

Time: 2 Hours

March – 2020

[Max. Marks: 40]

Note: i) All questions are compulsory.

ii) Use of a calculator is not allowed.

iii) The numbers of the right of the questions indicates full marks.

iv) In case of MCQs (Q.1. (A)), only the first attempt will be evaluated and will be given credit.

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

Q.1. (A) Choose the correct option. [5]

- i. Transfer of information from a molecule of DNA to mRNA is called _____ process.
 - a. transcription
 - b. translation
 - c. translocation
 - d. mutation
- ii. Body breaks up into several fragments and each fragment starts to live as a new individual. This is _____ type of reproduction.
 - a. budding
 - b. fragmentation
 - c. regeneration
 - d. binary fission
- iii. Incomplete combustion of fuels leads to formation of _____.
 - a. carbon monoxide
 - b. carbon dioxide
 - c. chlorofluorocarbon
 - d. hydrogen sulphide
- iv. The spindle fibres start appearing from _____ stage of karyokinesis.
 - a. prophase
 - b. metaphase
 - c. anaphase
 - d. telophase
- v. Salts which can be used as supplement of calcium and iron are obtained from _____.
 - a. carbonic acid
 - b. acetic acid
 - c. citric acid
 - d. gluconic acid

(B) Answer the following questions. [5]

i. **Find the odd one out.**

Drying, Salting, Cooking, Soaking with sugar

ii. **Find out the correlation and write in one sentence.**

Annelida : Earthworm : : Platyhelminthes : _____

iii. **State whether True or False.**

Tobacco-containing substances cannot cause cancer of mouth and lungs.

iv. **Write the functions of the testes.**

v. **I am a connecting link between Reptilia and Mammals. What is my name?**

Q.2. (A) Give scientific reasons. (Any two) [4]

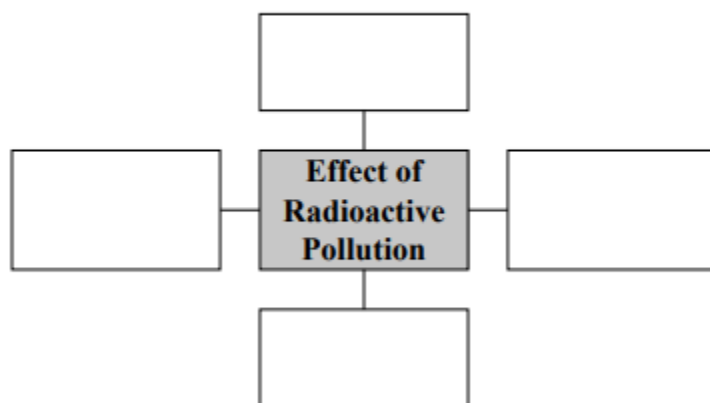
i. **Indians should follow family planning for controlling population.**

ii. **We feel exhausted after exercising.**

iii. **Hydroelectric energy, solar energy, and wind energy are called renewable energies.**

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

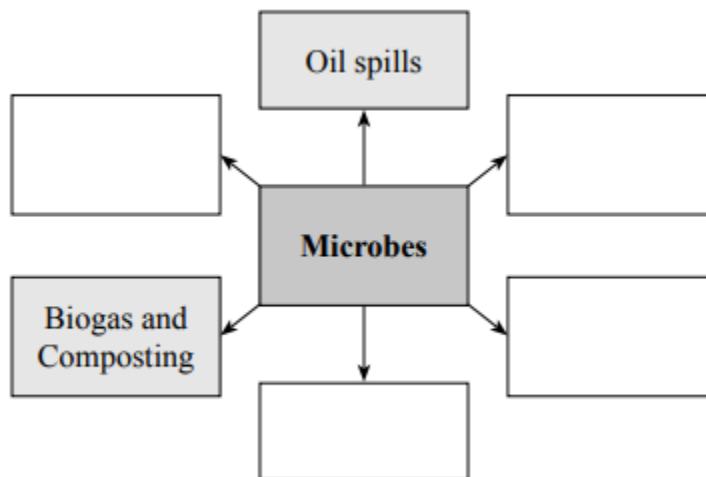
i. **Complete the following chart.**



- ii. Distinguish between Aves and Mammalia.
- iii. By observing the given picture, write any *two* effects of this disaster.

