Karnataka Board

Biology

Class 12

1. **This question paper consists of four parts A, B, C, and D, part D of two sections section 1 and section.**
2. **All the parts are compulsory.**
3. **Draw diagrams wherever necessary unlabeled diagrams for any illustrations do not attract any marks.**

PART –A

Answer the following question in one word or one sente4nce each. (1× 10 =10)

1) What is implantation?

Ans: Implantation happens early in the pregnancy stage after the fertilized egg (zygote) travels down the fallopian tube to the uterus and adheres to the epithelium, or uterine lining**.**

2) What the restriction site of EcoRI enzyme.

Ans: EcoRI is a restriction enzyme that cleaves DNA double helices into fragments at specific sites. It is also a part of the restriction modification system.

3) Define totipotency.

Ans: A cell or part having the potential for developing in various specialized ways in response to external or internal stimuli.

4) Mention the role of methanobacterium in rumen of cattle.

Ans: The role of **methanobacterium** involves converting carbon dioxide and hydrogen in the ruminant's gut into methane through the fermentation of cellulose. This assists the breakdown of cellulose and aids digestion for the ruminant host.

5) What is foetal ejection reflex?

Ans: Extremely high levels of adrenaline during late labour can trigger the fetal ejection reflex. This surge triggers strong, rapid contractions which move the baby from the uterus and into the birth canal.

6) Define saltation.

Ans: Saltation is a sudden and large mutational change from one generation to the next, potentially causing single-step speciation.

7) Name the type of antibodies produced during allergy.

Ans: Immunoglobulin E (IgE) are antibodies produced by the immune system during allergy.

8) What are Eurythermal organism .

Ans: Eurythermal organisms are organisms that can function at a wide range of different body temperatures. For example, a goldfish can function with a body temperature ranging from 5 to 30 degrees C.

9) Define bio magnification.

Ans: The increasing concentration of a substance, such as a toxic chemical, in the tissues of organisms at successively higher levels in a food chain is called Biomagnification

10) Write the name of toxic substance responsible for fever and chills in malaria.

Ans: Fever and chills in malariais a caused by a protozoan called Plasmodium.

PART - B

Answer any five of the following questions in three to five sentences each wherever applicable.

11) What are homogametic and heterogametes.

Ans Heterogametic means the two sex chromosomes of the organism are different (XY) whereas homogametic means that the two sex chromosomes of the organism are the same (XX). Heterogamete sex produces two different gametes, while the homogametic sex produces identical gametes.

12) Mention any two examples of evolution by anthropogenic action.

Ans: New species evolve in a short time scale of months or years due to anthropogenic actions or human activities. This hastens the evolutionary process.

For example, during post industrialization period in England, the tree trunks were covered by dust, coal particles and thus became dark. On such trunks, white moths could be easily picked up leaving the dark-peppered moths.

Due to excessive use of antibiotics or herbicides, new resistance varieties of organisms appeared. These resistant varieties got selected over the non-resistant varieties.

13) Distinguish between homozygous and heterogeneous plants.

Ans: The main difference between homozygous and heterozygous is that homozygous individuals carry two identical alleles whereas heterozygous individuals carry both dominant

and recessive allele. The self-breeding between homozygous individuals produces offspring with the same trait over generations. But, self-breeding between heterozygous individuals produces all possible traits that belong to that particular gene.

14) What is innate immunity? Mention any two types of innate immunity barriers.

Ans: Innate immunity is inherited by the organism from the parents and protects it from birth throughout life. isa immune system that provide immediate defense against infections. For example humans have innate immunity against distemper, a fatal disease of dogs. Innate immunity consists of four types of barriers— physical, physiological, cellular and cytokine barriers

15) What are the important components of quality farm management?

Ans: Four important components of poultry farm management are followings:

1) Selection of disease free and suitable breeds.

2) Proper and safe farm conditions.

3) Proper food and water.

4) Maintenance of hygiene and health care.

16) Write the methods to introduce alien DNA into host cell.

Ans: In a chromosome there is a specific DNA sequence called the origin of replication, which is responsible for initiating replication. Therefore, for the multiplication of any alien piece of DNA in an organism it needs to be a part of a chromosome(s) which has a specific sequence known as 'origin of replication'. Thus, an alien DNA is linked with the origin of replication, so that, this alien piece of DNA can replicate and multiply itself in the host organism. This can also be called as cloning or making multiple identical copies of any template DNA.

