CLASS XII (2019-20)
BIOLOGY (044)
SAMPLE PAPER-2

Time : 3 Hours **Maximum Marks : 70**

General Instructions :

- There are a total of 27 questions and five sections in the question paper. All questions are compulsory.
- Section A contains question numbers 1 to 5, multiple choice questions of one mark each.
- Section B contains question numbers 6 to 12, short answer type I questions of two marks each.
- Section C contains question numbers 13 to 21, short answer type II questions of three marks each.
- Section D contains question numbers 22 to 24, case-based short answer type questions of three marks each.
- Section E contains question numbers 25 to 27, long answer type questions of five marks each.
- There is no overall choice in the question paper. However, internal choices are provided in two questions of one mark, one question of two marks, two questions of three marks and all three questions of five marks. An examinee is to attempt any one of the questions out of the two given in the question paper with the same question number.

Section A

1. Most common honeybee species in India. [1]

(a) Apis indica (b) Apis florae

(c) Apis mellifera (d) Apis dorsata

Ans : (a) Apis indica

or

HIV that causes Acquired Immuno Deficiency Syndrome (AIDS) reduces the number of

(a) B-cells (b) cytotoxic T-cells

(c) helper T-cells (d) All of these

Ans : (c) helper T-cells

2. Name the labelled parts A, B and C in the following diagram of TS of a young anther.[1]

(a) A - Tapetum; B - Connective; C - Endothecium

(b) A - Endothecium; B - Connective; C - Tapetum

(c) A - Connective; B - Endothecium; C - Tapetum

(d) A - Connective; B - Tapetum; C - Endothecium

Ans : (c) A-Conncective, B-Endothecium and C-Tapetum.

3. While isolating DNA from bacteria, which of the following is not used? [1]

(a) Lysozyme (b) Ribonuclease

(c) Deoxyribonuclease (d) Protease

Ans : (c) Deoxyribonuclease

or

Given below are few statements with regards to restriction enzyme.

(i) It recognises a palindromic nucleotide sequence.

(ii) It produces the same kind of sticky ends in different DNA molecules.

(iii) It is isolated from viruses.

(iv) It ligates all purine and pyrimidine bases.

Which of the above mentioned statements are true for restriction enzyme?

(a) (i) and (iv) (b) (i) and (ii)

(c) (ii) and (iv) (d) (ii) and (iii)

Ans : (b) (i) and (ii)

4. What is common to the techniques (i) In vitro fertilisation, (ii) Cryopreservation and (iii) Tissue culture? [1]

(a) All are in situ conservation methods

(b) All are ex situ conservation methods

(c) All require ultra modern equipments and large space

(d) All are methods of conservation of extinct organisms

Ans : (b) All are ex situ conservation methods

5. Which of the following is not required for a PCR reaction? [1]

(a) Primers

(b) ddNTPs
(c) Template DNA
(d) A thermostable DNA polymerase

Ans : (b) ddNTPs

Section B

6. There is a statutory warning on the packets of cigarettes which warns against smoking and says that it is injurious to health. Yet, smoking is prevalent in our society. Suggest a few points advising the importance of avoiding smoking. [2]

Ans :

Smoking must be avoided because of the following reasons

(i) Cigarettes contain nicotine (an addictive agent) which stimulates adrenal gland to release adrenaline and nor-adrenaline into blood. It results in increased heart rate and blood pressure.
(ii) Smoking is associated with the cancer of lungs, throat and oral cavity.
(iii) It increases carbon monoxide content in blood and causes oxygen deficiency in the body.
(iv) It is associated with bronchitis, emphysema, gastric ulcer, etc.

or

Drugs like LSD, barbiturates, amphetamines, etc., are used as medicines to help patients with mental illness. However, their excessive doses and abusive usage are harmful. Enlist some major adverse effects of abuse of such drugs in people.

