EDUTECH ACADEMY
NURTURING THE FUTURE...
— Classes 5 to 10 —

SET A

N 714

Seat No. | | | | | | | |

2025 XII 29 1100 – N 714 – SCIENCE & TECHNOLOGY PART II (72)

(REVISED COURSE)

Time : 2 Hours **(Pages 7)** **Max. Marks : 40**

---- MODEL ANSWER ----

Q.1 (A) Choose the proper alternative and fill in the blanks: **5**

(1) Ans. (d) they reproduce asexually

(2) Ans. (a) triplet codon

(3) Ans. (b) convert organic material into inorganic forms

(4) Ans. (b) Arthropoda

(5) Ans. (d) Biotechnology

(B) Attempt the following: **5**

(1) Find the odd one out: **1**

Ans. Glucose (Others are products of glycolysis)

(2) State 'True' or 'False', if 'False' correct it: **1**

Ans. False

(3) Write the correlated terms: **1**

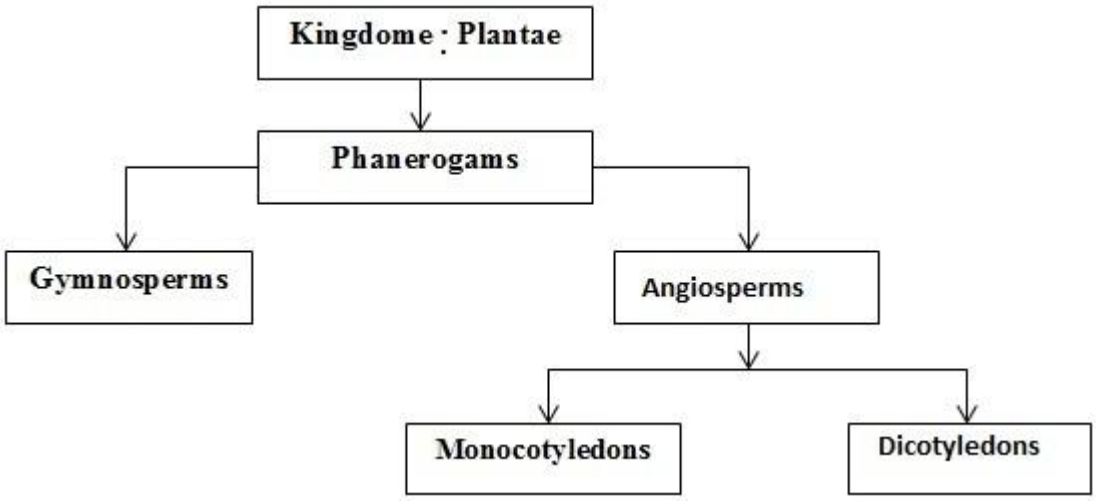
Ans. Secondary consumer

(4) Name the following: **1**

Ans. Origin of species

(5) Answer the following in one line: **1**

Ans.



