CLASS XII (2019-20)
BIOLOGY (044)
SAMPLE PAPER-3

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. Agarose extracted from sea weeds finds use in [1]

(a) spectrophotometry

(b) tissue culture

(b) PCR

(d) gel electrophoresis

Ans : (d) gel electrophoresis

or

There is a restriction endonuclease called Eco RI in which co part stands for

(a) colon (b) coelom

(c) coenzyme (d) coil

Ans : (d) coil

2. According to Allen's rule, the mammals from colder climates have [1]

(a) shorter ears and longer limbs

(b) longer ears and shorter limbs

(c) longer ears and longer limbs

(d) shorter ears and shorter limbs

Ans : (d) shorter ears and shorter limbs

or

Decomposers like fungi and bacteria are

(i) autotrophs

(ii) heterotrophs

(iii) saprotrophs

(iv) chemoautotrophs

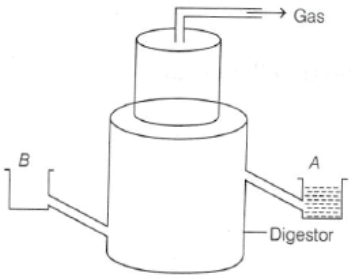
Choose the correct option.

(a) (i) and (iii) (b) (i) and (iv)

(c) (ii) and (iii) (d) (i) and (ii)

Ans : (c) (ii) and (iii)

3. Name the parts labelled 'A' and 'B' shown in a typical biogas plant. [1]



(a) A-Gas holder; B-Sludge tank

(b) A-Sludge tank; B-Slurry container

(c) A-Slurry container; B-Sludge tank

(d) A-Sludge tank; B-Gas holder

Ans : (b) A-Sludge tank; B-Slurry container

4. Which of the following statements is correct? [1]

(a) Surgical methods of contraception do not prevent gamete formation

(b) In embryo transfer technique, embryos are always transferred into the uterus

(c) Oral pills are very popular contraceptives among the rural women

(d) All STDs are not completely curable

Ans : (d) All STDs are not completely curable

5. Which gene was introduced in the first transgenic cow? [1]

(a) Human alpha lactalbumin

(b) OC-1-antitrypsin

(c) P-1-antitrypsin

(d) cry-IAC

Ans : (a) Human alpha lactalbumin

Section B

6. List any two ways through which foreign DNA is inserted into the plant cell genome to change its phenotypic expression. [2]

Ans :

Insertion of a foreign DNA into the plant cell genome to change its phenotypic expression is done by the following two ways

(i) Through a vector.

(ii) Through direct introduction of DNA by using different methods, i.e. microinjection, gene gun, etc.

7. How does pistil recognise the pollen grain of the right type? [2]

Ans :

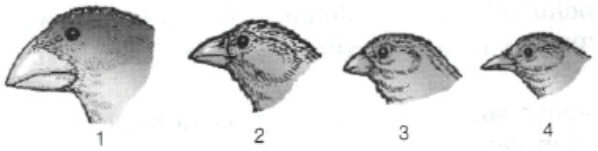
Pistil recognises the pollen grain of the right type by special proteins. If an unwanted pollen is encountered, the pistil rejects the pollen by preventing pollen germination on the stigma or pollen tube growth in the style which is also determined by specific chemicals. This continuous dialogue mediated by chemical components between pollen and pistil is referred to as pollen-pistil interaction.

8. Radhika went on a school trip to the garden and started sneezing on reaching there. In the evening when she came back home, she was feeling all fine. Suggest a valid reason behind her unique condition and also mention the type of antibody produced by the body as a response against this condition. [2]

Ans :

Radhika must have suffered from some kind of allergy either from the dust or may be by the pollen grains of the flowers, etc. Such substances causing allergy are called allergens. Our body eventually produces IgE antibodies as a response against such allergens.

9. Write your observations on the variations seen in the Darwin's finches shown below. [2]



How did Darwin explain the existence of different varieties of finches on Galapagos islands?

