

Time: 2 Hours

July – 2023

[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 alternative and write correct option number as answer. [5]

- (i) Genetic disorder like sickle cell anemia may be caused due to _____ .
(a) mutation (b) translation
(c) translocation (d) transcription
- (ii) Protein like interleukin produced by biotechnology is used against _____ disease.
(a) anemia (b) cancer
(c) diabetes (d) haemophilia
- (iii) We get _____ of energy from one gram of lipid.
(a) 9 cal (b) 4 kcal (c) 4 cal (d) 9 kcal
- (iv) The _____ bacteria are useful for cleaning the hydrocarbons and oil pollutants from soil and water.
(a) *Lactobacilli* (b) *Acidobacillus*
(c) *Pseudomonas* (d) *Streptococcus*
- (v) Human males have _____ numbers of chromosomes.
(a) 44 + XX (b) 44 + XY
(c) 22 + XY (d) 22 + XX

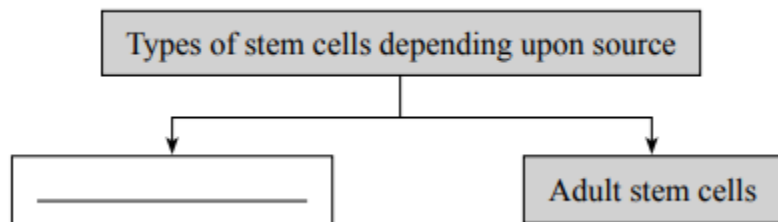
(B) Answer the following. [5]

- (i) Pick the odd man out:
 β -carotene, lycopenes, xylitol, lutein

- (ii) Identify the phylum of the given animal:



- (iii) Complete the given flowchart:



- (iv) State, if True or False:

Communication media like mobile phone, television, internet should be used often.

- (v) Write the co-relation:

Ovary : Estrogen :: Testes : _____ .

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

- (i) Duck billed platypus is a connecting link.
- (ii) Biofuel is important among the renewable sources of energy.
- (iii) Humans have a crucial role in maintaining environmental balance.

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

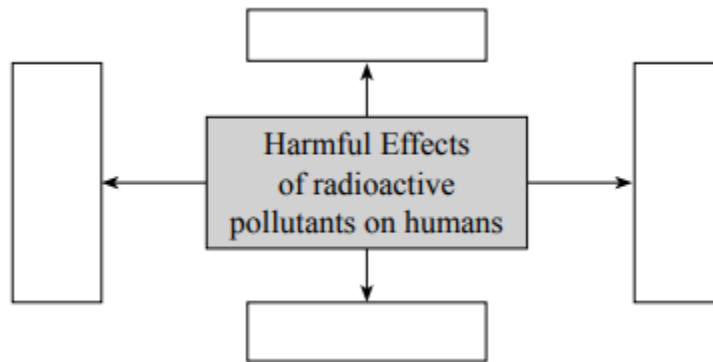
- (i) Draw a neat and labelled diagram of mitochondria and tri-carboxylic acid cycle.
- (ii) Write any two objections that were raised against Darwin's Theory of Natural Selection.
- (iii) Observe the given animal and answer the following questions:
 - (a) Identify the given animal and its phylum.

(b) Write any two characteristics of that phylum.



(iv) Write any two objectives of disaster management.

(v) Complete the given conceptual chart:



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

[15]

(i) Observe the given figures and answer the following:



A



B



C

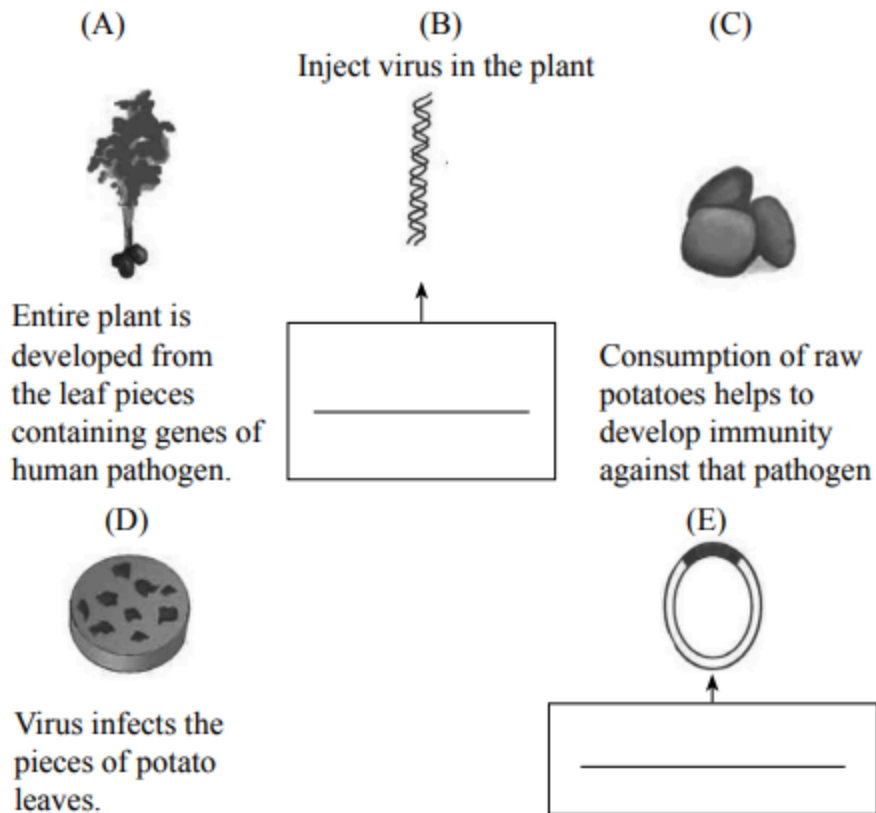
Identify the types of body symmetry and give *one* example of each apart from the given figure.

(ii) Write a short note on – The types of Biodiversity.

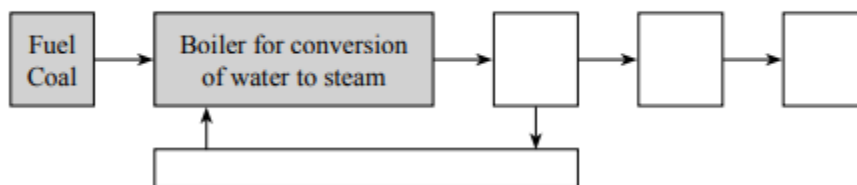
(iii) Complete the given chart:

Sr. No.	Body Constituents	Proteins/Amino Acids
1.	Blood	_____
2.	_____	Ossein
3.	Skin	_____
4.	_____	Insulin
5.	Muscle	_____
6.	_____	Various proteins of cell membrane

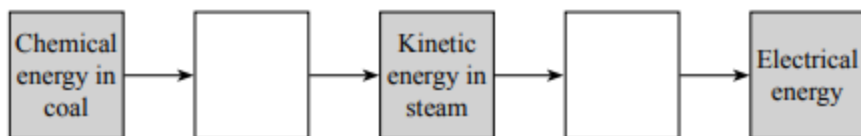
(iv) Rearrange and write proper alphabetical sequence only and complete the given blanks:



(v) (a) Complete the given flowchart for electrical energy production based on thermal power plant.



- (b) Complete the flowchart for energy transformation in thermal power plant.