Ans :

Harmful effects caused by the abuse of drugs like LSD, barbiturates and amphetamines are

(i) Anxiety, shakiness, nausea and sweating, loss of mind control.
(ii) Reckless behaviour, vandalism and violence.
(iii) Lack of interest in personal hygiene, fluctuations in weight and appetite.
(iv) Withdrawal, isolation, depression, fatigue, aggressive behaviour.

7. State the cause behind the discontinuous synthesis of DNA on one parental strand. What happens to the short stretches of DNA that are synthesised during this process? [2]

Ans :

Replication is discontinuous on the template with polarity $5' \rightarrow 3'$ because only a short segment of DNA strand can be built in the $5' \rightarrow 3'$ direction due to the exposure of a small stretch of template at one time. Short segments of replicated DNA are called Okazaki fragments.

These Okazaki fragments are joined together by using the enzyme, DNA ligase. DNA polymerase can polymerise nucleotides only in $5' \rightarrow 3'$ direction on $3' \rightarrow 5'$ strand because it adds them at the 3' end. Since, the two strands of DNA run in antiparallel directions, the two templates provide different ends for replication. Replication over the two templates thus, proceeds in opposite direction. One strand with polarity $3' \rightarrow 5'$ forms its complementary strand continuously because $3'$ end of the latter is always open for elongation. It is called leading strand.

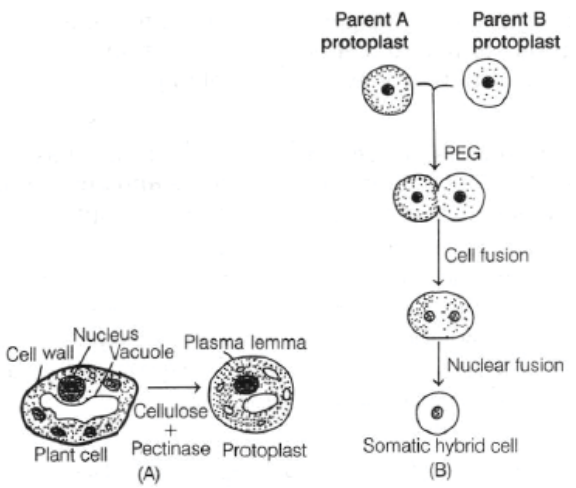
8. GM crops are tailor made plants used in many forms for human welfare. However, they are also known to have certain disadvantages which can make them unpopular as compared to their conventional forms. Provide atleast two evidences in support of the above mentioned claim and defend the progress of GMOs in present situation. [2]

Ans :

GM crops have certain disadvantages which can make them unpopular compared to their conventional forms. The evidences supporting the above fact are as follows

(i) Just as some populations of mosquitoes developed resistance to the new-banned pesticide DDT, many people are concerned that insects will become resistant to Bt or other crops that have been genetically modified to produce their own pesticides.
(ii) Another concern is that crop plants engineered for herbicide resistance and weeds will cross breed, resulting in the transfer of the herbicide resistance genes from the crops into the weeds. These 'superweeds' would then be herbicide tolerant as well.

9. Examine the two events A and B of somatic hybridisation given below. [2]



Describe the procedure of the technique somatic hybridisation.

Ans :

The somatic hybridisation is carried out in the following main steps.

Cell walls of isolated single cells are digested by the enzymes like pectinase and cellulase to expose the marked protoplasts. Naked protoplasts are then isolated from the plasma membrane. After that the isolated protoplasts are fused together induced by Polyethylene Glycol (PEG) solution to obtain the hybrid protoplasts in a special nutrient medium under sterile conditions. Hybrid protoplasts thus, obtained are cultured in a suitable medium to form new plants.

10. What is the main idea behind 'Joint Forest Management Concept' introduced by the Government of India? [2]

Ans :

The main idea behind Joint Forest Management Concept introduced by the Government of India was involving the local communities in the forest conservation.

This concept was adopted considering the extraordinary courage and dedication the local people showed in protecting the wildlife through movements like Bishnoi's movement in Jodhpur and Chipko Movement in Garhwal, Himalayas.