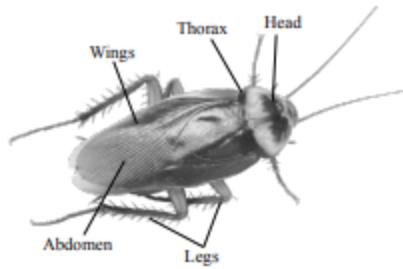


- iv. Explain *four* ways to minimize stress.
- v. Complete the following conceptual picture.



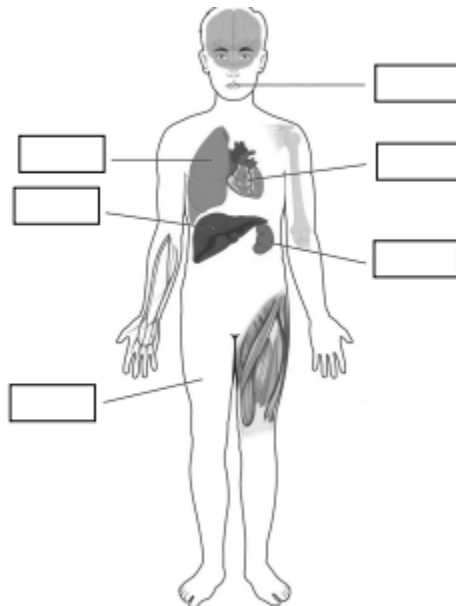
Q.3. Answer the following questions. (Any five) [15]

- i. Explain the importance of anatomical evidences with examples.
- ii. What will you do? Why?
 - a. Child of your neighbour is addicted to tobacco chewing.
 - b. Your friend has developed the hobby of snapping selfies.
 - c. Your sister has become incommunicative. She prefers to remain alone.
- iii. Which precautions are necessary for proper decomposition of domestic waste?
- iv. Observe the given diagram. Write the answers of the following questions:



- a. To which phylum does the animal included in the diagram belong?
 - b. What is the exoskeleton made up of?
 - c. What is the symmetry?
- v. Explain the following concepts in short.
- a. Surrogacy
 - b. In Vitro Fertilization (IVF)
 - c. Sperm Bank

- vi. Body organization of human is shown in the following figure. Label the different organs present in the human body.



- vii. Make a table based on forms of energy and corresponding devices.

Sr. No.	Forms of Energy	Devices
1.	Electric	
2.	Mechanical	Sewing machine, Bicycle
3.	Thermal	
4.		Solar cooker, Solar heater

- viii. Complete the paragraph using proper words from the brackets.
(mechanical, *Rhizobium*, aquatic, toxic, CO₂, nitrogen, *Pseudomonas*, amoeba, bacteria, hydrocarbons)

Spilling of petroleum oil occurs in ocean due to various reasons. This oil may prove fatal and toxic to _____ organisms. It is not easy to remove the oil layer from surface of water by _____ method. However, bacteria like _____ spp. and *Alcanovorax borkumensis* have the ability to destroy the pyridines and other chemicals. Hence, these _____ are used to clear the oil spills. These are called as hydrocarbonoclastic bacteria (HCB). HCB decompose the _____ and bring about the reaction of carbon with oxygen. _____ and water is formed in this process.

Q.4. Answer the following questions. (Any one) [5]

- i. Attempts at various levels are performed for conserving environment. Which role would you like to perform. Give two actions each.
- a. Prevention b. Control c. Production
d. Awareness e. Conservation
- ii. a. What is Biotechnology?
b. Give one use of Biotechnology.
c. Give one commercial use of Biotechnology.
d. Write two examples of bacterial biofertilizers.
e. Write names of two genetically modified crops.