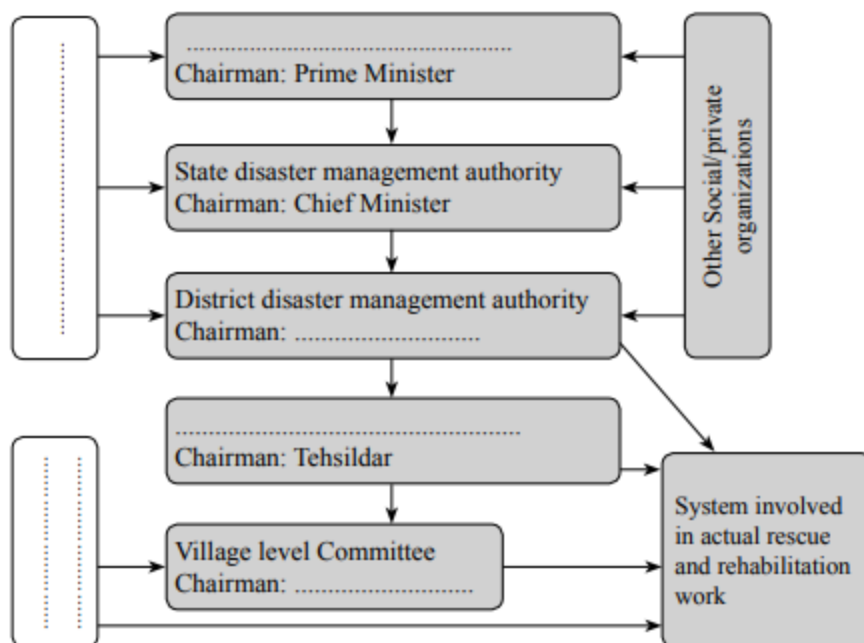


- (vi) Complete the paragraph with the help of words given in the bracket:

(nutritive, ethanol, salt, actinomycetes, fermentation, carbon dioxide, lactic acid, *Saccharomyces cerevisiae*)

Different types of breads are produced from flour of cereals. Dough is formed by mixing of baker's yeast – _____, water, _____ and other necessary materials with flour. Due to _____ of carbohydrates by yeast, sugar is converted into _____ and _____. Dough rises up due to CO_2 and the bread becomes spongy. Bread and other products produced with the help of yeast become _____.

- (vii) Fill in the blanks in the structure of Disaster Management Authority.



- (viii)(a) Write any two advantages and two problems associated with hydroelectric power plant.
- (b) Is hydroelectric power generation environment friendly? What is your opinion?

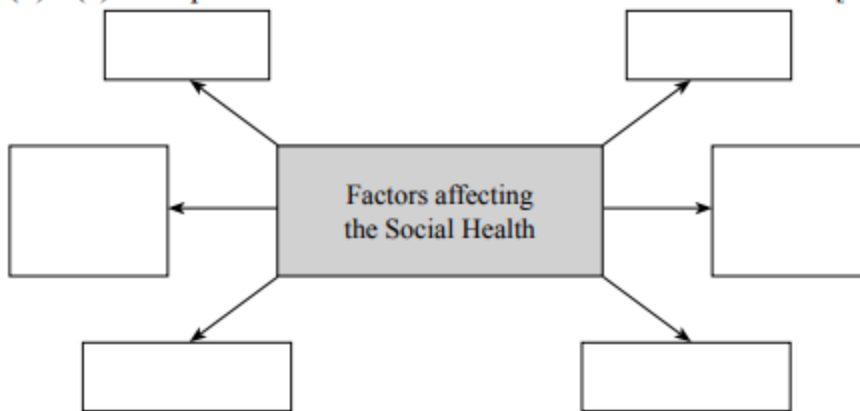
Q.4. Answer the following. (Any one)

[5]

- (i) Answer the following questions in complete sentence based on female reproductive system:
- How many immature oocytes are present at the time of birth in the ovary of female foetus?
 - What is ovulation?
 - What is menopause?
 - Draw scientifically correct diagram of female reproductive system.
 - Label the following parts:
 - Ovary
 - Uterus

(ii) (a) Complete the flowchart:

[3]



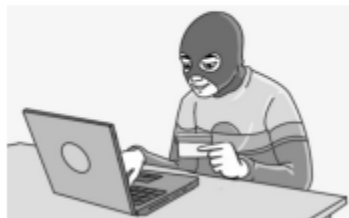
(b) Observe the following pictures and answer the following:

[2]

(i) Whether the incidence shown in the picture is rational or irrational? Justify your answer.



(ii) Identify the picture. What is the punishment given to the person shown in the picture?



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Q.1. (A) Choose the correct alternative and write correct option number as answer. [5]

- (i) a. Genetic disorder like sickle cell anemia may be caused due to mutation. [1]
- (ii) b. Protein like interleukin produced by biotechnology is used against cancer disease. [1]
- (iii) d. We get 9 kcal of energy from one gram of lipid. [1]
- (iv) c. The Pseudomonas bacteria are useful for cleaning the hydrocarbons and oil pollutants from soil and water. [1]
- (v) b. Human males have 44 + XY numbers of chromosomes. [1]

(B) Answer the following. [5]

(i) **Pick the odd man out:** β -carotene, lycopenes, xylitol, lutein
Ans. Xylitol. [1]