11. A female in your locality does not menstruate even after puberty. Doctor has told that she lacks one X-chromosome (44 + XO). Suggest the name for this syndrome and state some other symptoms. [2]

Ans :

The female has Turner's syndrome (44 + XO). This disorder is caused due to the absence of one X-chromosome. Such individuals are sterile females who have rudimentary ovaries, undeveloped breasts, small uterus, short stature, webbed neck, abnormal intelligence and hearing impairment.

12. Though each pollen grain has two male gametes, atleast 10 pollen grains (not 5) are required to fertilise 10 ovules present in particular carpel. Provide a suitable explanation for the above claim. [2]

Ans :

A pollen tube carrying two male gametes, enters in an ovule and releases two male gametes which fuse with two different structures in the embryo sac, namely the egg and two polar nuclei. Hence, for fertilising 10 ovules, 10 pollen grains are required.

Section C

13. Coextinction is one of the factors which results in the loss of biodiversity threatening the extinction of flora and related fauna. Substantiate this statement by giving examples. Also, mention other factors which together with coextinction form evil quartet responsible for the loss of biodiversity. [3]

Ans :

Coextinction When a species becomes extinct, the plant and animal species associated with it in an obligatory manner, also become extinct. For example, if the host species becomes extinct, all those parasites exclusively found on it will also become extinct. In plant pollinator mutualism, extinction of one results in the extinction of the other.

Other factors of evil quartet which are responsible for the biodiversity loss are as follows

(i) Overexploitation
(ii) Alien species invasion
(iii) Loss and fragmentation of habitat

14. Explain the hormonal control of spermatogenesis in humans regulated by hormones FSH and LH. [3]

Ans :

The hormonal control of spermatogenesis in humans is explained below.

The secretion of Gonadotropin Releasing Hormone (GnRH) by the hypothalamus

increases significantly during puberty.

GnRH acts on the anterior pituitary and stimulates the secretion of two gonadotropins namely Follicle Stimulating Hormone (FSH) and Luteinising Hormone (LH). LH acts on the Leydig cells of testes and stimulates them to secrete testosterone, which further stimulates the process of spermatogenesis. FSH acts on the Sertoli cells and stimulates them to secrete certain factors which are necessary for the process of spermiogenesis.

or

Name and explain the surgical methods advised to human males and females as a means of birth control. Mention its one advantage and one disadvantage.

Ans :

The surgical methods advised to human males and females as a means of birth control are vasectomy and tubectomy, respectively.

Vasectomy is the sterilisation procedure in males where a small part of the vas deferens is removed or tied up through a small incision on the scrotum thereby, preventing sperms to reach urethra.

Tubectomy is the sterilisation procedure in females where a small part of the Fallopian tube is removed or tied up through a small incision in the abdomen thus, preventing the ovulated egg to enter Fallopian tube.

The above described methods are highly effective as they block transport and fusion of gametes, but are irreversible.

15. Scientists believe that the evolution is gradual. But extinction as a part of evolutionary story, are 'sudden' and 'abrupt' and also group specific. Can you predict whether a natural disaster can be the cause for extinction of species? [3]

Ans :

Yes, a natural disaster can be the cause for extinction of species. As new species evolve to fit everchanging ecological niches, older species fade away. But, the rate of extinction is far from constant.

In last 500 million years, 50-90% or more of all species on earth have disappeared in a geological blink of the eye. Many times, these mass extinctions had been the consequence of a natural disaster.

The most studied mass extinction was between the Cretaceous and Palaeocene periods, i.e. about 65 million years ago, which killed the dinosaurs and made room for mammals to rapidly diversify and evolve. The cause is suspected to be volcanic eruptions and impact of large asteroids or comets striking the earth.

16. How do biocontrol agents control the target species? Explain by giving some important examples. [3]

Ans :

Biocontrol refers to the use of biological methods for controlling plant diseases, pests, etc. It relies on the natural control of pests, i.e. natural predation rather than introduced chemicals.

