Karnataka Board

Biology

Class 12

Instructions:

i) The question paper consists of four parts – A, B, C, and D

Part – D consists of two sections – Section I and Section II

All the Parts are compulsory

iii) Draw diagrams wherever necessary. Unlabeled diagrams or illustrations do not attract any marks.

PART A

Answer the following questions in one word or in one sentence each. 10X1=10

1) What are hermaphrodites?

Ans: Hermaphrodites are living organism having both male and female reproductive organs on same organism. Hermaphroditic plants are most flowering plants, or angiosperms are called monoecious, or bisexual. Hermaphroditic animals are mostly invertebrates such as worms, bryozoans (moss animals

2) Mention the Asexual Reproduction structure in sponges.

Ans: All sponges possess a remarkable ability to regenerate lost part. They reproduce asexually by Budding & Branching, Fission, Fragmentation, Reduction bodies, Gemmules.

3) What are Euchromatin?

Ans: Euchromatin is a lightly packed form of chromatin, DNA, RNA, and protein that is enriched in genes, and is often under active transcription.

4) Why DNA replication is called semi conservative?

Ans: The DNA replication creates two new complete helixes that are both composed of one new strand and one old strand thus the term Semi conservative replication.

5) Name the microbe used in the production of citric acid.

Ans: Cirtic acid is produced mainly by submerged fermentation using Aspergillusniger or Candida species from different sources of carbohydrates, such as molasses and starch based media

6) What is micro injection?

Ans: Microinjection is the process of using a glass micropipette to insert substances at a microscopic or borderline macroscopic level into a single living cell.

7) Define mortality.

Ans: Mortality is the death rate. It is a measure of the number of deaths in a particular population due to specific cause or in general cause.

8) Give an example of gaseous cycle.

Ans: Gaseous cycles include those of nitrogen, oxygen, carbon, and water; sedimentary cycles include those of iron, calcium, phosphorus, sulfur, and other more-earthbound elements.

9) Define endemism.

Ans: Endemism is the situation in which a species is restricted to a particular geographic region as a result of factors such as isolation or in response to abiotic conditions.

10) What is eutrophication?

Ans: Eutrophication is a biological process where dissolved nutrients cause oxygen-depleting bacteria and plants to proliferate creating a hypoxic or oxygen poor environment that kills marine life**.**

PART – B

Answer any five of the following questions in three to five sentences each wherever applicable. 5× 2 = 10

11) List the hormones produced by Placenta during pregnancy.

Ans: The major hormones secreted by the placenta are:

- Human chorionic gonadotropin
- Estrogen
- Progesterone
- Human placental lactogen
- Placenta serves as the main endocrine organ of pregnancy.

12) Write any two simple principles to prevent sexually transmitted diseases.

Ans: Diseases or infections which are transmitted through sexual intercourse are collectively called Sexually Transmitted Diseases (STDs) it can be prevented by following methods:

- Avoid sex with unknown partners/multiple partners.
- Always use condoms during coitus.
- Contact a qualified doctor for any doubt in early stage of infection.

13) Mention four symptoms of down syndrome.

Ans: Symptoms of Down's syndrome are:

The children at the time of birth are with physical anomalies. They have broad cranium of, short neck, flat hands, blunt fingers, lower lip bulging lower buzzing below, Tongue also sticks out of the mouth.

14) What is incomplete dominance give an example?

Ans**:** The pattern of inheritance where neither of the alleles is completely dominant over the other: both alleles can be seen at the same time. The allele for red flowers is incompletely dominant over the allele for white flowers. Red + white = pink. It is seen in Mendel's cross of flower colour in Snapdragon.

15) Write any two factor affecting Hardy weinberg principle.

Ans: Two 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.

16) What is significance of selectable marker in cloning vector?

Ans: Selectable marker is required for the maintenance of the plasmid in the cell. Due to the presence of the selective marker, the plasmid becomes useful for the cell. Under the selective

conditions, only cells that contain plasmids with the appropriate selectable marker can survive. Commonly, genes that confer resistance to various antibiotics are used as selective markers in cloning vectors.

17) Codon AUG has dual function justify.

Ans: During translation, AUG acts as an initiator of protein synthesis as well as a codon for methionine (Met) incorporation at internal protein positions in eukaryotes and an N-formylmethionine in prokaryotes.

18) What are the criteria of DNA to act as a genetic material?

Ans: A molecule can act as the genetic material it should fulfill following criteria:

It must be able to replicate, store information, express information, and allow variation by mutation. The central dogma of molecular genetics is that DNA makes RNA, which makes protein. The genetic material is physically transmitted from parent to offspring. Proteins and nucleic acids were the major candidates for the genetic material.