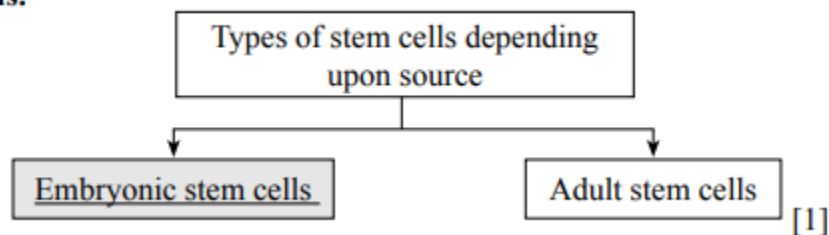
(ii) **Identify the phylum of the given animal:**



Ans. Animal shown in diagram belongs to Phylum Mollusca. [1]

(iii) **Complete the given flowchart:**

Ans.



(iv) **State, if True or False:**

Communication media like mobile phone, television, internet should be used often.

Ans. False. [1]

(v) **Write the co-relation:** Ovary : Estrogen : : Testes : _____ .

Ans. Testosterone. Ovary secrete estrogen whereas testes secrete testosterone. [1]

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

(i) Duck billed platypus is a connecting link.

Ans.

- (i) Duck billed platypus is a connecting link between reptiles and mammals. [1]
- (ii) It lays eggs like reptiles. [1/2]
- (iii) It has mammary glands and hair like mammals. [1/2]

(ii) Biofuel is important among the renewable sources of energy.

Ans.

- (i) Biofuels are easily available and in plenty of quantity. [1]
 - (ii) They are pollution free. These are reliable fuels of the future. [1]
- Hence, biofuels are an important tool in renewable energy sources.

(iii) Humans have a crucial role in maintaining environmental balance.

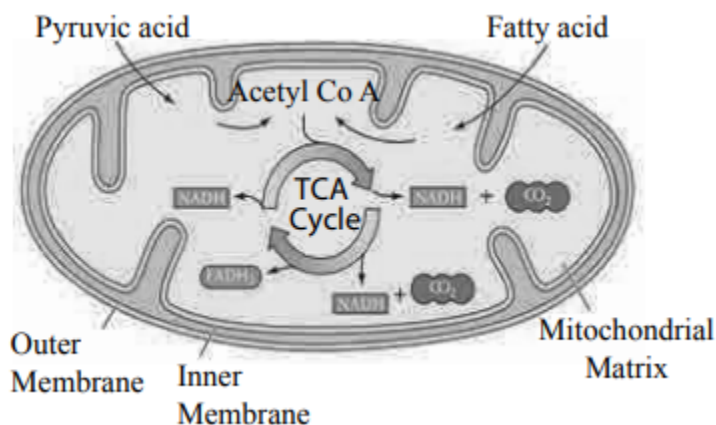
Ans.

- (i) Human beings have used as much natural resources as possible and have polluted the environment and depleted the natural resources, hence created many problems like increasing temperature, floods etc. [1]
- (ii) If humans have disturbed the environmental balance then, human themselves only can conserve and improve the quality of nature. [1]

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

(i) Draw a neat and labelled diagram of mitochondria and tri-carboxylic acid cycle.

Ans.



(ii) Write any two objections that were raised against Darwin's Theory of Natural Selection.

Ans. Objections were raised against this theory because:

1. Natural selection is not the only factor responsible for evolution.
2. Darwin did not provide any explanation about useful and useless modifications.
3. There was no explanation about slow and abrupt changes.

(iii) Observe the given animal and answer the following questions:

(a) Identify the given animal and its phylum.

(b) Write any two characteristics of that phylum.

Ans.

(a) The given animal is *Balanoglossus*. [1/2]

And phylum is Hemichordata. [1/2]



(b) Characteristics of phylum Hemichordata:

1. The body of *Balanoglossus* is divided into three parts – the proboscis, collar, and trunk.
2. The notochord is present in the proboscis region only. Hence, they are known as Hemichordates.
3. They are also called 'acorn worms'.
4. They are marine animals, and they live in burrows in sand.
5. They have one to many pharyngeal gill slits.
6. They may be unisexual or hermaphrodites.

(iv) Write any two objectives of disaster management.