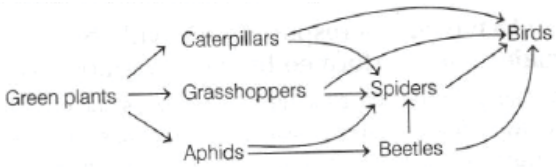
Ans :

Darwin's finches show variations in beaks due to adaptation to different food habits. The original finches were seed-eating. From them, some arose as insectivorous and some as vegetarian finches. This process of evolution of different species in a given geographical area, starting from a point and radiating to other habitats is called adaptive radiation.

10. A food web represents interlinking food chains of many consumers. Using this information, highlight the feeding relationship between the main groups of organisms of your choice in a food web. Also, mention an advantage of the food webs existing in an ecosystem. [2]

Ans :

A food web comprised of interlinked food chains showing different feeding relationships is as follows:



Due to interlinking of different food chains, organisms in a food web get benefits of alternative food sources and can better compete with others.

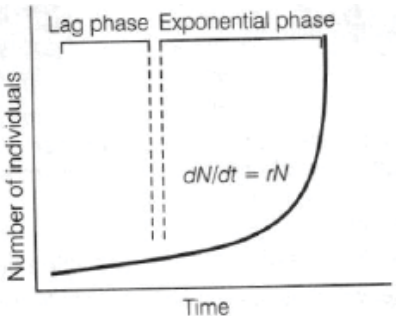
or

In a habitat with unlimited resources, which type of population growth can be observed? Support your answer with a graphical representation.

Ans :

In a habitat where the resources needed for survival are unlimited, the population growth occurs at an exponential rate. This type of growth has two phases, i.e. lag (when organisms are adapting to environment) and exponential (rapid phase of reproduction).

Finally, when the supply of resources exhausts, causing growth to slow down.



Population growth curve when resources are not limiting the growth.

The growth can be expressed as

$$\frac{dN}{dt} = rN$$

Where, N = Population size

t = Time

r = Intrinsic rate of natural increases

11. There is more species rich biodiversity in the tropical latitude when compared to the temperate ones. Justify the statement giving two reasons. [2]

Ans :

The reasons behind the fact that there is more species rich biodiversity in the tropical latitude when compared to the temperate ones are as follows

(i) Tropical environments are less seasonal, more constant and predictable than the temperate ones. This constant environment promotes niche specialisation and leads to a greater species biodiversity.

(ii) The availability of solar energy is much more in the tropics that contribute to the higher productivity which inturn results in greater species diversity.

12. Consider the following facts.

(i) Particulate air pollutants can be differentiated into settable and suspended forms.

(ii) According to CPCB, particulate matter of 2.5 1.1,m or less in size can cause harm to human health.

Reconcile the above statements with respect to particulate pollutants and suggest the harmful effects they can cause on human health. Also, present a solution to remove these types of pollutants from the environment. [2]

Ans :

(i) Particulate air pollutants are added into the air by industries, automobiles, etc. They are differentiated into settable particulate matter (diameter 10μm) that settles out in less than one day and suspended particulate matter (diameter 510 pm) that remains suspended in air for weeks.

(ii) Particulate size 2.5 1.im or less in diameter are responsible for causing great harm to human health. These pollutants can be inhaled deep into the respiratory tract (up to lungs) as they cannot be filtered out by our protective barriers and cause respiratory problems and may even lead to death.

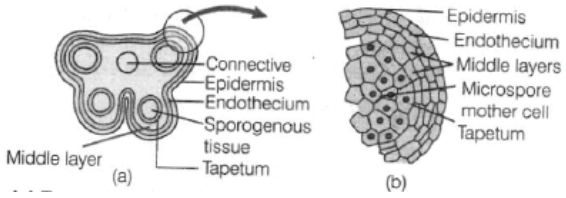
A solution to particulate matter pollutant is the use of electrostatic precipitators (in industries and thermal power plant), which can remove particulate matter with 99% efficiency.