Q.2 (A) Give reasons:(Any Two) **4**

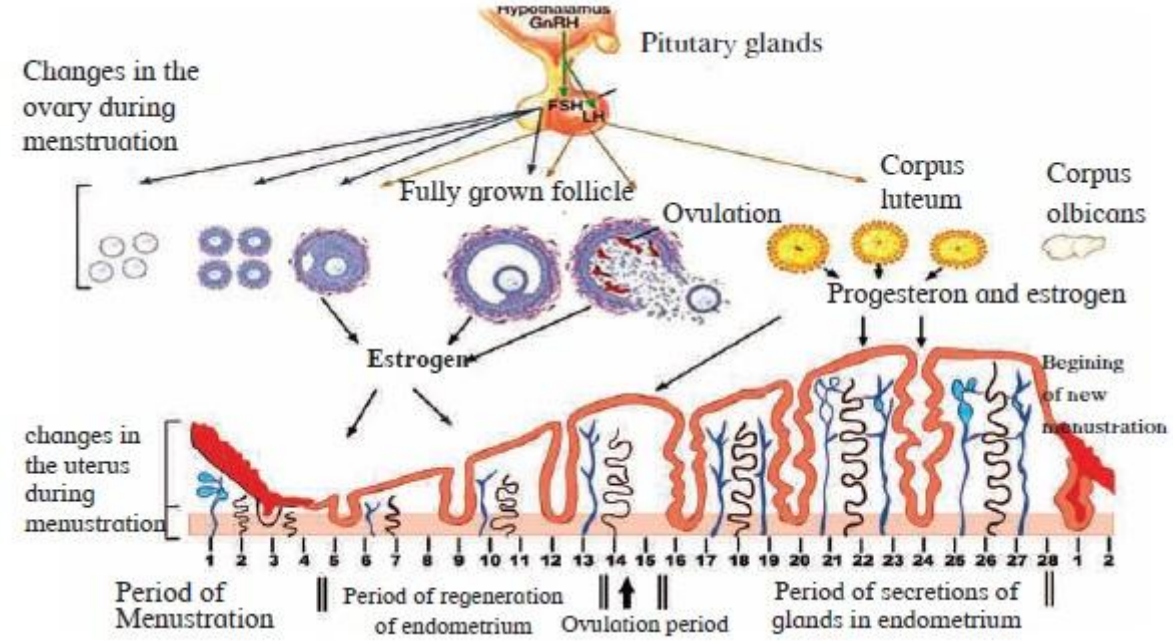
(1) Ans. 1. In sexual reproduction, the haploid male and female gametes are united to form diploid zygote.
2. The zygote thus carries chromosomes of both parents which are transferred via male and female gametes.
3. While producing gametes, there is meiosis in which genetic recombination takes place.
4. Therefore, the individual developed by sexual reproduction always carry recombined genes of both the parents.

(2) Ans. 1. Vertebrates are animals that have a backbone or spinal column. These include mammals, birds, reptiles, amphibians, and fish.
2. The characteristic features of the phylum Chordate include the presence of a notochord and paired pharyngeal gill slits.
3. In sub-phylum Vertebrata, the notochord present in embryos gets replaced by a cartilaginous or bony vertebral column in adults.
4. But in cephelochordates, notochord persists throughout their life and in urochordates, notochord is present only in larval stages and absent in adults.
5. Thus, according to the above points it can be said that all vertebrates are chordates but all chordates are not vertebrates.

(3) Ans. i. There is an inter-relationship between humans and the environment.
Ii. In an attempt to live a satisfactory life, humans over-utilized natural resources.
Iii. Natural resources are depleting in nature. Humans need to conserve and improve its quality in order to maintain the environmental balance.
Iv. Humans are responsible for the deterioration of nature and its components.
V. Hence, only humans can conserve and improve the quality of nature.

(B) Answer the following:(Any Three) **6**

(1) Ans.



(2) Ans. i. Above mentioned characters are of phylum-Echinodermata.
ii. Sea star is an example of this phylum.
iii. In new system of classification, these animals classified with the help of criteria like-body organization, body symmetry, body cavity, etc.

(3) Ans. (i) The structural and functional unit of the body is called as a cell.
(ii) Tissue culture and genetic engineering.

(4) Ans. 1. The chief and immediate effects of dry famine are death and diseases.
2. There is scarcity of water due to which crops die because there is no proper irrigation. This results into shortage of food.
3. Lack of food over a prolonged period causes people to lose weight and become weak.
4. Lack of water and foods results into forced migration of human beings and even death of animals and human beings.

(5) Ans. 1. In the process of sexual reproduction, there is union of gametes producing new offspring. Gametes are formed due to cell division.
2. In asexual reproduction also cell division occurs.
3. Hence due to cell division, formation of new organism of same species by earlier existing organism take place.