Some examples of biological control agents are as follows

(i) Ladybird and dragonfly are used to get rid of aphids and mosquitoes, respectively.

(ii) Bacillus thuringiensis(Bt) is used to control bollworm insects.

(iii) Free-living fungi like Trichoderma is common in root ecosystem and it is used for controlling several plant pathogens.

(iv) Baculoviruses are used for species specific narrow spectrum insecticidal applications and is beneficial in IPM programme.

or

(i) What would happen if a large volume of untreated sewage is discharged into a river?

(ii) In what way anaerobic sludge digestion is important in the sewage treatment?

Ans :

(i) If untreated sewage is discharged directly into the rivers, it will lead to serious pollution of the water bodies with organic matter and pathogenic bacteria, protozoans and many other disease causing microorganisms.
Their water, if used, will cause outbreaks of water borne diseases.

(ii) In anaerobic sludge digestion, anaerobic bacteria digest aerobic bacteria and fungi in the sludge and the remaining organic matter.
During this digestion, bacteria produce a mixture of gases such as methane,

hydrogen, carbon dioxide and little amount of hydrogen sulphide. These gases (biogas) can be used as a source of energy as it is inflammable.

17. With the help of an example can you highlight how genetically modified plants can [3]
(i) reduce the usage of chemical pesticides?
(ii) enhance the nutritional value of food crops?

Ans :

(i) Genetically modified plants can reduce the usage of chemical pesticides by introducing pest resistant plants.
For example, a nematode Meloidogyne incognita infects the roots of tobacco plants, which reduces the production of tobacco. A novel strategy was adopted to prevent this infestation which was based on the process of RNA interference (RNAI) that occurs in all eukaryotic organisms as a method of cellular defence.
Using Agrobacterium vectors, nematode-specific genes were introduced into the host plant. The introduction of DNA was such that it produced both sense and antisense RNA in the host cells. These two RNAs being complementary to each other formed a double-stranded RNA that initiated RNN and thus, silenced the specific mRNA of the nematode. The consequence was that the parasite could not survive in a transgenic host expressing specific interfering RNA.

(ii) Genetically modified plants can enhance the nutritional value of food crops.
For example, 'Golden rice' developed at Swiss Federal Institute of technology is an example of biofortified crop. It is rich in β-carotene (a precursor of vitamin-A) and the rice grains are golden-yellow in colour. It contains 'beta-carotene' gene from daffodil plant and crt I gene from some bacteria. (1)

18. (i) For the expression of traits, genes provide only the potentiality and the environment provides the opportunity. Comment on the veracity of the statement.
(ii) In order to obtain the F_1 -generation, Mendel pollinated a pure breeding tall plant with a pure breeding dwarf plant. But for obtaining the F_2 -generation, he performed self-pollination of the tall F_1 -plants. Why ? [3]

Ans :

(i) Obviously, genes are not the only factors that determine the phenotype of an individual. Environment also plays an important role in the expression of traits. Genes are actually quite active throughout our lives, switching their expression on and off in response to the environmental stimulus.
Besides the effect of internal factors like hormones and metabolism on gene expression, external factors like temperature, light, nutrition, etc., also affect the gene expression and ultimately exhibiting phenotypic changes.
So, we can say that genes provide only the potentiality and the environment provides the opportunity for the expression of traits.

(ii) Characters segregate during gamete formation. Pure breeding parents give rise to F_1 progeny with heterozygous conditions. Only self-pollination of heterozygous offspring can result in all possible recombinations of characters in progeny as mating is random.