Section C

13. Explain the structure of a typical microsporangium with the help of a well-labelled diagram. Also, highlight the major roles performed by the innermost layer of the microsporangium. [3]

Ans :

Microsporangium or Pollen sac is a cylindrical structure that produces numerous spores, which give rise to the male gametophyte. It consists of two parts, i.e. an outer wall and a central sporogenous tissue. Microsporangial wall is made up of four different layers, i.e. epidermis (also known as common anther covering), endothecium, 1-3 middle layers and the tapetum (innermost layer).



(a) Transverse section of a young anther

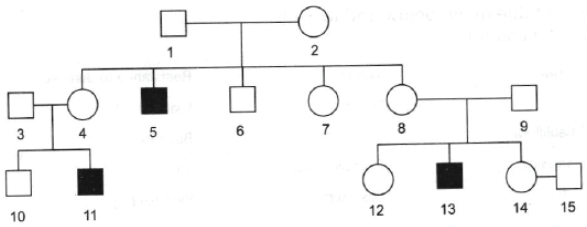
(b) Enlarged view of one microsporangium showing layers

Tapetum performs a number of functions as

(i) Nourishment to the developing pollen grains.

(ii) Production of lipid rich Ubisch granules.
(iii) Secretion of enzymes like callase, which is responsible for the degradation of callose wall around pollen tetrad.

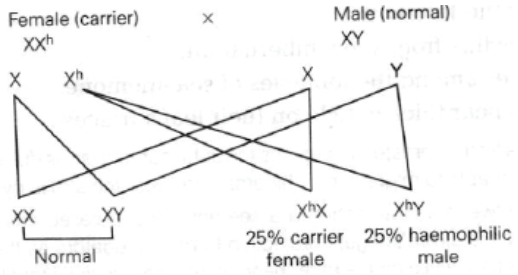
14. Haemophilia is a sex-linked recessive disorder of humans. The pedigree chart given below shows the inheritance of haemophilia in a family. Study the pattern of inheritance and answer the questions that follows. [3]



(i) Give all the possible genotypes of the members 4, 5 and 6 in the pedigree chart.
(ii) A blood test shows that the individual 14 is a carrier of haemophilia. The member numbered as 15 got recently married to number 14. What is the probability that their first child will be a haemophilic male?

Ans :

(i) Possible genotype of member 4 is XX^h.
Possible genotype of member 5 is X^hY.
Possible genotype of member 6 is XY.
(ii) According to the given pedigree, if the member 15 gets married to the member 14 of this family, then the probability of first child to be a haemophilic male will be 25% as follows



Thus, heterozygous female (carrier) for haemophilia may transmit the disease to her sons.

or

Name the type of genetic disorder and its two symptoms that will likely be observed in an individual, if
(i) the production of α-globin gene on chromosome 16 is affected by mutation or deletion of one or more of its four alleles.
(ii) the karyotype is 45 + XO.

Ans :

(i) The genetic disorder is alpha (a)-thalassemia, an autosomal-linked recessive disease, occurring due to either mutation or deletion of genes, resulting in reduced rate of synthesis of one of the globin chains of haemoglobin. It is controlled by closely linked genes HBA1 and HBA 2 on the chromosome 16.
Symptoms
(a) Anaemia
(b) Fatigue and weakness
(ii) Disease is Turner's syndrome (45 + XO)
Symptoms
(a) Affected females are sterile because of rudimentary ovaries.
(b) Short statured individuals with small uterus, puffy fingers and webbed neck.

15. (i) Study the table given below and identify (a), (b), (c) and (d) [3]

Crop	**Variety**	**Resistance to disease**
(a)	Himgiri	Leaf rust
Cauliflower	(b)	Black rot
Brassica	Pusa Swarnim	(c)
(d)	Pusa Komal	Bacterial blight

(ii) Plant breeding technique has helped sugar industry in North India.
(a) Between sugarcane variety of North India and South India, which one has higher sugar content?
(b) What attempt was made to increase yield of sugarcane in North India?