Q.3 Answer the following:(Any Five) 15

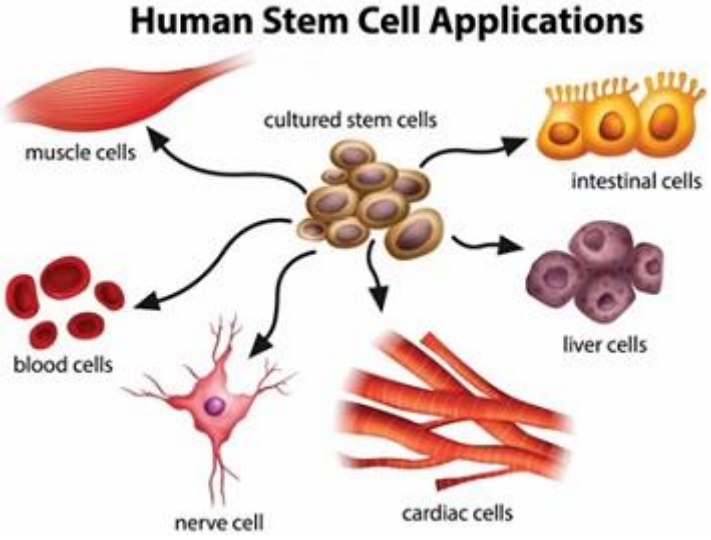
(1) Ans. Heredity is the transfer of biological characters from one generation to another via genes.
The mechanisms of hereditary changes are as follows:
1. Mutation: It is a sudden change in genes of the DNA which results into changes in the hereditary characters.
2. Crossing over: In meiosis type of division, the crossing over takes place which creates new recombination of the genetic information. Therefore, the gametes carry the changed hereditary characters to the next generation.

(2) Ans. (a) Electrical energy.
(b) Natural gas.
(c) Power generation from natural gas is more ecofriendly because natural gas does not contain sulphur or other toxic gases so burning results in less pollution.

(3) Ans. 1. Since existence of human, there is interrelationship between human and environment.
2. Human stepped on the earth long after formation of earth.
3. On the earth, human being proved its superiority as compared to other animal with the help of characters like intelligence, memory, imaginary ability etc.
4. Human established domination over the nature.
5. Human utilized all the natural resources as much as possible.
6. In an attempt to live a satisfactory life, human kept on snatching from the nature as much as possible and this lead to increase in problems. No other organism on the earth except man can change the ecosystem in such a drastic way.
7. So the human has crucial role in maintaining the environmental balance.
8. If human has disturbed the environmental balance, then human itself only can conserve and improve the quality of nature.
9. Hence, it is said rightly that human beings have important place in environment.

(4) Ans. Excessive use of social media and technology is proving harmful because of the following reasons:
1. Misuse of time.
2. Developing habit of watching obscene material on internet
3. Increase in cyber crimes.
4. Persons become self-centered i.e. an autistic.
5. People are becoming more violent due to wrong cartoons and games.
6. People are becoming more dependent on machines.
7. Self-reliance is on the decline.

(5) Ans.



(6) Ans. i. The picture depicts 'insensitivity' type of mental disorder.

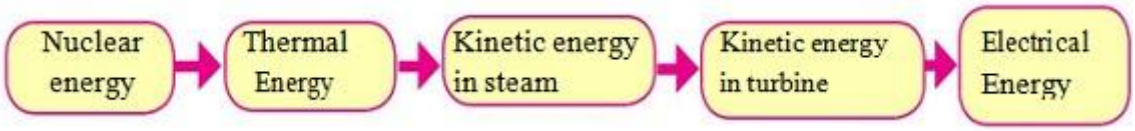
ii. Social message:

1. Instead of making video-clips of the accident, provide help to the victims.
2. Inform the police immediately.
3. As per the situation, provide CPR (Cardiac-Pulmonary Resuscitation) to the victim; if necessary.
4. Call '108' for an ambulance.

(7) Ans. 1. We face different types of major or minor disasters in our daily life.

2. Varieties of disasters like accidents, stampede, injuries in fighting, electric shock, burns, heat shock, snake bite, dog bite, fire due to electric short circuit, epidemic of any disease, etc. happen around us.
3. Victims of disaster need to be offered some primary help before actual medical treatment because there may be delay in getting actual medical treatment due to various problems such as transportation, unavailability of doctors etc. Hence, to save life of injured people, primary treatment should be given. This primary treatment is known as First aid i.e. first aid is useful in such circumstances.
4. The need of knowledge of first aid may be required at any time in case of our parents, our siblings at home or in school etc.
5. Hence, it is essential to get the training of first aid.

(8) Ans.



Q.4 Answer the following:(Any One) 5

(1) Ans. Prophase 1 of Meiosis is the first stage of meiosis and is defined by five different phases; Leptotene, Zygotene, Pachytene, Diplotene and Diakinesis (in that order).

Prophase 1 is essentially the crossing over and recombination of genetic material between non sister chromatids- this results in the genetically unidentical, haploid daughter chromatid cells.