19. Plant breeding is the purposeful manipulation of plant species to create plants with desirable traits. However, the term desirable trait can indicate different things for different plants or the breeder. Analyse the possibilities that can be included within the term desirable traits with suitable examples. [3]

Ans :

The desirable trait can be different for different plants. The breeders have tried to incorporate these traits into crop plants. The list may be as follows

(i) Increased tolerance to environmental stress (salinity, extreme temperature, drought) e.g. hybrid maize, jowar and bajra which are resistant to water stress.
(ii) Resistance to pathogens (viruses, fungi and bacteria) e.g. moong bean (resistance to yellow mosaic virus and powdery mildew).
(iii) Increased tolerance to insect pests, e.g. a new variety of Brassica (rapeseed mustard) is resistant to aphids.
(iv) High-yielding and improved quality of

crop plant, e.g. Atlas 66 used as a donor for developing wheat varieties with improved protein content.

20. (i) Identify A, B and C in the table given below [3]

Pattern of Inheritance	**Monohybrid F_1 Phenotypic Expression**
Codominance	'A'
'B'	Progeny resembled only one of the parents
Incomplete dominance	C

(ii) You are given tall pea plant with yellow seeds, whose genotypes are unknown. How would you find the genotype of this plant? Explain with the help of cross.

Ans :

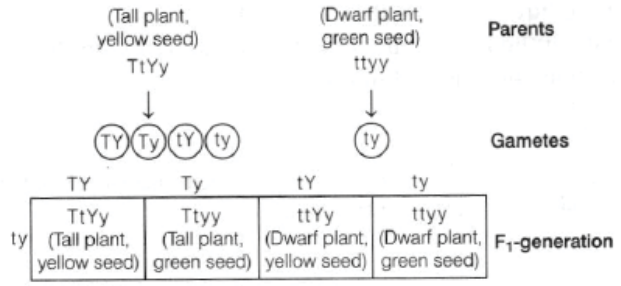
(i) Identify A, B and C in the table given below

Pattern of Inheritance	**Monohybrid F1 Phenotypic Expression**
Codominance	Dominant trait
Dominance	Progeny resembled only one of the parents
Incomplete dominance	Phenotype obtained in between of two parental traits

(ii) (a) The given tall pea plant with yellow seeds need to be crossed with a dwarf plant with green seeds.

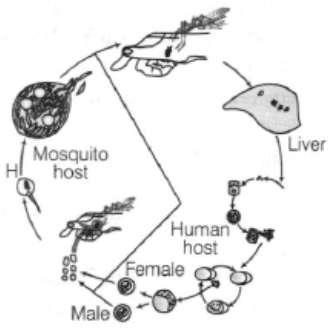
- The dominant traits are tallness and yellow colour of seeds. The recessive traits are dwarfness and colour of seeds.
- Cross between tall plant/yellow seeds and dwarf plant/green seeds.

(b) Cross showing heterozygous nature for both traits.



In this cross, the F_1 generation shows four phenotypes in the ratio of 1 : 1 : 1 : 1. So, the given plant is heterozygous for both the traits.

21. Refer to the diagram given below and answer the questions that follows. [3]



(i) The sexual stages of parasite are referred to as? Where does the fertilisation and development of parasite take place in mosquito body?

(ii) What are sporozoites?

(iii) What is the cause of cycle of fever during malaria?

Ans :

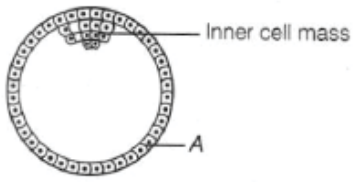
(i) The sexual stages of parasite are referred to as gametocytes. The fertilisation and development of parasite take place in stomach in mosquito's body.

(ii) The mature infective stage of mosquito is called sporozoite.

(iii) At regular intervals, the parasite reproduces and causes bursting of RBCs. This releases haemozoin and causes periodic cycle of fever.

Section D

22. Study the figure given below and answer the questions that follows. [3]



(i) Name the stage of human embryo the figure represents.

(ii) Identify 'A' in the figure and mention its function.

(iii) Mention the fate of the inner cell mass after implantation in the uterus.

(iv) Where are the stem cells located in this embryo?

