



SCIENCE AND TECHNOLOGY PAPER - 2

[Time : 2 hours]

[Max. Marks : 40]

Note:

- (i) All questions are compulsory.
 - (ii) Use of a calculator is not allowed.
 - (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), (D) with sub-question number is to be written as answer.
For Eg : (i) (A), (ii) (B), (iii) (C)
 - (vi) Scientifically correct, labelled diagrams should be drawn wherever necessary.
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Q.1. (A) Choose the correct option and write its number for the following questions : [5]

- (i) Transfer of information from molecule of DNA to RNA is called ____ process.
- (A) Transcription
 - (B) Translation
 - (C) Translocation
 - (D) Mutation

Answer: (A) Transcription

- (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

Answer: (B) Fragmentation

- (iii) Incomplete combustion of fuels leads to formation of. _____
- (A) Carbon monoxide
 - (B) Carbon dioxide
 - (C) Chlorofluorocarbon
 - (D) Hydrogen sulphide

Answer: (A) Carbon monoxide

- (iv) The spindle fibres start appearing from ____ stage of karyokinesis.
- (A) Prophase



- (B) Metaphase
- (C) Anaphase
- (D) Telophase

Answer: (B) Metaphase

- (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

Answer: (D) Gluconic acid

(B) Solve the following questions :

[5]

(i) Find odd one out :

Drying, Salting, Cooking, Soaking with sugar.

Answer: Cooking

(ii) Write the correct co-relation :

Annelida : Earthworm : : Platyhelminthes : _____

Answer: Planaria

(iii) State whether True/False :

Tobacco containing substances cannot cause cancer of mouth and lungs.

Answer: False

(iv) Write function of testes.

Answer: Function of testes is to produce sperms and male hormone-testosterone.

(v) I am connecting link between Reptilia and mammals. What is my name?

Answer: Duck-Billed Platypus.

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

[4]

(i) Indians should follow family planning for controlling the population.

(ii) We feel exhausted after exercising.

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

Answer:

- (i) In India population is increasing tremendously. Today Indian population is more than 130 crores. This population explosion causes stress on natural resources.

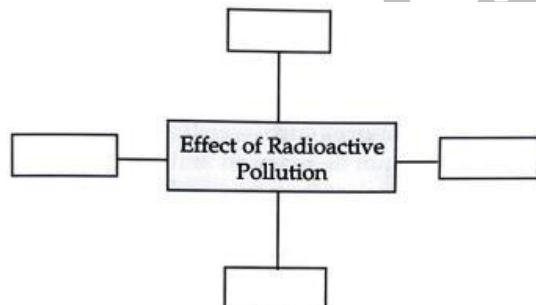
The available natural resources are unable to complete the increasing demands of the increasing population. Also the increasing population causes lack of education unemployment, poverty, crime, poverty, decreasing per capita income and increasing loan, etc. This worse condition can be improved only by controlling population. Hence, Indians should follow family planning for controlling the Population.

- (ii) When we perform heavy exercises, we feel shortage of oxygen. In such situation, our muscles and other tissues perform anaerobic respiration. In this process lactic acid is formed, and also the molecules of ATP produced in oxidation of food are much less. So there is accumulation of lactic acid in our body and less energy is produced in our body. Due to this we feel exhausted after exercising.
- (iii) Conventional energy sources such as coal, natural gas and fossil fuels are limited on the earth. They cannot be renewed and so in future, they will get exhausted. But solar energy, hydroelectric energy and wind energy are obtained from solar radiations, flowing water and flowing wind respectively. Sun, water reservoirs and wind are the inexhaustible and sustainable resources. They will not be finished. Thus, hydroelectric energy, solar energy and wind energy can be replenished and so they are called renewable.