17) Define endemics .Name any two regions of accelerated Habitat loss in India.

Ans: Endemic plants and animals are those that are unique to a specific geographic region. This makes them incredibly special and more vulnerable to extinction. Because they are only found in certain locations, they require special conservation efforts

Habitat loss is occurred for many reasons, but in the highly populated countries like India, the main reason is environmental hazards. Examples in India:

1) Kerala: Due to the recent floods in the Kerala region, the normal population had decreased significantly.

2) Ladakh: Due to the previously happened natural disasters in this region, the normal population had also decreased here.

18) Invasion of alien animal species eliminates the native animal species give two example.

Ans: Example of Invasion of alien animal species are followings.

The black or ship rat, of Eurasian origin is the most significant invasive mammal species in Africa. It is an indiscriminate feeder, causing massive economic losses throughout Africa and worldwide by consuming and contaminating foodstuffs (e.g. crops, seeds and seedlings, fruits, etc.) and animal feed.

The Indian house crow was introduced to the east coast of Africa over a century ago, has spread to coastal towns on the Red Sea and Indian Ocean. It is still spreading inland. They form large flocks around human habitation where they negatively impact on human health, public amenities, poultry and native bird populations.

PART – C

Answer any five of the following questions in about 40 to 80 words each wherever applicable.

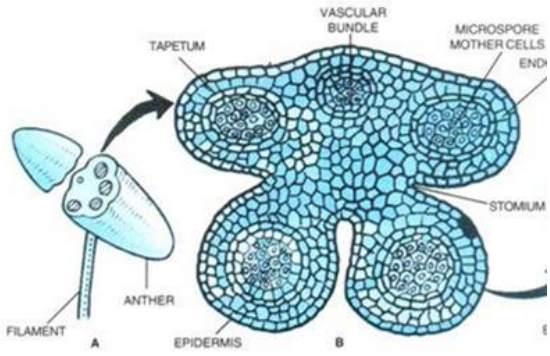
19) Mention the vegetative propagules of the following plants:

Ans: Water hyacinth - Vegetative Propagules we refer to a part of the plant that becomes detached from the rest of the plant and grows into a new one. The vegetative propagulespresent in water hyacinth are offset.

Agave - The vegetative propagules present in agave are bulbils and in water hyacinth are offset.

Banana. - The vegetative propagules present in Banana is rhizome.

20) Draw a neat labelled diagram of T.S. of young anther.



T.S. ANTHER

21) Describe haplo-diploid sex determination system in honey bees.

Ans: In honeybees the drones (males) are entirely derived from the queen, their mother. The diploid queen has 32 chromosomes and the haploid drones have 16 chromosomes. Drones produce sperm cells that contain their entire genome, so the sperm are all genetically identical except for mutations. The male bees' genetic makeup is therefore entirely derived from the mother, while the genetic makeup of the female worker bees is half derived from the mother, and half from the father.[12] Thus, if a queen bee mates with only one drone, any two of her daughters will share, on average, 3/4 of their genes. The diploid queen's genome is recombined for her daughters, but the haploid father's genome is inherited by his daughters "as is".

22) State Hardy weinberg principle of genetic equilibrium. Write any four factors affecting the equilibrium.

Ans: Hardy Weinberg's principle states that allele frequencies in a population are stable and is constant from generation to generation.

Four factors known to affect Hardy Weinberg equilibrium are:

Genetic migration - When migrations of a selection of population to another place occur, gene frequencies change in the original as well as the new population. New genes/alleles are added to the new population and these are lost from the population.

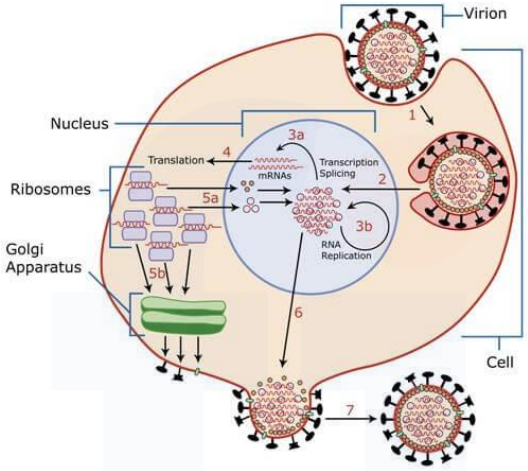
Genetic drift - It deals with the gene frequency of a reproducing small population. In a small population not all the alleles, representatives of that species may be present. Thus the inheritance process is in violation of Hardy-Weinberg law.