PART- C

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

5 × 3 = 15

19) Name the types of vegetative propagules in following plants.

a) Potato

Ans: In potato the vegetative propagation by axillary bud.

b)Ginger:

Rhizome is the vegetative propagule

b) Bryophyllum:

Budding is the vegetative propagules in budding new offspring are produced through the buds which are repetitive cell division at one spot.

20) What is pollination? Mention any four features of wind pollinated flowers

Ans: Pollination is a method where pollen grains are picked from an anther, which is the male part of a flower and transferred to the flower's female part called the stigma. To make the

pollination work successfully, the pollen grains must be transferred from the same species of flower**.**

Wind-pollinated plants don't depend on the ability to attract birds or insects, so their flowers tend to be small, drab, unscented and inconspicuous. Anthers (structures where pollen is produced) and stigmata (structures where the pollen will land) often project from the flower in order to be exposed to the wind.

21) What is infertility? Give reason for infertility in humans.

Ans**: I**nfertility is a phenomenon which occurs when a couple cannot conceive after having regular unprotected sex. It is the inability to conceive. Infertility is seen in both males and females. Reason for infertility in females are following**:**

- Failure to ovulate is one common cause of infertility in females..
- In some rare cases, women may produce antibodies against sperms. These are found in the cervix, uterus and oviducts.
- Damage to Oviducts:
  The fallopian tubes may be blocked or narrowed in some women. This interferes with the movement of the eggs and fertilization.
- Infertility in male-Absence of sperms in the semen is known as azoospermia.

22) What are analogous organs.Give any two examples.

Ans: The organs having the same functions but different structure origin and constituting part are called analogous organs .For example the wings of bat and the wings of birds are analogous organs as their origin, design ,structure and components are different but they have a common use of flying.other example is Cladode of Ruscus and a foliage leaf.

23) Mention tohat type of carcinogen with an example of each.

Ans: Different Types of carcinogens are followings:

- Chemicals/substances: Certain chemicals used the home or workplace may be carcinogenic. For example, asbestos in insulation can lead to lung cancer and mesothelioma.
- Environmental radiation: Ultraviolet radiation from the sun is a well-known cause of skin cancer..
- Medical radiation: Both radiation used medically for diagnostic tests and that used to treat cancer are considered carcinogens

24) Write the meaning of following terms.

a) Explants.

Ans: To take living material from an animal or plant and place it in a culture medium is called explant.

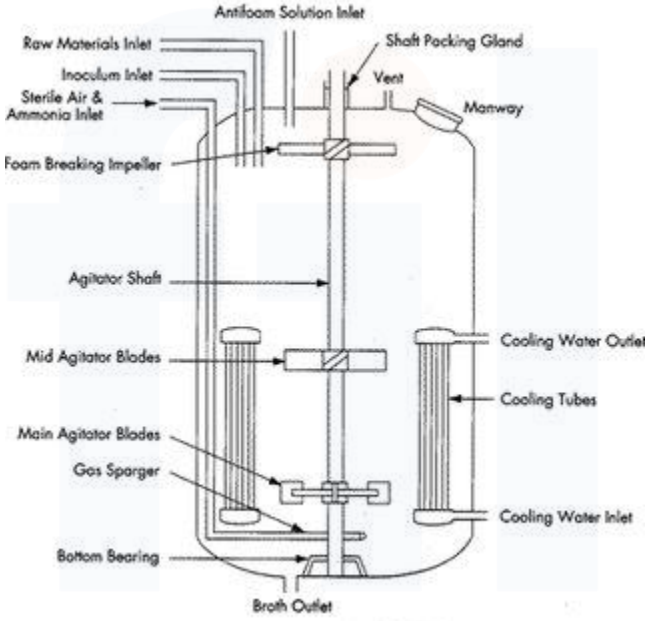
b) Totipotency –

Ans: Ability of a single cell to divide and produce all the differentiated cell of an organism. Spores and zygote are examples of totipotent cells. A cell with tot potency represents a cell with highest dividing potential

c) Somaclones –

Ans: The plants produced, that are genetically identical to the original or parent plant are known as Somaclones.

25) Draw a neat labelled diagram of simple Stirred tank bioreactor.



STIRRED TANK BIOREACTOR

26) Mention three causes for biodiversity losses.