Q.1. (A) Choose the correct option. [5]

- i. a. Transfer of information from a molecule of DNA to mRNA is called transcription process.
- ii. b. Body breaks up into several fragments and each fragment starts to live as a new individual. This fragmentation is type of reproduction.
- iii. a. Incomplete combustion of fuels leads to formation of carbon monoxide.
- iv. a. The spindle fibres start appearing from prophase stage of karyokinesis.
- v. d. Salts which can be used as supplement of calcium and iron are obtained from gluconic acid.

(B) Answer the following questions. [5]

i. Find the odd one out.

Drying, Salting, Cooking, Soaking with sugar

Ans. Cooking. All others are methods of preservation of food (or processing of fruits). The process of cooking involves transfer of heat to the food items. It is not a method used for preservation of food.

ii. Find out the correlation and write in one sentence.

Annelida:Earthworm::Platyhelminthes:_____

Ans. *Planaria* (or Tapeworm or Liverfluke). Earthworm belongs to phylum Annelida; while *Planaria* (or Tapeworm or Liverfluke) belongs to phylum Platyhelminthes.

iii. State whether True or False.

Tobacco-containing substances cannot cause cancer of mouth and lungs.

Ans. False. Tobacco-containing substances cause cancer of mouth and lungs.

iv. Write the functions of the testes.

Ans. The functions carried out by the testes in the human body are:

- 1. They produce sperms.
- 2. They produce the male reproductive hormone, testosterone.

v. I am a connecting link between Reptilia and Mammals. What is my name?

Ans. Duck-billed Platypus

Q.2. (A) Give scientific reasons. (Any two) [4]

i. Indians should follow family planning for controlling population.

Ans.

- (a) India has a very high rate of population growth.
 - (b) At present, the population of India is greater than 135 crore.
 - (c) Due to the population explosion, we have to face various problems like unemployment, decreasing per capita income and increasing loan, and stress on natural resources.
 - (d) We can overcome these problems only by controlling the population.
 - (e) Family planning helps to reduce birth rate.
- Hence, it is essential to follow family planning to control the population in India.

ii. We feel exhausted 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 pyruvic acid produced undergoes fermentation to produce lactic acid.
 - (d) Due to incomplete oxidation of glucose, less energy is produced and the lactic acid produced leads to muscle fatigue.
- Hence, we feel exhausted after exercising.

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

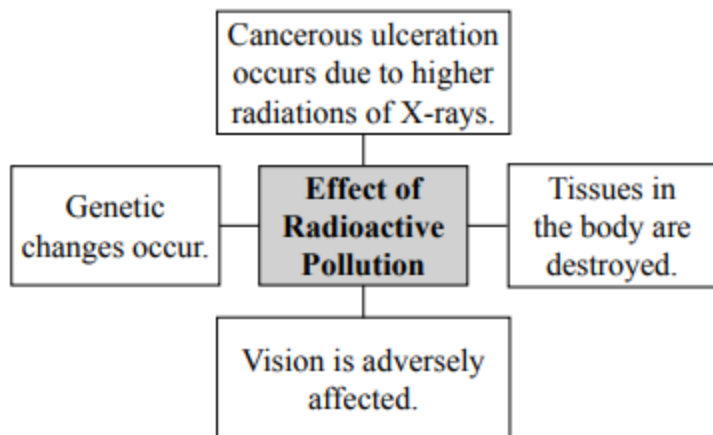
Ans.

- (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.
- Hence, hydroelectric energy, solar energy, and wind energy are called renewable energies.

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

i. Complete the following chart.

Ans.



ii. Distinguish between Aves and Mammalia.

Ans.

Aves	Mammalia
1. The exoskeleton is in the form of feathers.	1. The exoskeleton is in the form of hair or fur.
2. Mammary glands are absent.	2. Mammary glands are present.
3. Forelimbs are modified into wings.	3. Forelimbs and hind limbs are present.
4. Examples: Pigeon, Duck, Parrot, etc.	4. Examples: Elephant, Human, Bat, etc.

iii. By observing the given picture, write any *two* effects of this disaster.