Ans :

(i)

Crop	**Variety**	**Resistance to disease**
Wheat	Himgiri	Leaf rust
Cauliflower	Pusa Shubhra	Black rot
Brassica	Pusa Swarnim	White rust
Cowpea	Pusa Komal	Bacterial blight

(ii) (a) Saccharum barberi originally of North India has poor sugar content, while Saccharum officinarum of South

India has thick stems and high sugar content.

(b) The sugarcane varieties of South India and North India were crossed to get the high yield hybrid variety. It has thick stem and high sugar content with the ability to grow in the areas of North India.

16. Give reasons for the following. [3]

(i) Some animals like frog, show hibernation.

(ii) Clownfish lives among the tentacles of sea anemone.

(iii) Desert plants bear thick cuticle on their leaf surfaces.

Ans :

(i) Some animals like frog hibernate. Sometimes the unfavourable (stressful) conditions are for a short duration and if the animals are not able to migrate, they hibernate to avoid the stress by escaping in time.

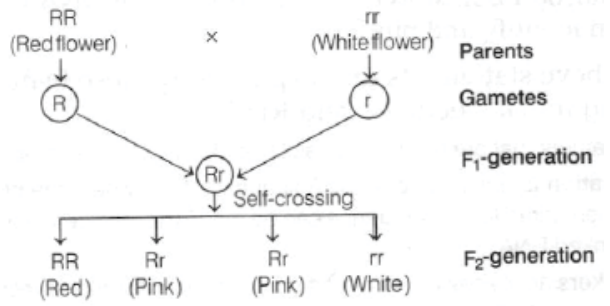
(ii) The interaction between a clownfish and a sea anemone is called commensalism. As the sea anemone has stinging tentacles, the clownfish gets protection from its predators as the tentacles keep them away. Thus, the clownfish is benefitted, while on the other hand, sea anemone is neither benefitted nor harmed.

(iii) Desert plants have a thick cuticle on their leaf surfaces and have their stomata arranged in deep pits to minimise the water loss through transpiration. These plants have special photosynthetic pathway (CAM) that enables their stomata to remain closed during daytime to minimise the rate of transpiration.

17. In a cross between red and white flowers of snapdragon, all pink flowers were produced. Explain, why it is a case of incomplete dominance and not of blending inheritance. [3]

Ans :

In incomplete dominance, the genes of an allelomorphic pair are not expressed as dominant or recessive but they are expressed partially when present together in a hybrid. As a result, an intermediate character is obtained. It is not a case of blending inheritance because parental characters reappear in the F2-generation without any modification.



18. Biotechnologists identified the source and isolated different types of cry genes from the bacterium Bacillus thuringiensis and incorporated them into many crops. Briefly explain, how have these genes brought beneficial changes in the crops and the mankind. [3]

Ans :

cry genes (Bt toxin genes) were isolated from bacterium Bacillus thuringiensis and were incorporated into several crops like cotton, tomato, brinjal, etc.

Some strains of B. thuringiensis produce proteins that kill certain insects such as lepidopterans (tobacco budworm, armyworm), coleopterans (beetles) and dipterans (flies, mosquitoes).

B.thuringiensis forms protein crystals during a particular phase of their growth which contains a toxic insecticidal protein. This protein encoded by cry gene exists as an inactive protoxin, but becomes active on ingestion by an insect. This happens because of the alkaline pH of the gut which solubilises the crystals. This toxin creates pore, cell swelling, lysis and eventually leads to the death of an insect.

