

**Time : 2 Hrs.**

**Marks : 40**

**Q.1 A) Multiple choice Questions.**

- 1) ii) Chromosomes are arranged parallel to equatorial plane of the cell
- 2) iv) Bartholin's gland
- 3) i) IUCN
- 4) ii) Cold
- 5) iv) All of the above

**B) Name the following.**

- 1) Monozygotic Twins, Dizygotic Twins
- 2) Sacred
- 3) Uranium or Plutonium
- 4) Ideonella sakaiensis
- 5) Hacking

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

- 1) i) Forelimb of bat and flipper of whale appear different superficially and also have different functions.  
ii) They however, are similar in structure of bones and bony joints in organs and hence indicates a common ancestry.
- 2) i) The sources of energy which are being produced continuously in nature and are inexhaustible, i.e., they are always available for use are called renewable sources of energy.  
ii) Hydroelectric energy, solar energy, wind energy are produced from energy sources like water, sunlight and wind respectively that are produced continuously in nature and will not get depleted. Thus, hydroelectric energy, solar energy and wind energy are called renewable energies.
- 3) i) Condition of natural imbalance has occurred due to greed of economic progress of human being.  
ii) The increasing pollution led to increasing demands which further led to the emergence of some problems which reached its peak.  
iii) Economic inequality, racial and religious differences etc., have led to the condition of instability in the country.  
iv) Incidences like terrorism, abduction, social differences, etc., have become common.  
v) Although production of certain harmful chemicals has been banned in developed nations, they are still being produced in developing and poor countries. This can be also lead to disasters.  
vi) Increase in autonomic energy plants in many countries pose a threat to life, in case of radiation leakage due to carelessness.

**B) Answer the Following. (Any 3)**

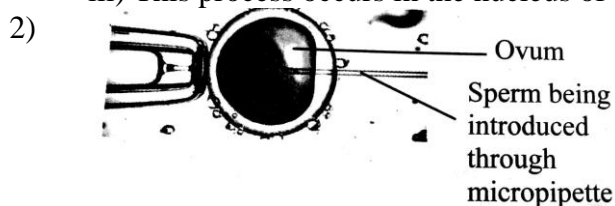
- 1) The steps involved in fragmentation of Spirogyra are as follows:-  
i) Fragmentation is the process of asexual reproduction in which the parent body breaks into many pieces or fragments and the fragments develop into mature filaments.  
ii) This process of reproduction is used by spirogyra.  
iii) When plenty of water and nutrients are available, Spirogyra grows rapidly and breaks up into many small fragments.  
iv) Each fragment grows independently and develops as a new Spirogyra fiber.
- 2) (i-b), (ii-d), (iii-a), (iv-e)

Microbes	Organic Acid	Uses
Aspergillus Niger	Citric Acid	Production of drinks, toffees, chocolate.
	Gluconic acid	Production of minerals used as supplement for the Calcium and iron.
Lactobacillus delbrueckii	Lactic acid	Production of vitamins
Aspergillus Itaconius	Itaconic acid	Paper, Textile, Plastic industry, gum production.

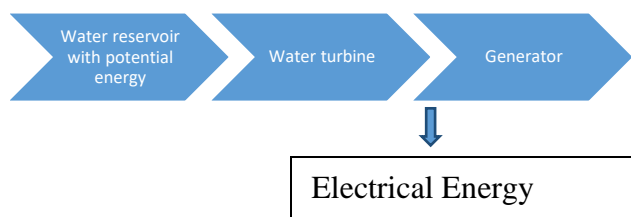
- 4) i) Stem cells are specialized cells that give rise to all other types of cells present in the body of multicellular organisms.  
ii) The two types of stem cells are embryonic stem cells and adult stem cells.
- 5) i) A person may get addicted to various harmful substances like, alcohol, tobacco, cigarette, gutkha, drugs, etc.  
ii) Excessive consumption of liquor leads to decrease in efficiency of nervous system (especially brain) and liver and reduces the lifespan of the person. In adolescents, it affects brain development and reduces ability of memorization and learning.  
iii) Temporarily intoxicating drugs of plant origin as well as some chemicals can permanently damage the human nervous system, muscle system, heart etc.  
iv) The use of tobacco can lead to cancer of mouth and lungs.

**Q.3 Answer the following. (Any 5)**

- 1) i) The cellular process depicted in the diagram is transcription.  
ii) The enzyme required for this process is RNA polymerase.  
iii) This process occurs in the nucleus of a cell.