The five stages of prophase-1 of meiosis are as follows:

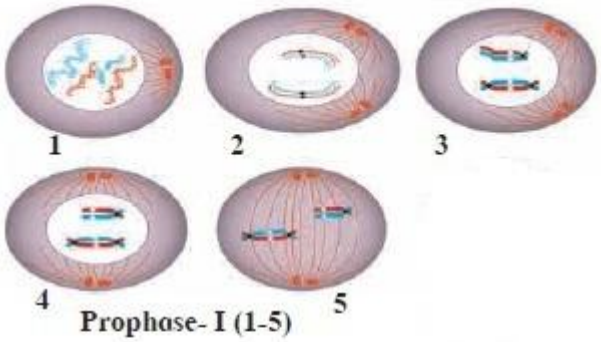
i. Leptotene:-Leptotene is the first of five stages of Prophase 1 and consists of the condensing of the already replicated chromosomes, this procedure continues throughout Prophase 1. The chromosomes become visible by using electron microscopy, which can distinguish between sisters chromatid. The appearance of the chromosomes at this stage of Prophase 1 is likened to 'a string with beads, these beads are called chromomeres. Each sister chromatid is attached to the nuclear envelope and are so close together that they can be mistaken for only one chromosome. This is a very short stage of Prophase 1.

ii. Zygotene:-Zygotene is the sub-stage where synapsis between homologous chromosomes begins. It is also known as zygonema. This synapsis can form up and down the chromosomes allowing numerous points of contact called 'synaptonemal complex'. This can be compared to a zipper structure, due to the coils of chromatin. The synaptonemal complex facilitates synapsis by holding the aligned chromosomes together. After the homologous pairs synapse they are either called tetrads or bivalents. Bivalent is more commonly used at an advanced level as it is a better choice due to similar names for similar states (a single homolog is a 'univalent', and three homologs are a 'trivalent').

iii. Pachytene:-Once the synapse is formed it is called a bivalent where a chromatid of one pair is synapsed/attached to the chromatid in a homologous chromosomes and crossing over can occur. Subsequently, the synapses snap completing the crossing over of the genetic information. As a result the variation in genetic material has been increased significantly, because up and down the chromosome there has been an exchanged of the mother and father's genetic material. The two sister chromatids separate from each other, but the homologous chromosomes remain attached. This makes the complex look much thicker. The synaptonemal complex is complete, allowing chiasma to form. This is what allows the crossing over alleles to occur as this is a process that only happens over a small region of the chromosomes.

iv. Diplotene:-During this phase, the two homologous chromosomes begin to migrate apart as the 'synaptonemal complex' disintegrates between the two chromosomal arms and they begin to repel one another. This allows the two chromosome to move apart, held only by the chiasma(ta). Whilst this process occurs the chromosome begin to uncoil, contrary to the natural progression of Prophase, however, they are still coiled enough to allow a distinct image of a chiasma formation under a microscope. The chiasma is fully visible at this stage, so can be seen to move towards the end of the chromatids in a process known as terminalisation.

v. Diakinesis:-Diakinesis is the final step of Prophase 1 and is the termination of the condensing of the chromosomes; this allows the chiasmata and bivalent structure to be seen more clearly under an electron microscope. The chromosomes are at their most condensed form during diakinesis. The homologous chromosomes in a bivalent are still connected by at least 1 chiasma. The rest of this phase is setting up the cell to make way for metaphase 1. Therefore, the nucleolus disappears, the nuclear envelope disintegrates and the centrioles (centrosome) move to the equator, whilst the mitotic spindles migrate.



Prophase- I (1-5)

1. Leptotene
2. Zygotene
3. Pachytene
4. Diplotene
5. Diakinesis

(2) Ans. i. The picture shows the lack of management of waste water/sewage.

Ii. Microbes which can decompose any compound as well as destroy the pathogens of cholera, typhoid, etc. are mixed with sewage. They release methane and CO_2 by decomposition of the carbon compounds present in sewage. Phenol oxidizing bacteria decompose the xenobiotic chemicals present in sewage.

Iii. Hydrocarbonoclastic bacteria like Alcanivorax borkumensis & Pseudomonas are used to clear the oil spillage from ocean water. These bacteria decompose the hydrocarbons and the bring about the reaction of released carbon with oxygen to produce CO_2 & water.

....All The Best....