The choice of the Bt toxin genes depends on the crops and targeted pest as most Bt toxins are insect group specific. They have helped in developing insect resistance. Bt toxin gene has been cloned from the bacteria and has been expressed in plants to provide them resistance to the insects without the need for insecticides, e.g. Bt cotton, Bt corn, rice, etc. (3)

19. Name the two different categories of microbes naturally occurring in sewage water . Explain their role in cleaning sewage water into usable water. [3]

Ans :

Bacteria and fungi are two categories of naturally occurring microbes present in

sewage. The bacteria along with the fungal mycelia form flocs. These flocs are utilised during the secondary treatment of sewage. The primary effluent after separation of the grit and debris is taken to the secondary treatment. Here, the effluent is passed to an aeration tank, where it is constantly agitated and air is pumped into it. This leads to vigorous growth of bacteria and floc formation. The bacteria in these flocs consume organic matter, thus decreasing the BOD of the sewage.

or

The valuable services bees provide to local ecosystems make it possible for farms and cattle operations to succeed. Acknowledging the above mentioned fact, how would you explain and convince the farmers that apiculture is both an easy and economically beneficial practice for them?

Ans :

Bee-keeping can be practised in any area where there are sufficient pastures of some wild shrubs, fruit orchards and cultivated crops are present. Beehives can be kept in the courtyard or veranda or even on the roof of the house. Bee-keeping is not a labour intensive work. Keeping beehives in the crop fields during flowering season increases honey yield. Since, there is an increased demand for honey, it is an income generating industry both on small scale and large scale. Honeybees are pollinators of many of our crop plants, e.g. sunflower, apple, pear and mustard. Hence, keeping beehives in crop areas during flowering period increases pollination and improves both crop and honey yield.

20. Consider the following statements. [3]

(i) Origin of replication or on site is a specific sequence of DNA from where replication initiates.

(ii) Selectable markers are genes which impart unique features to a vector, e.g. antibiotic resistance.

(iii) Cloning or Recognition sites are short stretches of DNA which specific restriction enzymes can identify and bind to.

Reconcile the above statements and explain why these features are considered essential to facilitate cloning into a vector during RDT.

Ans :

There are certain features that are required to facilitate cloning into a vector during RDT. These are:

(i) **Origin of replication** (ori) is a specific DNA sequence from where the process of replication begins. Thus, any piece of DNA when linked to this sequence can be made to replicate within the host cells. It also controls the copy number of the linked DNA.

(ii) **Selectable markers** are genes which impart unique characters to the vector. This helps in identifying or selecting the transformants and eliminating non-transformants and hence, selectively permits only the growth of the transformants, e.g. antibiotic resistance.

(iii) **Cloning sites** are generally required to link foreign or alien DNA with the vector DNA. For this, the vector requires very few or single recognition sites for commonly used restriction enzymes, e.g. restriction sites in E. coil cloning vector PBR322 are Hind III, Eco RI, Barn HI, Sal I, etc.

21. A paternity dispute case for a child has reached the court for which there is no definitive evidence. Propose an alternative solution which can settle this dispute without any suspicion. [3]

Ans :

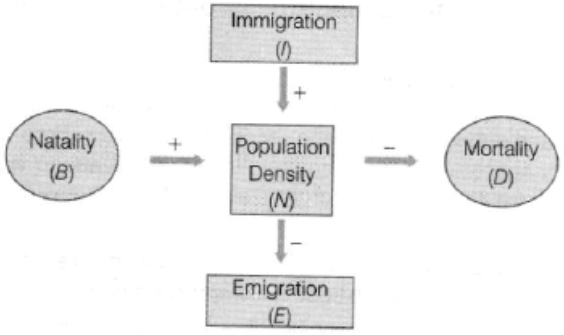
DNA fingerprinting is the technique used in solving the paternity dispute for a child. It is used to determine nucleotide sequences of certain areas of DNA which are unique to each individual. The basis of DNA fingerprinting is DNA polymorphism. Although the DNA from different individuals is more alike (99.9%) than different (0.1%), there are many regions of the human chromosomes that exhibit a great deal of diversity. Such variable sequences are termed as 'polymorphic' (meaning many forms).