- Mutation: Mutations are considered as raw materials for evolution. They help to create and provide variations in a population along with genetic recombinations.
- Genetic recombination-During meiosis, due to crossing over of chromosomes, genetic arrangements get altered.

23) Write a short note on ecosystem services.

Ans: Living things perform a waste of ecological services that help maintain life natural systems and moderate conditions on our planet. They provide the oxygen that we breathe and food that we eat. They remove billions of tons of carbon dioxide from Earth's atmosphere. They generate clouds and bring rainfall to moderate our climate .They help fertilize earth soil, pollinated our crops .The ecological services performed by earth biota have economic, medical, genetic, agriculture, climate and survival values**.**

24) Sketch the diagrammatic representation of the replication of retrovirus inside and Animal cell.



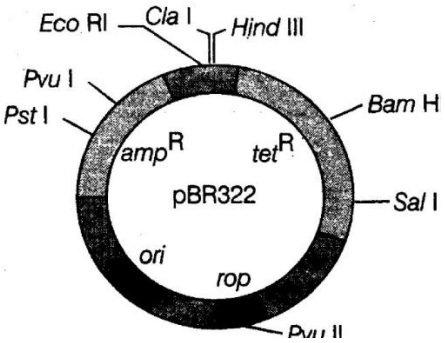
REPLICATION OF RETROVIRUS

25) What is ecological succession? How hydrarch succession is different from Xerach succession?

Ans: Ecological succession is the process by which the structure of a biological community evolves over time. Two different types of succession—primary and secondary—have been distinguished. Primary succession occurs in essentially lifeless areas—regions in which the soil is incapable of sustaining life as a result of such factors as lava flows, newly formed sand dunes, or rocks left from a retreating glacier. Secondary succession occurs in areas where a community that previously existed has been removed; it is typified by smaller-scale disturbances that do not eliminate all life and nutrients from the environment.

Xerach succession is initiated in very dry situations and climates. Hydrach succession takes place on very wet land or in water.

26) Draw a neat labeled diagram of plasmid pBR322.



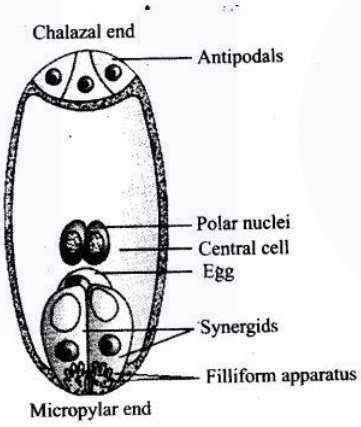
pBR322

Part- D

Section 1

Answer any four of the following questions in about 200 to 250 words each wherever applicable. (4×5 =20)

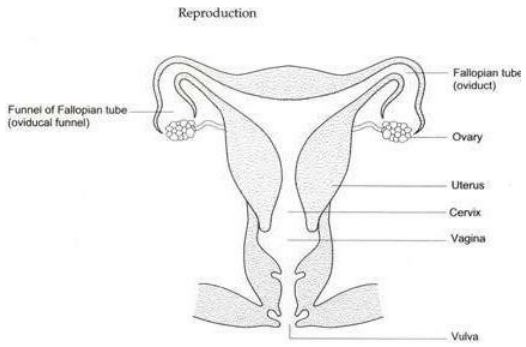
27) Draw and describe the structure of a mature embryo sac of angiosperms.



The mature embryo sac

Ans: A typical embryo sac is ellipsoidal in structure with tapering ends and it is made up of cellulosic cell wall. In an embryo-sac three cells are grouped together at the micropylar end and constitute the egg apparatus. The egg apparatus is consist of two synergids and one egg cell. The synergids have cellular thickenings at the micropylar tip called filiform apparatus, which plays an important role in guiding the pollen tubes into the synergids. Three cells are at the chalazal end and are called antipodal. Embryo sac is present at the centre of the nucellus of the ovule. It is seven celled and eight nucleated structure which is composed of three celled egg apparatus, three antipodals and a bi nucleated central cell or secondary nucleus.