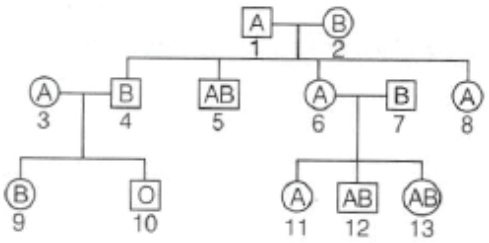
Ans :

(i) Blastocyst.

(ii) 'A' is trophoblast. The trophoblast layer gets attached to endometrium and later

forms chorionic villi.
(iii) The inner cell mass gets differentiated into an embryo.
(iv) Inner cell mass.

23.



Study the given pedigree chart showing the inheritance pattern of blood group in a family and answer the following questions. [3]
(i) Give the possible genotypes of the individual 1 and 2.
(ii) Which antigen(s) will be present on the plasma membranes of RBCs of individual 5 and 10?
(iii) Give the genotype of the individuals 3 and 4.

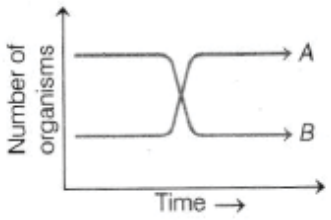
Ans :

(i) Possible genotypes and phenotypes of individual 1 and 2 are as follows

Genotype			**Phenotype**
Individual 1	$I^A I^A$ or $I^A i$	⟶	Type A
Individual 2	$I^B I^B$ or $I^B i$	⟶	Type B

(ii) Individual - 5, Phenotype - AB
Antigen - A and B, Genotype - $I^A I^B$
Individual - 10, Phenotype - O
Antigen - None, Genotype - ii
(iii) Individual - 3, Phenotype - A
Genotype - $I^A I^A$ or $I^A i$
Individual - 4, Phenotype - B
Genotype - $I^B I^B$ or $I^B i$

24. Two types of aquatic organisms in a lake show specific growth patterns as shown below, in a brief period of time. The lake is adjacent to an agricultural land extensively supplied with fertilisers.



Answer the questions based on the facts given above. [3]
(i) Name the organisms depicting patterns A and B.
(ii) State the reason for the growth pattern seen in A.
(iii) Write effects of growth patterns seen above.

Ans :

(i) The pattern A is depicted by microorganisms and pattern B is depicted by fishes or any other aquatic organism.
(ii) As the lake is adjacent to an agricultural land extensively supplied with fertilisers, the run-off water from the field will result in increase in nutrients of lake. Thus, number of microorganisms will rise to degrade organic matter.
(iii) As the microorganisms increase (depicted by pattern A) , they result in decrease of dissolved oxygen in water thus, causing decrease in number of aquatic organisms like fish, etc. (depicted by pattern B).

Section E

25. (i) Name the hormones involved in menstrual cycle.
(ii) Name the ovarian phases of menstrual cycle during the following periods
(a) 5th-12th day of the cycle
(b) 14th day of the cycle
(c) 16th-25th day of the cycle
(iii) What influence do hormones LH and FSH have on different ovarian events stated in (ii) (a), (b) and (c)? [5]

Ans :

(i) **Hormone** - Luteinising Hormone (LH), Follicle Stimulating Hormone (FSH).
(ii) The ovarian phases of menstrual cycle during the following periods are
(a) 5th-12th day - Follicular phase (proliferative phase).
(b) 14th day of cycle -Ovulatory phase (release of ovum).
(c) 16th-25th day -Luteal phase.
(iii) (a) FSH is secreted by the anterior pituitary, which stimulates the ovarian follicle to secrete oestrogen, which inturn stimulates the proliferation of the endometrium of the uterine wall.
(b) Both LH and FSH attain a peak level

in the middle of the cycle (about 14th day). Rapid secretion of LH leading to its maximum level during the mid-cycle is called LH surge. It induces the rupture of Graafian follicle followed by the release of an ovum (ovulation).

(c) The remaining cells of Graafian follicles are further stimulated by the LH to develop corpus luteum which secretes large amount of progesterone, a hormone essential for the maintenance of endometrium.

or

Male and female gametes in human beings differ from each other in terms of both structure and function. Enumerate some major differences between the two, along with their diagrams.