DNA fingerprinting is a special type of polymorph, called VNTR (Variable Number of Tandem Repeat), composed of repeated copies of a DNA sequence that lie adjacent to one another on the chromosome. These VNTRs of two persons may be of same length and sequence at certain sites, but vary at other sites. Therefore, it differs from person

to person in a population. Hence, paternity dispute can be settled out.

Section D

22. Observe the diagram of the factors influencing population density and answer the questions that follows. [3]



(i) Define immigration and emigration.
(ii) Name the factors on which the size of a population for any species depend?
(iii) Give the expression for the change in population size.

Ans :

(i) Immigration is the number of individuals of the same species that have come into the habitat from elsewhere during the time period under consideration.
Emigration is the number of individuals of population who left the habitat and moved elsewhere during a given period of time.

(ii) The size of a population for any species is not a static parameter, it keeps changing with time. It depends on the following factors
(a) Food availability
(b) Predation pressure
(c) Weather

(iii) Expression for the change in population size

$$N_t = N_0 + (B + I) - (D + E)$$

where, N_0 = Size of population at the beginning.

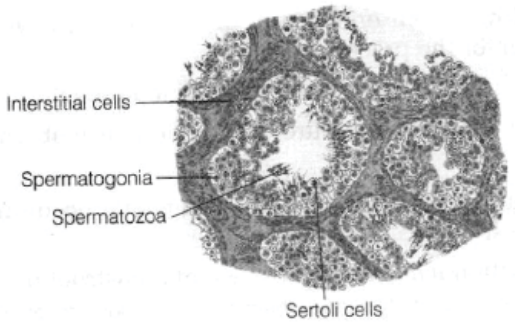
B = Birth rate

D = Death rate

I = Immigration

E = Emigration et.

23. With reference to the below diagrammatic sectional view of seminiferous tubule, answer the following questions. [3]



(i) Name the cells that divide by mitosis to increase their number and the cells that undergo meiosis-II.
(ii) Discuss about the hormones influencing the process of gametogenesis in males.

Ans :

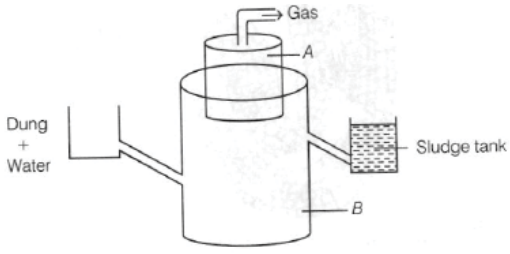
(i) Spermatogonia are the cells that divide by mitosis to increase their number. Secondary spermatocytes are the cells that undergo meiosis-II.

(ii) Spermatogenesis (i.e. gametogenesis in males) is initiated due to an increase in the secretion of Gonadotropin Releasing Hormone (GnRH) by the hypothalamus at the age of puberty. This further stimulates the secretion of gonadotropins, i.e. Iuteinising hormone and follicle stimulating hormone. LH acts on Leydig cells to stimulate androgen secretion, which stimulates the process of spermatogenesis, while FSH acts on Sertoli cells to secrete factors helpful in spermiogenesis.

24. The biogas plant shown below is used in rural areas for the production of biogas. [3]

(i) Observe the figure and label the different parts marked as A and B.

(ii) Explain the working of a biogas plant.



Ans :

(i) The different parts of the biogas plant marked as A and B are
A-Gas holder B-Digester

(ii) The biogas plant consists of a concrete tank (10-15 feet deep) in which the

biowastesare collected and a slurry of dung is fed in which equal amount of water and dung is mixed. A floating cover is placed over the slurry, which keeps on rising, as the gas is produced in the tank due to the microbial activity (methanogens like Methanobacterium). Methanogens grow anaerobically on cellulose present in the cow dung producing large amount of methane (CH_4), hydrogen (H_2) and carbon dioxide (CO_2). The biogas plant has an outlet which is connected to a pipe that supplies biogas. The spent slurry is removed through another outlet and can be used as manure.