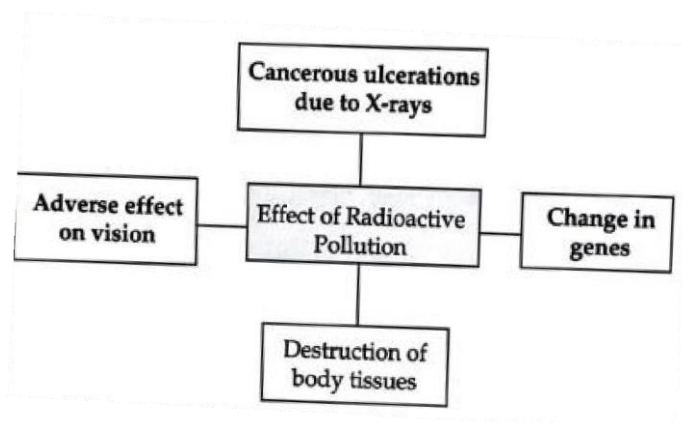
Q2. (B) Solve the following questions. (Any three) :

[6]

- (i) Complete the following chart :



Answer:



(ii) Distinguish between Aves and Mammalia.

Answer:

Aves	Mammalia
1. These are adopted for aerial mode of life.	1. These are adapted for terrestrial life.
2. Body is spindle shaped and it is divided into head, neck and trunk.	2. Body is not spindle shaped and it is divided into head, neck, trunk and tail.
3. They have two pairs of limbs and forelimbs are modified to form wings.	3. They have two pairs of limbs, which are adapted for walking and running on the ground.
4. Exoskeleton is in the form of feathers.	4. Exoskeleton is in the form of hair, wool or fur.
5. Jaws are modified into a beak	5. Jaws have teeth which surround the mouth.
6. These are oviparous. They hatch the eggs into nest lings.	6. These are viviparous. They give birth to live young ones.

(iii) By observing given picture, write any two effects of this disaster:



Answer: The given picture shows the railway accident. The worst effects of this disaster are:

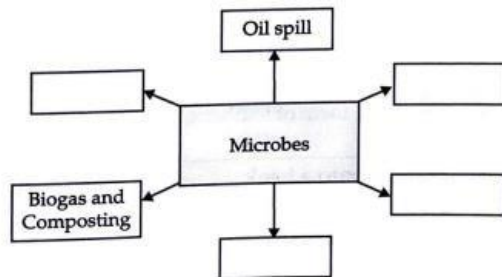
- 1. Loss of life:** In railway accidents hundreds of people die and too many are injured also.
- 2. Economic loss:** The repairing and maintenance of railways result into economic pressure on government and public also.

(iv) Explain four ways to minimize stress:

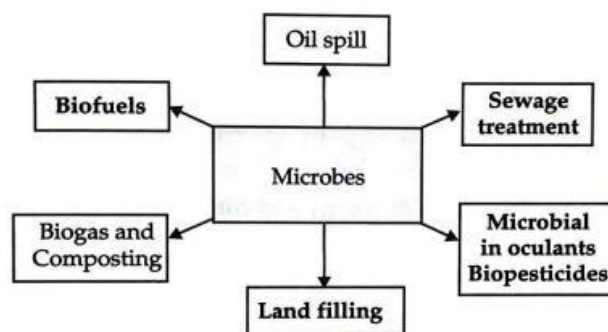
Answer:

1. One should express his feelings with their near and dear ones, or he should note down his feelings in a diary.
2. One should learn Yoga and Meditation. Also, he should perform physical exercise daily.
3. One should inculcate good hobbies like reading, drawing, cooking, dancing, photography etc., in his routine.
4. We should listen and also learn the music, because music reduces the mental stress and it teaches us how to enjoy the life.

(v) Complete the following conceptual picture:



Answer:



Q. 3. Solve the following questions. (Any five) :

[15]

(i) Explain the importance of Anatomical evidences with examples.