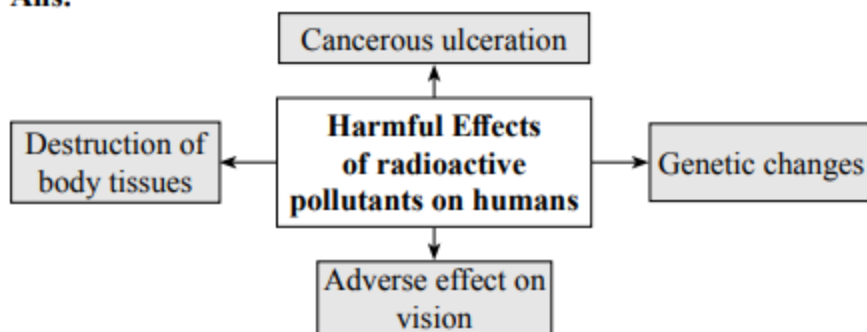
Ans.

1. To reduce deaths during a disaster and to give relief to the people.
2. To supply essential commodities to the people affected by disaster and reduce their suffering.
3. To restore human life in the region to normalcy by creating reconciliation.
4. To rehabilitate them in an appropriate manner.
5. To formulate plans and protective measures to avoid disasters and to reduce the intensity of the effects of disasters.

(v) Complete the given conceptual chart:

(For incomplete chart refer July 2023 question paper)

Ans.



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

(i) Observe the given figures and answer the following:

(Refer July 2023 paper for picture.)

Identify the types of body symmetry and give one example of each apart from the given figure.

Ans.

Figure A shows asymmetry. Examples: Sponge, Amoeba, Paramecium

Figure B shows radial symmetry: Examples: Starfish, sea anemone, sea cucumber.

Figure C shows bilateral symmetry: Examples: Fishes, frog, birds, mammals.

[For each type of symmetry: 1/2 mark and one example: 1/2 mark]

(ii) Write a short note on – The types of Biodiversity.

Ans.

a. **Genetic diversity** [1/2]

Occurrence of diversity among the organisms of same species is genetic diversity. [1/2]

b. **Species diversity** [1/2]

Innumerable species occur in nature. This is called species diversity. [1/2]

c. **Ecosystem diversity** [1/2]

Many ecosystems are present in each region. Each ecosystem has its own characteristic animals, plants, microbes, and abiotic factors. [1/2]

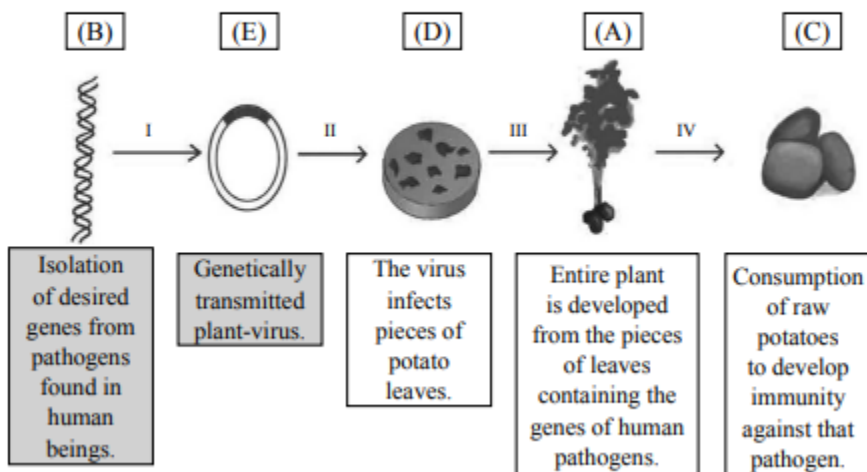
(iii) Complete the given chart:

Ans.