28) Draw a neat labeled diagrammatic sectional view of female reproductive system.



FEMALE REPRODUCTIVE SYSTEM

29) Explain the inheritance of one gene with reference to stem height of the garden pea plant.

Ans: Mendel's first experiments explain how a single gene segregates in inheritance. When Mendel crossed a true breeding tall plant (female parent) with a true breeding plant of the dwarf variety (male parent), he got tall plants like one parent in the first filial generation designated F1.S elf fertilization of the F1 hybrids produced the second filial generation. Tall and dwarf plants appeared in F2 in the proportion of is 3:1.He used the term "dominant" for the tall character which dominated in the F1 generation, and "recessive" for the character of dwarfness which remained hidden (latent) in the F1 generation.

30) a. What are features of an ideal contraceptive? (2)

Ans: Features of an ideal contraceptive are:

- It must be easy to use both for male and female.
- It must provide protection against STDs.
- It should not cause any side effects.
- It must be easily removable if the couple wants to conceive in the future.

b) Mention the natural methods of contraception . (3)

Ans: Withdrawal is a birth control method when the penis is removed from the vagina before ejaculation. The basal body temperature method involves observing a woman's temperature every morning. Because a woman's temperature drops about 1°F 12 to 24 hours before her ovary releases an egg, this indicates a period of high fertility. One should abstain from intercourse during this time to avoid pregnancy.

31) Explain the following terms.

a) Inbreeding depression.

Ans: Inbreeding depression refers to decrease or loss of vigor and fertility as a result of inbreeding. The main effect of inbreeding depression results in the increase in the homozygous in the progeny, which is proportionate to the degree of inbreeding**.**

b) Interbreeding Hybridization:

Ans: Hybridization is the process of interbreeding between individuals of different species (interspecific hybridization) or genetically divergent individuals from the same species (intraspecific hybridization). Offspring produced by hybridization may be fertile, partially fertile, or sterile.

c) Biofortification: it can be defined as a process to increase the bioavailability and the concentration of nutrients in crops through both conventional plant breeding and recombinant DNA technology.

d) Micro propagation--It is the practice of rapidly multiplying stock plant material to produce a large number of progeny plants, using modern plant tissue culture methods

e)Soma clones.

The plants produced, that are genetically identical to the original (parent) plant are known as Soma clones

32) Explain the regulation of Lac Operon in absence and presence of lactose as an inducer.

In the absence of an inducer such as allolactose or IPTG, the lacI gene is transcribed and the resulting repressor protein binds to the operator site of the lac operon, Olac, and prevents transcription of the lacZ, lacY and lacA genes**.**

In the presence of an inducer during induction, the inducer binds to the repressor. This causes a change in conformation of the repressor that greatly reduces its affinity for the lac operator site. The lac repressor now dissociates from the operator site and allows the RNA polymerase (already in place on the adjacent promoter site) to begin transcribing the lacZ, lacY and lacA genes. They are transcribed to yield a single polycistronic mRNA that is then translated to produce all three enzymes in large amounts.

Section – II

Answer any three of the following questions in about 200 to 250 words each wherever applicable. (3× 5 = 15)

33) Oswald Avery and others have continued Griffith transforming principle to prove DNA as a genetic material. Substantiate.

Ans: Griffith was a British medical officer and geneticist. He discovered what he called a "transforming principle" that caused inheritance. Oswald and his colleagues, Colin MacLeod and Maclyn McCarty continued Griffith's research and discovered that DNA is the material of which genes and chromosomes are made. Avery, MacLeod and McCarty continued Frederick Griffith's research with their own set of experiments .They used techniques to remove various organic compounds from bacteria to test how characteristics were inherited. After removing certain organic compounds, if the remaining organic compounds were still able to cause R strain bacteria to transform then the substances removed couldn't be the carrier of genes. They thus tried to identify the source of inheritance through the method of elimination. They first removed the large cellular structures from the S strain bacteria. Then they treated the bacteria with protease enzymes, which removed the proteins from the cells. The remainder of the S strain bacteria was then placed with R strain bacteria. But the R strain bacteria still transformed, proving that proteins did not carry the genes for causing the disease. When the remnants of the R strain bacteria were treated with a deoxyribonuclease enzyme which removed the DNA, the R strain bacteria no longer transformed. This indicated that DNA was the carrier of genes in cells**.**

34) Describe the role of microbes in sewage treatment plant.