Ans: Some important causes of biodiversity losses are as follows:

- Habitat loss fragmentation -This is the most important cause of driving animals and plants to extinction The ability of biodiversity to survive depends on the capacity of particular species which start successfully on the onslaught of adverse environmental factors .
- Over expectation-Humans have always dependent on nature for food and shelter but when need turns to greed it leads over exploitation of natural resources.
- Alien species invasion- Introduction of alien species in innovation deliberately or inadvertently has affected many native species by composing new factors in the competition

for food and space, predation, Habitat destruction and degradation, transmission of disease and parasites

PART – D

SECTION – I

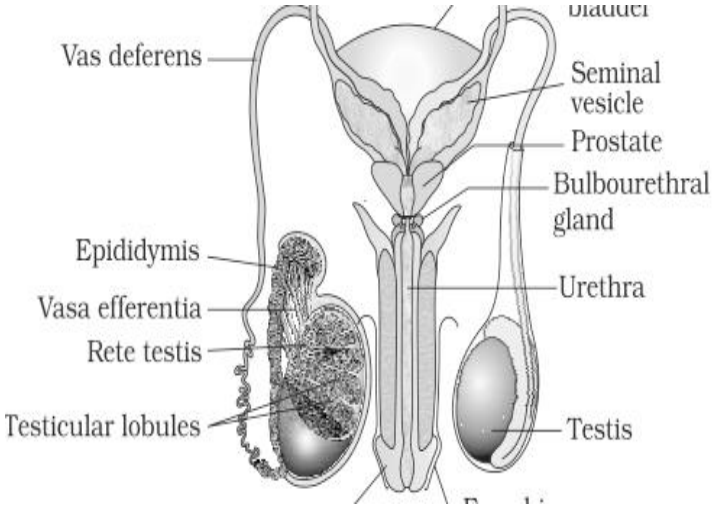
Answer any four of the following questions in about 200 to 250 words each wherever API applicable.

27) Describe the structure of pollen grains of angiosperms.

Ans: Within the microsporangium, the microspore mother cell divides by meiosis to give rise to four microspores, each of which will ultimately form a pollen grain. An inner layer of cells, known as the tapetum, provides nutrition to the developing microspores, contributing key components to the pollen wall. Mature pollen grains contain two cells: a generative cell and a pollen tube cell. The generative cell is contained within the larger pollen tube cell. Upon germination, the tube cell forms the pollen tube through which the generative cell migrates to enter the ovary. During its transit inside the pollen tube, the generative cell divides to form two male gametes. Upon maturity, the microsporangia burst, releasing the pollen grains from the anther. Each pollen grain has two coverings: the exine (thicker, outer layer) and the intine. The exine contains sporopollenin, a complex waterproofing substance supplied by the tapetal cells. Sporopollenin allows the pollen to survive under unfavorable conditions and to be carried by wind, water, or biological agents without undergoing damage.

Pollen develops from the microspore mother cells. The mature pollen grain is composed of two cells: the pollen tube cell and the generative cell, which is inside the tube cell. The pollen grain has two coverings: an inner layer (intine) and an outer layer (exine). The inset scanning electron micrograph shows Arabidopsis lyrata pollen grains.

28) Draw neat labelled diagram of human male reproductive system.



MALE REPRODUCTIVE SYSTEM

29) Explain Mendel's experiment to describe Inheritance of gene with reference to height of pea plants.

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.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 in the F1 generation. Mendel found one parental character dominating in the F1 hybrid, and after self fertilisation in F2 generation both parental characters appeared in the proportion of three-fourths to one-fourth in all his experiments.

30) List the salient features of Human Genome.

Ans: The salient features of Human Genome Project are followings**:**

i) The human genome contains 3164.7 million nucleotide bases.

(ii)The average gene consists of 3000 bases, but sizes vary greatly, with the largest known human gene being dystrophin at 2.4 million bases.

(iii)The total number of genes is estimated at 30,000–much lower than previous estimates of 80,000 to 1,40,000 genes. Almost all (99.9 per cent) nucleotide bases are exactly the same in all people.

(iv) The functions are unknown for over 50 per cent of discovered genes.

(v)Less than 2 per cent of the genome codes for proteins.

31) Name the disease caused by following organisms:

a) Rhinovirus

Ans: The common cold is caused by Rhinovirus.

b) Epidermophyton

Ans: Causes skin and nail infection in human**.**

c) Salmonella typhoid

Ans: Causes typhoid**.**

d) Wutchereriamalayi

Ans: Causes Lymphatic filariasis in human

e) Plasmodium vivax

Ans: Causes Malaria

32) What is beekeeping? Write any Four Points for successful beekeeping.