Sr. No.	Body Constituents	Proteins/Amino Acids
1.	Blood	Haemoglobin/ Antibodies
2.	Bones	Ossein
3.	Skin	Melanin/Keratin
4.	Pancreas	Insulin
5.	Muscle	Actin/myosin
6.	Cell	Various proteins of cell membrane

(iv) Rearrange and write proper alphabetical sequence only and complete the given blanks:

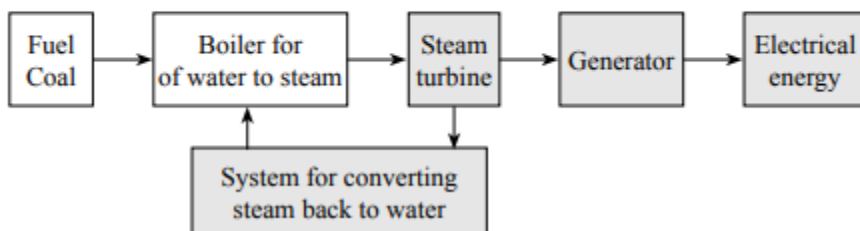
Ans.



(v) (a) Complete the given flowchart for electrical energy production based on thermal power plant.

(For incomplete chart refer July 2023 question paper)

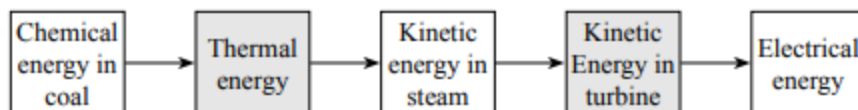
Ans.



(b) Complete the flowchart for energy transformation in thermal power plant.

(For incomplete chart refer July 2023 question paper)

Ans.



(vi) Complete the paragraph with the help of words given in the bracket:

(nutritive, ethanol, salt, actinomycetes, fermentation, carbon dioxide, lactic acid, *Saccharomyces cerevisiae*)

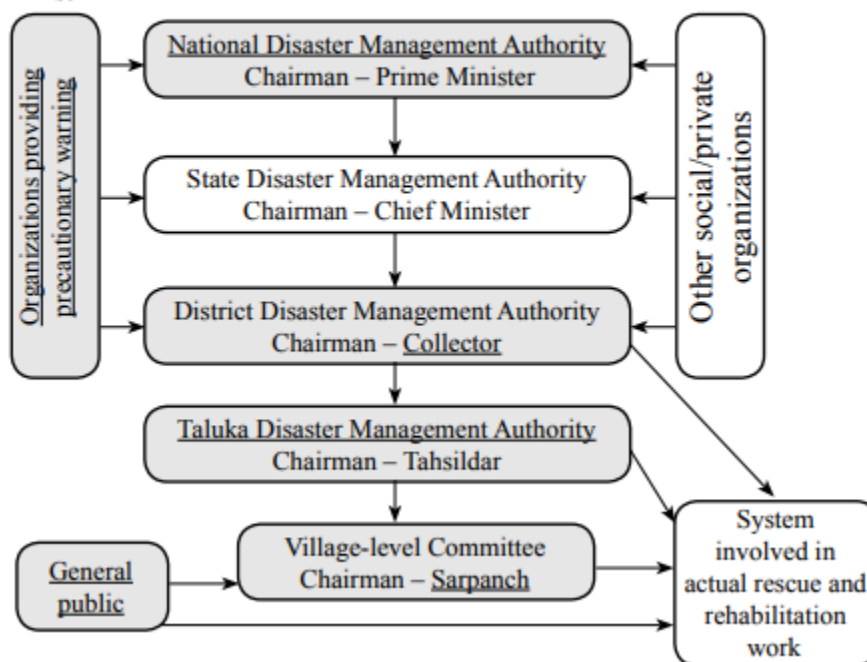
(For incomplete paragraph refer July 2023 question paper)

Ans. Different types of breads are produced from flour of cereals. Dough is formed by mixing of baker's yeast – *Saccharomyces cerevisiae*, water, salt and other necessary materials with flour. Due to fermentation of carbohydrates by yeast, sugar is converted into carbon dioxide and ethanol. Dough rises up due to CO₂ and the bread becomes spongy. Bread and other products produced with the help of yeast become nutritive.

(vii) Fill in the blanks in the structure of Disaster Management Authority.

(For chart with blanks refer July 2023 question paper)

Ans.



(viii)(a) Write any two advantages and two problems associated with hydroelectric power plant.

**(b) Is hydroelectric power generation environment friendly?
What is your opinion?**

Ans.

Advantages:

1. Hydroelectric power generation does not involve burning of fuels; hence there is no pollution arising from combustion of fuel.
2. If there is sufficient water storage in the dam, it is possible to generate electricity as and when necessary.
3. Water in the dam can be replenished during rainy season, enabling uninterrupted power generation.