Ans. This is a picture of railway accident caused due to derailment and collision of two trains.

Effects of a railway disaster:

- The train and disaster site suffer huge damage.
- Many people lose their lives.
- Blockage of railway tracks causes disruption of rail traffic and inconvenience to public.
- Chaos and confusion break out. Thieves may exploit the situation and rob passengers and other people.
- If a goods train is involved in an accident, it may lead to chemical or oil spill, leakage of harmful gases, etc., which may lead to environmental damage.
- A railway accident results in heavy financial losses.

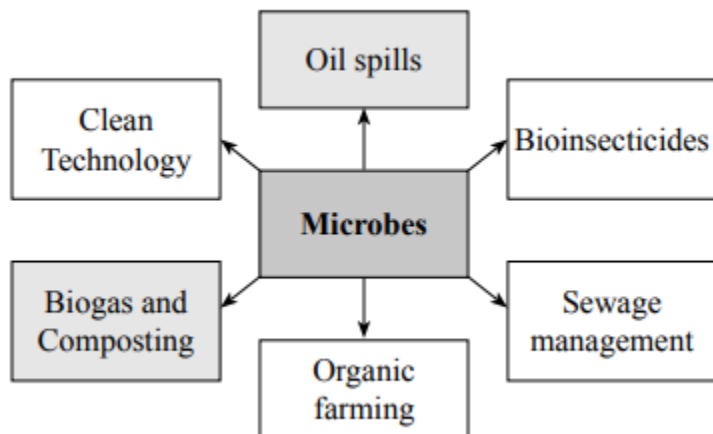
iv. Explain four ways to minimize stress.

Ans. Excessive stress is becoming a common problem these days. One needs to know the various ways of minimizing stress.

- (a) Communication – Various ways of expression like, establishing communication with friends, peers, cousins, teachers and more importantly parents are important to reduce stress.
- (b) Noting down feelings, expressing and sharing our feelings of fear, worry, anger, etc., with near and dear ones helps to relieve stress.
- (c) Fostering hobbies like material collection, photography, reading, cooking, sculpturing, drawing, rangoli-making, dancing, etc. help one to utilize his/her free time and help to minimize one's thoughts towards worries.
- (d) One can divert the energy and mind towards positive thinking, and negative thoughts can be neutralized.
- (e) Meditation for a few minutes can help one focus, concentrate and relax oneself.
- (f) Time management also helps to reduce stress.
- (g) Good sleep and nutritious food rejuvenate our mind and body and thus reduce stress.
- (h) Singing and learning/listening to music keep us happy and drive away stress.
- (i) Outdoor games/activities – These are very beneficial as they provide physical exercise; improve our discipline, interaction, and unity; drive away loneliness; and help us socialize.

v. Complete the following conceptual picture.

Ans.



Q.3. Answer the following questions. (Any five) [15]

i. Explain the importance of anatomical evidences with examples.

Ans.

1. The study of the internal structure of organisms is called anatomy.
2. Anatomical similarities help as evidence in the theory of evolution.
3. When we see a human hand, forelegs of ox, patagium of bat, or flipper of a whale, there doesn't seem to be any similarity.
4. Also, the use of each of these structures in different animals is different, e.g. a human hand is used to pick up things, forelegs of ox are used to walk, bat's patagium is used for flying, and flippers of whales are used for swimming.
5. However, there is similarity in the structure of bones and bone-joints in the above-mentioned organs of each of these animals.
6. This similarity indicates that these animals may have a common ancestor. Thus, anatomical evidence helps in understanding the evolution process.

ii. What will you do? Why?

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

Ans.

1. I will make the child aware of the health risks associated with chewing of tobacco.
2. I will show him pictures of effects of tobacco addiction and make him aware about the dangers of tobacco addiction as it may permanently damage his/her nervous/muscle system/heart, etc. Tobacco can even cause cancer.
3. I will try to help the child to get out of this addiction.