Ans :

Differences between male gamete (sperm) and female gamete (ovum) of human beings are given below:

Male gamete (sperm)	**Female gamete (ovum)**
Male gametes (sperms) are produced inside the testes.	Female gametes (ova) are produced inside the ovary.
Millions of sperms are produced per day.	Only one ovum is produced every 28 days.
Sperms are motile in nature.	Ovum is non-motile in nature.
Reserve food material is less.	Reserve food material is sufficient.
A sperm is differentiated into four parts, i.e. head, neck, middle piece and tail.	Ovum is not externally differentiated into parts.

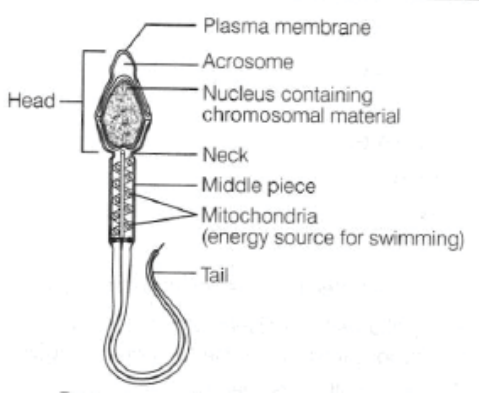


Figure: Structure of Sperms

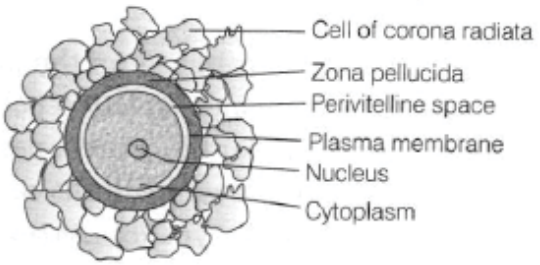


Figure: Structure of Ovum

26. The genetic code is, for the most part, universal, with few exceptions. Explain it by giving the example of mitochondria, the powerhouse of cell. [5]

Ans :

The genetic codes are universal, with few exceptions and mitochondrial DNA includes some of these exceptions. For most organisms, the stop codons are 'UAA', 'UAG' and 'UGA'. In vertebrate mitochondria, 'AGA' and 'AGG' are also stop codons, but not 'UGA', which codes for tryptophan instead. Another codon 'AUA' codes for isoleucine in most organisms, but for methionine in vertebrate mitochondrial mRNA.

There are many other variations among the codes used by other mitochondrial mRNA, which are not harmful to these organisms and can be used as a tool (along with other mutations among the mtDNA/RNA of different species) to determine relative proximity of common ancestry of related species.

The more related any two species are, the more mtDNA/RNA mutations will be the same in their mitochondrial genome. From this, it is estimated that the first mitochondria arose around 1 .5 billion years ago. A generally accepted hypothesis is that mitochondria originated as an aerobic prokaryote in a symbiotic relationship within an anaerobic eukaryote.

or

Evidences from the studies of comparative anatomical and morphological features indicate the progress of evolution.

(i) Thorn of Bougainvillea differs from tendril of Cucurbita in its function; both are located at similar (axillary) position and have similar origin. These

organs are considered homologous.

(ii) The wings of birds and butterfly look alike, they perform similar function of flying but are not anatomically or structurally similar. These organs are considered analogous.

Assess the above statements and explain how these evidences relate to the process of evolution.

Ans :

The evidences from study of comparative anatomy and morphological features highlight the similarities and differences among the organisms of today and those that existed before them years ago (ancestors). Such studies reveal how inspite of the unlike appearances of large number of organisms, they show most of the systems and organs performing similar or different functions. These evidences thus, help in understanding the extent of evolutionary progress. The evidences of comparative anatomical and morphological studies are grouped as follows

(i) **Homologous Organs**

- The organs having similar basic structure and developmental origin, but differ in functions.
- The organisms possessing such organs are said to have originated from a common ancestor.
- For example, in plants, a thorn of Bougainvillea differs from a tendril of Cucurbita in its function; however, both are located at a similar (axillary) position and have similar origin. Thus, thorns and tendrils are homologous structures.