[Any 2 points :1/2 mark each]

Problems:

1. The backwater due to storage of water in dams may submerge nearby villages, forests, and fertile land, posing a serious issue – rehabilitation of displaced population.
2. New studies show that flooding results in uncontrolled decomposition of the submerged vegetation, which releases much CO₂ and methane gases, polluting the environment.
3. The obstruction of the flow of river water may have adverse effect on living things in the river.
4. As the normal flow of the river is practically stopped by a dam, the level of dissolved oxygen in the water reduces, leading to the death of aquatic organisms such as fish.

[Any 2 points :1/2 mark each]

Thus, we see that hydroelectric plants provide clean, pollution-free energy, but they can also harm the environment. However, they are more environment-friendly when compared to thermal and nuclear power plants.

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

(i) Answer the following questions in complete sentence based on female reproductive system:

- (a) How many immature oocytes are present at the time of birth in the ovary of female foetus?**
- (b) What is ovulation?**
- (c) What is menopause?**

(d) Draw scientifically correct diagram of female reproductive system.

(e) Label the following parts:

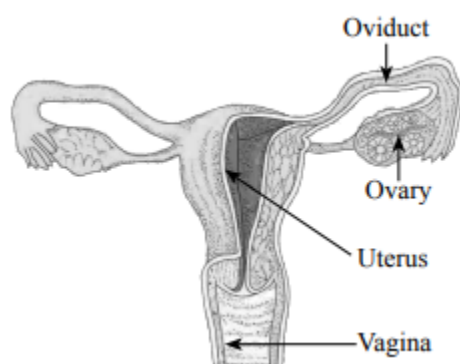
(i) Ovary (ii) Uterus

Ans. (a) At the time of birth, there are 2-4 million immature oocytes in the ovary of female foetus. [1]

(b) Follicle bursts under the effect of luteinizing hormone and the oocyte is released, this is called ovulation. [1]

(c) Menopause is the stoppage of functioning of female reproductive system. [1]

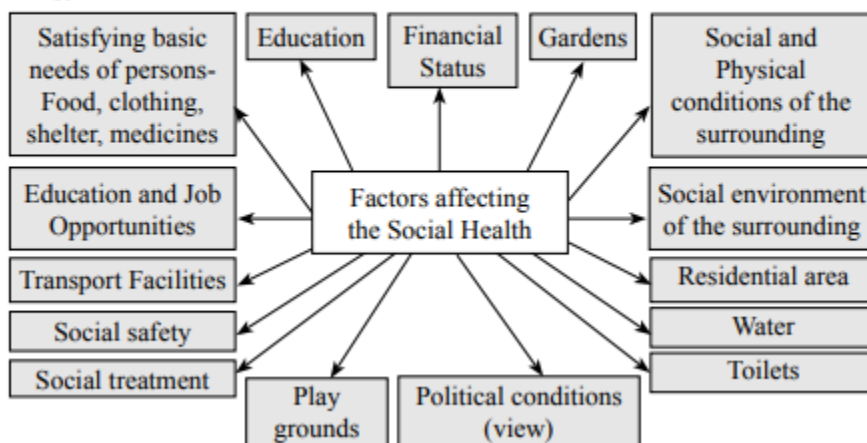
(d)



(ii) (a) Complete the flowchart: [3]

(For incomplete flowchart refer July 2023 question paper)

Ans.



(b) Observe the following pictures and answer the following:[2]

(i) Whether the incidence shown in the picture is rational or irrational? Justify your answer.



Ans.

1. Yes. The incidence shown in the picture depicts ill treatment and is hence not at all rational.
2. A lot of old people are being ill-treated by their own children.
3. Elderly people are not shown the love and care that they really need.
4. Sometimes, they are even sent to old age homes.
5. They fall sick, yet they are left to themselves.
6. Such ill-treatment is definitely not rational. It may harm social health.

(ii) Identify the picture. What is the punishment given to the person shown in the picture?



Ans. Picture shown is of cyber-crime. [1/2]

Person committing cyber-crime has to face the punishment like imprisonment for 3 years or fine upto 5 lakh. [1/2]