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

Ans.

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

c. Your sister has become incommunicative. She prefers to remain alone.

Ans.

1. I will start engaging her in activities of her interest, so that her mind remains engaged.
2. Then, I will help her to start talking, I won't push her too much, but will encourage her slowly to talk about her feelings, by being very patient and not making her uncomfortable.
3. Being incommunicative and preferring to stay alone is a sign of mental stress. So, I will try to relieve her of the stress she is facing.

iii. Which precautions are necessary for proper decomposition of domestic waste?

Ans. The precautions to be taken for proper decomposition of domestic waste are:

1. Wet and dry waste should be properly segregated.
2. Bio-medical waste, e-waste, etc. should not be mixed with wet waste.
3. After segregation, the waste should be disposed of carefully.
4. Medical waste should be incinerated to prevent the spread of infection.
5. Dry waste and e-waste should be sent for recycling.
6. Wet waste should be completely free of any non-biodegradable matter. This can then be converted to compost.

iv. Observe the given diagram. Write the answers of the following questions:

a. To which phylum does the animal included in the diagram belong?

Ans. The animal shown in the diagram is cockroach.
It belongs to phylum Arthropoda.

b. What is the exoskeleton made up of ?

Ans. The exoskeleton is made up of chitin.



c. What is the symmetry?

Ans. The cockroach shows bilateral symmetry.

v. Explain the following concepts in short.

a. Surrogacy

Ans. Some women have problems with implantation of embryo in the uterus. Such women can take the help of this technique to give birth to a child. In surrogacy, the oocyte from the ovary of a woman having problems in implantation of embryo in the uterus, is fertilized in a test-tube by using the sperms from her husband. The embryo formed is implanted in the uterus of another woman having normal uterus. Such a woman in whose uterus the embryo is planted is called the surrogate mother.

b. In Vitro Fertilization (IVF)

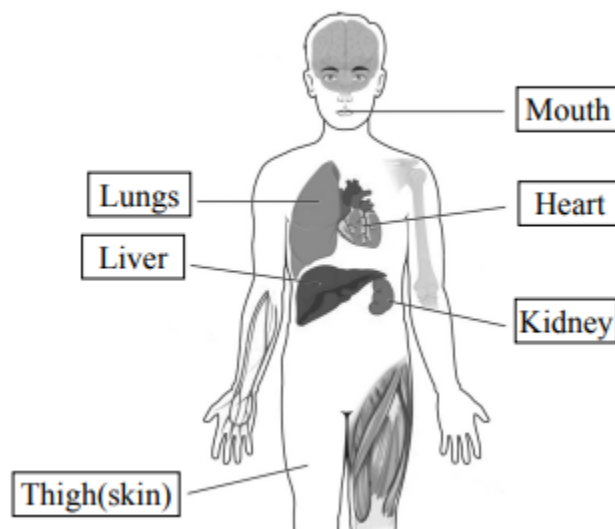
Ans. This technique is used for those couples who have problems like, less sperm count in man, or obstacles in the oviduct of woman. In this technique, fertilization is brought about in the test-tube and the embryo formed is implanted in the uterus of the woman at an appropriate time.

c. Sperm Bank

Ans. Some men may have problem of sperm production or their sperm count may be much lesser than required. Such men can use the services of a sperm bank. A sperm bank is similar to a blood bank. Semen ejaculated by donor men is collected after thorough physical and medical check-up of the donor and stored in the sperm bank. As per the wish of a needful couple, the oocyte of woman of the concerned couple is fertilized by IVF technique using the semen from sperm bank. Resultant embryo is implanted in the uterus of the same woman. Name of the semen donor is strictly kept secret as per the law.

vi. Body organization of human is shown in the following figure. Label the different organs present in the human body.

Ans.



vii. Make a table based on forms of energy and corresponding devices.