- i) IVF is a technique in which fertilization is brought about in the test tube. Sperm is injected into the ovum using a micropipette.
- ii) The embryo formed after fertilization is implemented in the uterus of a woman at the appropriate time.
- iii) Childless couples, who have problems like, less sperm count, obstacles in oviduct, etc. can use IVF technique for having child.
- 3) i) In a hydroelectric power plant, potential energy in water is converted to electrical energy.  
ii) High rise dams are constructed on rivers to obstruct the flow of water.  
iii) The stored water possesses potential energy.  
iv) This water stored at high level in a dam is then carried to the turbine, at the bottom of the dam. In this way, the potential energy in water is converted to kinetic energy.  
v) The kinetic energy of the fast flowing water drives the turbine which in turn rotates the generator to produce electrical energy.



- 4) i) Molluscs have a soft and slimy body.  
ii) They are aquatic or terrestrial. Most of the aquatic molluscs are marine, but few of them inhabit fresh water too.  
iii) Members of phylum Mollusca are triploblastic, eucoelomate, non-segmented and bilaterally symmetrical.  
iv) The body of molluscs is divided into head, foot and visceral mass.  
v) VISCERAL mass is covered with a mantle that secretes a hard, calcareous shell. This shell is present either externally or internally or even absent in some animals.  
vi) These animals are unisexual. E.g. Bivalve, snail, octopus, etc.
- 5) i) Carbon compounds present in fruit juices, maple syrup, sugar molasses, and starch of roots. Etc., are fermented using yeast to obtain ethanol.  
ii) A mixture of bacterial strains like, Acetobacter and Gluconobacter is mixed with ethanol to carry out its microbial degradation.

- iii) This results in the production of acetic acid and by products. From this mixture, acetic acid is separated by rarefaction.
- iv) Acetic acid is bleached with the help of potassium ferrocyanide and then it is pasteurized.
- v) At the end of this process, a very small to produce quantity of  $SO_2$  gas is mixed to produce vinegar.
- 6) i) In vaccination, small amount of vaccine i.e. killed / inactivated form of pathogens (antigen) is introduced into the body to induce immune response against a specific pathogen or disease.  
e.g. Polio vaccine, hepatitis vaccine, etc.
- ii) Vaccines produced by biotechnology are comparatively safer than using completely or partially killed pathogens vaccines.
- iii) These vaccines are more thermo-stable.
- iv) Vaccines produced by biotechnology remain active for longer periods in the body.
- v) Edible vaccines are being produced using biotechnology e.g. Transgenic potatoes provide immunity against cholera and diseases caused by *Escherichia coli*.
- 7) The effects of television and video games on children are as follows:
  - i) Children may imitate the characters in cartoon films which they have watched.
  - ii) They may also develop a negative tendency by playing games like virtual war and car races which includes deliberately brought about virtual accidentence.
  - iii) Also continuous laying of these games on cell phones and computers consumes a lot of time, affects concentration on some essential subjects and may also prove fatal in certain cases.
  - iv) It may also lead to various physical problems like tiredness, headache, forgetfulness, etc.
- 8) The objectives of Disaster management are as follows:
  - i) To reduce the loss of human life caused during the disaster and to rescue people from those disasters.
  - ii) To reduce the effect of disaster by supplying essentials commodities to people.
  - iii) To restore the human life in the region and bring normalcy in life of people affected by disaster.
  - iv) To rehabilitate the people affected by disaster.
  - v) To take precautionary steps so as to reduce the effect of similar disasters in future.

**Q.4 Answer the following. (Any 1)**

- 1) a) Two ATP molecules (net gain of the process of glycolysis) would be generated through anaerobic respiration.
- b) Pyruvic acid formed by oxidation of glucose through glycolysis, is fermented to produce alcohol in yeast during anaerobic respiration.
- c) Alcohol, lactic acid, vinegar, vitamins are examples of products formed by fermentation.
- d) Our muscle cells perform anaerobic respiration during exercise, consequently generating less amount of energy and resulting in accumulation of lactic acid, due to which we feel tired.
- e) Seeds sown in soil in a marshy land having high water content would perform anaerobic respiration during germination.
- 2) a) i) Endangered species :- These are the species whose either number is declined or habitat is shrunk to such an extent that they can be extinct in near future, if conservative measures are not implemented e.g. Lion tailed monkey Lion tailed macaque), Lesser florican.
- ii) Rare species: - Number of these organism is considerably declined. Member of this species being ENDEMIC may become extinct very fast. These species are rarely encountered and very uncommon. E.g. Red Panda, Musk deer.
- b) Lion tailed macaque and lesser florican are classified as endangered species.
- c) Threatened species are endemic and their number is declining very fast. Hence, they are protected by in-situ conservation in national parks, etc., and may not be spotted elsewhere.
- d) Red Panda, Tiger, Lion, Gait squirrel (Shekru), etc., are example of threatened species.
- e) Anthropogenic activities like poaching, mining, construction of dams, etc., has lead to destruction of wildlife habitat, thereby declining the number of animal species.