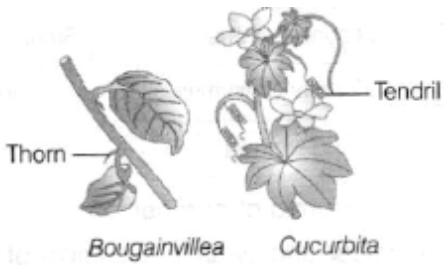


Figure: Thorn of Bougainvillea and tendril of Cucurbita showing homology

- In divergent evolution, a same basic organ becomes adapted by specialisation to perform different functions, in order to adapt to the different environmental conditions, prevailing in the habitat, e.g. forelimbs of vertebrates. Therefore, adaptive radiation and divergent evolution are interrelated and are based on the modifications of homologous structures.

(ii) Analogous Organs

- These are organs that are not anatomically similar, though they perform similar functions.
- For example, the wings of birds and butterfly look alike, they perform the similar function (flying) but are not anatomically or structurally similar.
- Analogous organs lead to convergent evolution, i.e. the similar habitat resulting in the selection of similar adaptive features in different or distantly related group of organisms evolving towards the same function.

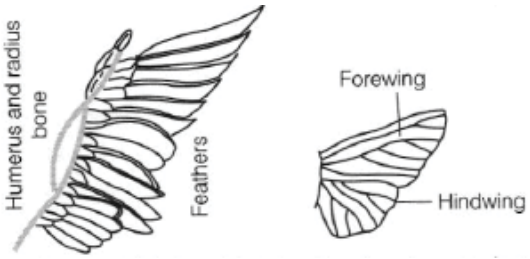


Figure: Wings of bird and butterfly showing analogy

27. (i) What does BOD stand for? Explain the term.

(ii) What is the relationship between dissolved oxygen and BOD?

(iii) Mention the effect of higher BOD value on aquatic life in the river. [5]

Ans :

(i) BOD is Biochemical Oxygen Demand. It is the amount of oxygen required for microbial breakdown of biodegradable organic matter present in one litre of water which is heavily polluted.

(ii) The amount of dissolved oxygen in water body and the value of BOD are inter-related. As the BOD increases, the amount of dissolved oxygen in the water body decreases sharply from the point of sewage discharge.

Hence, higher the BOD value, more polluted is the water body.

(iii) The effects of higher BOD value on aquatic life are as follows

(a) It causes high mortality of aquatic animals.

(b) Algal blooms occur due to the excessive growth of algae as the water bodies become nutrient enriched.

or

(i) Draw a pyramid of numbers of a situation, where a large population of insects feed upon a very big tree. The insects inturn are eaten by small birds which inturn are fed upon by large birds.

(ii) Differentiate between the pyramid of biomass of the above situation and the pyramid of number that you have drawn.

Ans :

(i) Structure of a pyramid of number, where a large population of insects feed upon a very big tree; the insects inturn are eaten by small birds which inturn are fed upon by large birds is given below:

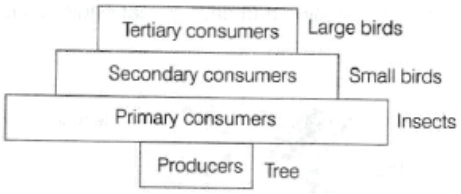


Figure: Pyramid of number

(ii) Differences between pyramid of biomass and pyramid of number of the given situation are as follows

Pyramid of biomass	**Pyramid of number**
The biomass of the single tree is much more than the biomass of insects.	The base is much smaller with a single tree compared to the thousands of insects.
The pyramid looks upright with these two levels.	The pyramid looks inverted with these two levels.
The biomass of birds is much more than those of insects.	The number of birds feeding on the insects is less than that of insects.