Answer:

1. The structure and anatomy of different animal groups show certain similarities. For example, human hand, cat's foreleg, flipper of whale and patagium of bat, Etc., are similar in their internal anatomy.
2. External morphology of those organs does not show any similarity. Also the use of These organs is also different in different animals.
3. But there is similarity in structure of bones and bony joints in organs of each of these animals.
4. This similarity indicates that those animals many ave a common ancestor.
5. Thus, the anatomical evidence tries to prove the process of evolution.

(ii) What will you do? Why?

- (a) Child of your neighbor 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.**

Answer:

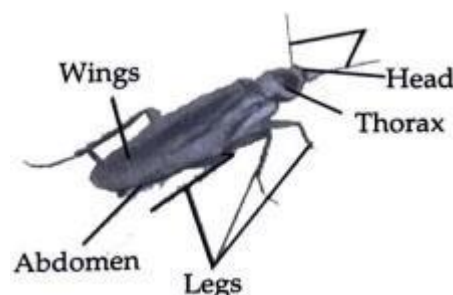
- (a) I will explain the bad effects of tobacco chewing to that child. I will convince him How tobacco causes cancer of mouth by showing him different videos and Photographs. Also, I will inform his parents about his habit of tobacco chewing. I Will try my best to make him free from his addiction.
- (b) The person who has the hobby of snapping selfies is always thinking of himself Only. I will try to find out the reason behind his self-centeredness. I will try to motivate him to do some other good things so that his habit of snapping selfies will be lessened.
- (c) I will take my sister in confidence, and I will try to find out the reason behind the lack of communication of her. I will speak with her on various interesting topics and will always stay with her. I will invite her friends at home so that she will mix with them. Also, i will encourage her to pursue her hobbies and will try my best to make her happy.

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

Answer:

For proper decomposition of domestic waste, decomposable and non-decomposable garbage i. e., wet and dry garbage should be properly separated. Wet garbage can be used to make compost at home. Non-decomposable garbage i.e., plastic, broken metallic things, pieces of glass, bottles of medicines, E-waste, etc., should be stored separately, so that this dry garbage can be sent for re-cycling and re-use. If wet and dry garbage are mixed together then it becomes very difficult to decompose the waste. So non-decomposable waste material should be strictly kept aside. Thus these are the precautions which are necessary for proper decomposition of domestic waste.

(iv) Observe the following diagram. Write the answers of the following.



- (a) To which phylum does the animal included in the diagram belong ?**
- (b) What is the exoskeleton made up ?**
- (c) What is the symmetry?**

Answer:

- (a) Cockroach is shown in the diagram. It belongs to phylum Arthropoda.
- (b) The exoskeleton is made up of chitin.
- (c) Body of cockroach shows bilateral symmetry.

(v) Explain the following concepts in short:

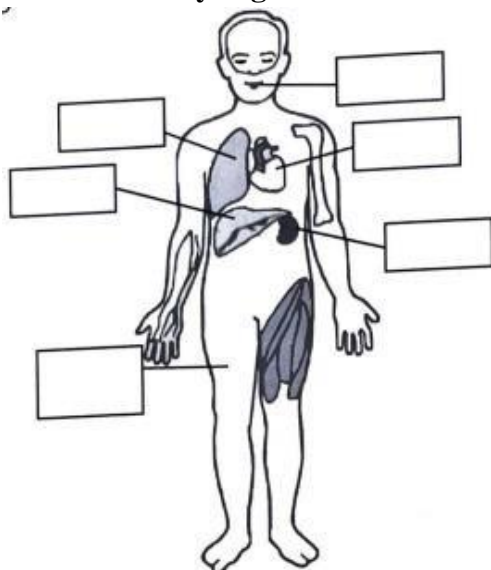
- (a) Surrogacy
- (b) In Vitro Fertilization (IVF)
- (c) Sperm Bank

Answer:

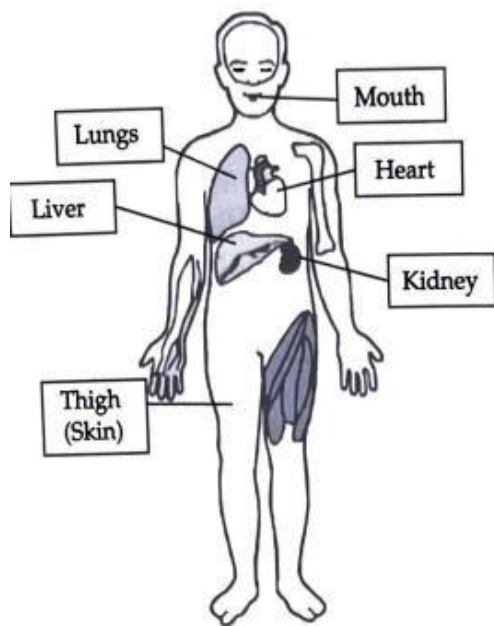
(a) Surrogacy: Some women have problems in implantation of embryo in uterus. For such women surrogacy is the remedial technique. In this technique oocyte is collected from the ovary of the woman having problem in implantation in uterus. That oocyte is fertilized in test-tube with the help of sperms collected from her husband. The embryo formed from such fertilization is implanted in the uterus of some other woman having normal uterus. Such a woman in whose uterus the embryo is implanted, is called as surrogate mother and this entire procedure is termed as surrogacy.

(b) In Vitro Fertilization (IVF): In this technique fertilization is brought about in the test tube and the embryo formed is implanted in uterus of woman at appropriate time. This technique is used for having the child in case of those childless couples who have problems like less sperm count, obstacles in oviduct etc.

(c) Sperm Bank: Semen ejaculated by the desired men is collected after their thorough physical and mental check-up and is stored in the sperm bank. As per the wish of needful couple, 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 same woman.

(vi) Label the body organization of human in the following figure:

Answer:



(vii) Make a table based on forms of energy and corresponding devices :

	Forms of Energy	Devices
(a)	Electric	_____
(b)	Mechanical	Sewing machine, Bicycle
(c)	Thermal	_____
(d)	_____	Solar cooker, Solar heater

Answer:

Forms of Energy	Devices
(a) Electric	Tube light, fan, Refrigerator, Microwave oven, etc.
(b) Mechanical	Sewing machine, Bicycle
(c) Thermal	Chulha, Furnace, Steam engine.
(d) Solar	Solar cooker, Solar heater

(viii) Complete the paragraph using proper words :

(Mechanical, Rhizobium, Aquatic, Toxic, CO_2 , 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 *Alcanivorax 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 ____and bring about the reaction of carbon with oxygen____and water is formed in this process.

Answer:

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 *Alcanivorax 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. **CO_2** and water is formed in this process.

Q. 4. Solve 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**

Answer:

- (a) Prevention:** 1. Preventing possible harms.
2. Designing new plans,
- (b) Control:** 1. Stopping the harmful activities.
2. Changing the mindset
- (c) Production:** 1. Revival of harmed factors of environment.
2. Attempting innovation
- (d) Awareness:** 1. Education,
2. Guidance
- (e) Conservation:** 1. Conserving the available resources.
2. Using the available pool of resources in sustainable manner.

(ii) (a) What is Biotechnology?

(b) Give one use of Biotechnology.

(c) Give one commercial use of Biotechnology.



(d) Write two bacterial examples of biofertilizer.

(e) Write two names of crops genetically developed.

Answer:

- (a) The techniques of bringing about improvements in living organisms by artificial genetic changes and by hybridization for the welfare of human beings is called Biotechnology.
- (b) Due to development of fast fruit setting varieties due to biotechnology, yield per annum has been increased.
- (c) Animal husbandry: Two main methods as artificial insemination and embryo transfer are used in animal husbandry. It helps to improve both, the quantity and quality of animal products. E.g. Milk, meat, wool etc. Similarly animals with more strength have been developed for hard work. This is one of the commercial use of Biotechnology.
- (d) Rhizobium and Azotobacter.
- (e) BT cotton and Golden rice.

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