The role of microorganisms are also important in the treatment of wastewater. What is waste for humans and higher vertebrates becomes a useful food substrate for the microorganisms. In both natural and engineered treatment systems microorganisms such as bacteria, fungi, protozoa, and crustaceans play an essential role in the conversion of organic waste to more stable less polluting substances.

35) One of the applications of biotechnology is to get pest resistant plants.Justify the statement with reference to BT Cotton.

Ans: Biotechnology can be broadly defined as using organisms or their products for commercial purposes. One example of modern biotechnology is genetic engineering .Some of the applications of biotechnology in agriculture are the production of pest registered plants which decrease the amount of pesticides used.

BT toxin is produced by by the bacterium and expressed in plants to provide resistance to insect. in effect created a bio pesticides for example BT Cotton, BT corn, Golden rice. BT Cotton is created by using some strains of bacteria Thuringienesis that produces protein that kill certain insects such as lepidopterans (Tobacco, budworm and armyworm). BT toxin protein exist in

inactive protoxin but once and insects ingest the Inactive toxin it is converted into active form of toxin due to alkaline pH of the gut which solubilized the crystals. The activated toxin bind to the surface of midgut epithelial cells and create pores that cause the cell swelling and lysis leading to death of insects. Most BT toxin are insect group specific.

36) What are ectoparasites and endoparasites? (2)

Ans: Parasites which has to live within the body of a life form that is commonly known as a host are called the endoparasites or because of their living habits, they can be known as the internal parasites as well. The presence of the endoparasites can be found in lots of different types of phyla either of the animals or the protists. These are the endoparasites which have the ability to live in the shape of the intracellular or extracellular environments inside their host. The term of intracellular parasites describes the living habits of these sorts of parasites because they live inside the cell bodies. The malaria parasite is the best example of the intercellular parasites as they live in the human red blood cells. On the other side, the extracellular parasite have the capability of living in the body tissues of their hosts. The Trichinella is the example of the extracellular parasites seeing that it lives inside the muscle tissue.

Parasites which live on the body surface of an organism are known as the external parasites commonly called the Ectoparasites. Ectoparasites are found in both the plants and animals. The main target of the Ectoparasites is to suck the blood of the living things or take the juices of their hosts for their survival. The Ectoparasites can feed on living tissue as well. The animal Ectoparasites mostly suck the bold of their hosts while the plant Ectoparasites have to rely of the juices. The major examples of the human ectoparasites are the louse, rat flea, ticks, and itch mite

OR

List any three parasitic adaptations in animal. (3)

Ans: Parasitic adaptation in animal -

- In order to lead a parasitic life complete or partial degeneration or loss of organs has taken place in the body of helminthes parasites. Such degeneration are found especially in those organs which are of little or no use to the parasite.
- The helminthes parasites have attained certain special structures which help them adjust well within the body of their host.
- The endoparasites has to face the changing chemical environment inside the body of their host, hence are adapted to exhibit the phenomenon of chemotaxis, which allow them to find their way and respond accordingly.

37) Write a note on the following.

A) Radioactive waste. (3)

Ans: Radioactive waste is nuclear fuel that is produced after being used inside of a nuclear reactor. It looks same asit did before it went to nuclear but it changes the compound which is different. What is left is considered radioactive material and is very dangerous to anyone. This remains this way for just not a few years but for thousands of years .It must be handled in right manner because it can cause a ton of devastation in the world it could take just a second to die from exposure to radioactive materials .It ivate is a kind of waste in gas liquid solid form that contain radioactive nucleus substance

(B) Joint forest management (2)

Ans: JFM is defined as a concept of developing partnerships between fringe forest user groups and the Forest Department (FD) .On the basis of mutual trust and jointly defined roles and responsibilities for forest protection and development. It is a forest management strategy under which the Government which is represented by the Forest Department, and the village community enter into an agreement to jointly protect and manage forestlands adjoining villages and to share responsibilities and benefits.