Section E

25. (i) What is triple fusion? Where and how does it take place? Give the name of nuclei involved in triple fusion. What is the product of this process? [5]

(ii) Which of the following, an endosperm or an embryo, develops first in an angiospermic seed? Give reason for the precedence.

(iii) State the role of endosperm in mature albuminous seed.

(iv) Draw a labelled diagram of a mature dicotyledonous embryo.

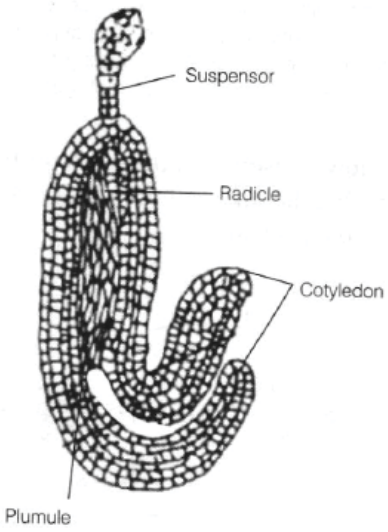
Ans :

(i) Triple fusion refers to the process of fusion of three haploid nuclei. It takes place in embryo sac. The three nuclei that fuse together are nucleus of the male gamete and two polar nuclei of the central cell. They produce a triploid primary endosperm nucleus.

(ii) The development of endosperm is followed by the development of an embryo in angiospermic seeds. It is because the endosperm cells provide nutrition to the developing embryo.

(iii) In mature albuminous seeds, endosperm exists as the storage tissue. It stores starch and fat.

(iv) Diagram showing mature dicot embryo is given below



or

(i) With the help of a flowchart, explain the events that occur during fertilisation in humans. Also, mention the site of its occurrence.

(ii) Successful fertilisation leads to the absence of menstruation in females. Give reason.

Ans :

(i) Flowchart showing events of fertilisation in humans is as follows

Discharge of semen in female vagina
↓
Movement of sperms to reach at ampullary-isthmus junction of the Fallopian tube
↓
Release and reach of ovum at the same junction
↓
Contact of sperm with zona pellucida of the ovum
↓
Secretion of acrosome makes a passage for sperm into the ovum
↓
Initiation and completion of meiotic division of secondary oocyte and fusion of sperm with ovum
↓
Formation of zygote

The site of occurrence of fertilisation in humans is the ampullary-isthmic junction of Fallopian tube.

(ii) Successful fertilisation leads to development of foetus, its implantation and formation of placenta.

The developing placenta secretes the hormone hCG, which maintains the corpus luteum and stimulates it to

secrete progesterone and oestrogen. In turn, they suppress the gonadotropins, which is required for the development of new follicles. Therefore, a new cycle cannot be initiated and leads to the absence of menstruation in females.

26. During the course of evolution DNA was chosen over RNA as genetic material in most living organisms. Give reasons by first discussing the desired criteria in a molecule that can act as genetic material and in the light of biochemical differences between DNA and RNA. [5]

Ans :

A molecule that can act as a genetic material must fulfil the following criteria

(i) It should be able to generate its replica (replication).

(ii) It should be chemically and structurally stable.

(iii) It should provide the scope for slow changes (mutation) that are required for evolution.

(iv) It should be able to express itself in the form of 'Mendelian characters'.

Biochemical differences between DNA and RNA

(i) Both nucleic acid (DNA and RNA) are able to mutate. Since, RNA is unstable and mutates at a faster rate.

(ii) RNA is reactive, it also acts as catalyst. Hence, DNA is less reactive and structurally more stable than RNA.

(iii) The presence of thymine at the place of uracil also confers additional stability to DNA.

or

(i) Mutation occurs when there is a change in the sequence of triplet codons which may alter the phenotype of an organism. One such mutation is substitution whereby one base gets substituted with another. Using an example, explain how this substitution of one base in DNA alters the phenotype of an organism.