Ans.

Sr. No.	Forms of Energy	Devices
1.	Electric	Fans, Refrigerators
2.	Mechanical	Sewing machine, Bicycle
3.	Thermal	Gas stove, heating element
4.	Solar	Solar cooker, Solar heater

viii. **Complete the paragraph using proper words from the brackets.**

Ans. Spilling of petroleum oil occurs in ocean due to various reasons. This oil may prove fatal and toxic to aquatic organisms. It is not easy to remove the oil layer from surface of water by mechanical method. However, bacteria like *Pseudomonas* spp. and *Alcanovorax borkumensis* have the ability to destroy the pyridines and other chemicals. Hence, these bacteria are used to clear the oil spills. These are called hydrocarbonoclastic bacteria (HCB). HCB decompose the hydrocarbons and bring about the reaction of carbon with oxygen. CO₂ and water is formed in this process.

Q.4. Answer the following questions. (Any one) [5]

- i. **Attempts at various levels are performed for conserving environment. Which role would you like to perform. Give two actions each.**

- | | |
|------------------------|---------------------|
| a. Prevention | b. Control |
| c. Production | d. Awareness |
| e. Conservation | |

Ans. Human existence is totally impossible without the existence of nature. Hence, it is our basic responsibility to preserve the nature without disturbing its balance. There should be a positive attitude of human beings towards the environment for welfare of entire living world. For this purpose, we can play different roles like conservator, organizer, guide, plant-friend, etc. I would like to play the role of conservator to help save the environment. The following actions can be taken under each head:

- a. Prevention** - Deforestation can be prevented by provident use of paper and planting more trees.
- b. Control** - Pollution can be controlled by making use of a bicycle instead of a vehicle. Using biogas plant for disposal of waste material will also help control pollution.
- c. Production** - Using modern methods of farming for production of crops, will give better yield. Innovative methods of production of goods can reduce wastage and increase productivity and thus conserve natural resources.
- d. Awareness** - Creating awareness about importance of conservation of environment among the general public through campaigns and by staging street plays.
- e. Conservation** - Natural resources like water are very scarce. We all should not waste water and use it very judiciously to conserve it. Similarly, we should try to use environment friendly fuels like biofuels instead of non-renewable fuels like petrol and diesel. This will also help prevent air pollution.

b. Give one use of Biotechnology.

Ans. Biotechnology is used in various fields such as agriculture and pharmacy. In agriculture, new experiments are being performed for improving the agricultural yield. High-class varieties of crops have been developed through the technique of tissue-culture. In pharmacy, antibodies, vitamins, and hormones like insulin have been produced successfully.

ii.

a. What is Biotechnology?

Ans. The techniques of bringing about improvements in living organisms by artificial genetic changes and by hybridization for the welfare of human beings are together called biotechnology.

c. Give one commercial use of Biotechnology.

Ans. Biotechnology is used in almost all fields; some are mentioned below:

1. **Agriculture:** Biotechnology is used in agriculture to develop genetically modified crops such as BT cotton and BT brinjal, herbicide tolerant plants, biofertilizers, etc.
2. **Human health:** Biotechnology helps to identify the role of genes, if any, in various diseases, e.g. diabetes, heart diseases, etc. Diagnosis of diseases like diabetes and heart diseases has become possible even before the onset of symptoms. Diagnosis of diseases like AIDS and dengue can be done within a few minutes. Hence, treatment can be done at the earliest. It is also used to produce hormones and vaccines, and in gene therapy.
3. **Industrial products:** Various industrial chemicals can be produced through less expensive processes. For example, alcohol production from sugar molasses with the help of transgenic yeast.

d. Write two examples of bacterial biofertilizers.

Ans. Bacteria like *Rhizobium*, *Azotobacter*, *Nostoc*, and *Anabaena* are used as biofertilizers.

e. Write names of two genetically modified crops.

Ans. BT Brinjal, BT Cotton, Golden Rice are some examples of genetically modified crops.