
iv. Getting special training for disaster management	iii. Participation of preferably local people saved from the disaster in arranging the help to victims

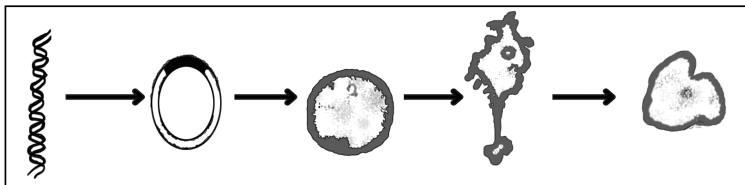
- c. Complete the diagram.** 2

(For incomplete chart refer December 2020 Question paper)

Ans.



ii. Observe the figure and answer the following questions.



a. Identify the process given in the above figure. 1

Ans. The process of production of transgenic potatoes which act as edible vaccines is shown in the figure.

b. Write the importance of the above process. 2

Ans. Transgenic potatoes act against bacteria like *Vibrio cholerae*, *Escherichia coli*. Consumption of these raw potatoes generates immunity against cholera and the diseases caused due to *E. coli*.

c. Write any two benefits of Biotechnology. 2

Ans. Benefits of Biotechnology

- It has become possible to increase the per hectare yield irrespective of the limitations of crop-land area.
- Expenses on disease control have minimized since development of resistant varieties.
- Due to development of fast fruit setting varieties, yield per annum has increased.
- Development of stress resistant varieties which can withstand variable temperature, water-stress, changing fertility of soil, etc. has become possible.

(Note: Students can write any 2 benefits.)

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