(ii) According to you, why was the arrangement of the bases in the nucleic acids thought to be in the form of a triplet?

Ans :

(i) Mutation is a change in the sequence of triplet codons which may alter the phenotype of an organism, e.g. substitution, whereby one base is substituted with another since only one codon is changed, one amino acid is substituted for another. If the new amino acid is similar in its properties to the original one, no damage is expected to occur. If not, considerable harm can occur. For example, sickle-cell anaemia in humans is caused by the substitution of the amino acid, valine, for the usual amino acid, glutamine.

This is because the properties of valine (which is hydrophobic) are significantly different from glutamine (which is polar) so that a haemoglobin, which cannot adequately transport oxygen, is produced instead of the normal oxygen-carrying haemoglobin.

(ii) The arrangement of the bases in the nucleic acids is in the form of a 'triplet code' due to the higher number of possible codes that may be formed in order to sufficiently fulfil the requirements of 20 codes. As each of the 20 different amino acids is determined by one genetic code, there needs to be 20 different codes that can be arranged. With four different bases in DNA, there will be 64 possible combinations of the bases if a triplet code of bases is used. This number is more than enough to be able to code for 20 amino acids.

27. (i) In an aquarium, two herbivorous species of fish are living together and feeding on phytoplanktons. As per the Gause's principle, one of the species is to be eliminated in due course of time, but both are surviving well in the aquarium. Analyse the above situation and provide valid reasons for the continued co-existence of the two species. Give possible reasons.

(ii) Do you agree that the plants inhabiting a desert are not found in mangrove? Present your opinion with proper reasons. [5]

Ans :

(i) Competition is a type of relationship between two or more organisms in which both are harmed. A competition between individuals of same species (intraspecific) is more acute than the

competition between individuals of different species as all the members in an intraspecific competition have same basic requirements like food, water, light, space, mating and shelter.

But this is true only when resources are limited. According to Gause's principle, in such a situation competitively inferior species gets eliminated.

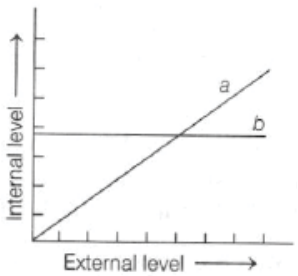
But studies recently have revealed that species facing intraspecific competition may evolve mechanism to encourage co-existence rather exclusion. They could avoid competition by choosing, different times of feeding or foraging patterns which is known as 'resource partitioning'.

(ii) In xerophytic (desert) condition, plant roots grow deeply to explore any possibility of underground water and leaves are highly reduced (spine) to minimise transpiration. Leaves may have sunken stomata, stem has thick cuticle and are fleshy to preserve moisture. While, mangrove has salty condition so that specialised root grows negatively geotropic and called pneumatophores, leaves are thin, small and green. Stems are usually cuticularised. That is why desert inhabited plants are not found in a mangrove.

or

The graph given below represents the response of different organisms to certain environmental fluctuations
(e.g. temperature).

(i) Which are conformers out of a and b?
(ii) What does the other line in graph depict?
(iii) Suggest how these organisms differ from each other with reference to homeostasis.
(iv) Suggest the category to which humans belong. Give an example to support your answer.



Ans :

(i) 'a' represents conformer organisms.
(ii) The other line 'b' represents regulators.
(iii) The difference between conformers and regulators are as follows

Conformers	**Regulators**
The organisms, which cannot maintain a constant internal environment and change according to the ambient atmospheric conditions.	The organisms which maintain a constant internal environment despite changes in the environment.
They show a narrow range of distribution.	They show a much wider range of distribution.

(iv) Human beings are regulators. They have constant body temperature of 37°C. For example, when external temperature is more than our body's temperature, we sweat profusely which results in a cooling effect and evaporation brings down the temperature of the body to constant 37°C.