Ans: The rearing of honey bee to obtain honey and other commertially important product is known as agriculture or beekeeping. In India ApisIndica is the best bee for agriculture industry because of its gentle nature and efficient prolific work. Beekeeping can be practiced in any area where there are sufficient bee pastures of some wild shrubs, fruit Orchids and cultivated crops. Beehive can be kept in one's country yard, on the verandah of the house or even on the roof .The ultimate aim of the keeping his to get more and more money in pure .The old method of collecting honey is very cruel and unplanned.in this method of extraction of honey burning fire is brought near the bee hive at night which either kill the bees or escape from the hives. Thereafter the hive full of honey is removed cut into pieces squeezed to extract honey. This method is not only crude but money is extracted is not pure. This method of honey collection is now gradually replaced by a better and scientific method call Apiculture .Honey bees are reared in artificial Hives with large brood chamber and bee wax sheets called comb Foundation. These are attracted to form cells and comb on the comb foundation which are then remove for extraction of honey. The following points are important for successful beekeeping:

- Knowledge of the habitat and nature of honeybees.
- Selection of suitable place for keeping the beehive.
- Catching of honeybees.

- Management of the hives during different Seasons.
- Handling and collection of honey and beewax.

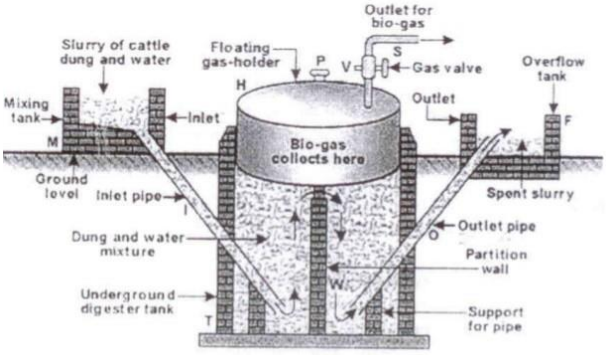
SECTION-II

Answer any three of the following questions in about 200 to 250 words each wherever applicable.

33) Describe the biogas plant with a neat labelled diagram.

Ans: A biogas plant is an anaerobic digester that produces biogas from animal wastes or energy crops. Energy crops are cheap crops grown for the purpose of biofuels, rather than food. Biofuels are liquid, gaseous, or solid fuel made from live or recently dead organic material known as biomass, as opposed to fossil fuels, which are composed of ancient biological materials. Biogas is a type of biofuel created via anaerobic, or oxygen-free, digestion of organic matter by bacteria. A biogas plant is composed of a digester and a gas holder.

The digester is an airtight container in which the waste is dumped and decomposed, and the gas holder is a tank that harnesses the gases emitted by the slurry. Bacteria within the digester tank breaks down the waste and, as it decomposes, gases such as carbon monoxide, methane, hydrogen, and nitrogen, are released. Through a pressurized system, the gas holder conducts the flow of these gases upward into a hole in its drum. The hole is specially designed to allow gases to pass freely into the holder while prohibiting any gases from escaping back into the digester. In a controlled environment, the gases are later combusted, or reacted, with oxygen to create an energy source for such processes as heating and vehicle propulsion.



BIOGAS PLANT

34 a) What is biopiracy?

Ans: Bio piracy is the term used to refer to the use of bio resources by multinational companies and other organization without proper authorization from the countries and people concerned without compensatory payment. Biopiracy is a situation where indigenous knowledge of nature originating from indigenous people is used by others for profit without permission from or with little or no compensation for reorganization to the indigenous people themselves.It is theft robbery of genetic resources in business to a country bio piracy is widespread in Asia Africa and Latin America where abundant biological resources are produced.

b) How ADA deficiency cured by gene therapy?

Ans: Adenosinedeaminase (ADA) deficiency is a rare inherited disorder of purine metabolism characterized by the accumulation of metabolic substrates that lead to abnormalities of immune system development and function and a variety of systemic defects. The process of gene therapy to treat patient's condition involved getting some of white blood cells from patient's blood. Once outside of the body, new, working copies of the adenosine deaminase gene were inserted in to the cells via a vector. Vectors are 'vehicles' used by scientists to insert new genes into DNA. In this case, the vector was a virus that had been modified so it no longer caused disease. Once the functioning adenosine deaminase gene had been inserted into white blood cells by the virus, these white blood cells were injected back into patient's blood. Because the white blood cells originally came from body, there was no risk of her immune system attacking the cells. The initial impact of the gene therapy was amazing. Within six months of the procedure white blood cell count had risen to normal levels, and over the next two years patient continued to improve.

35) a. What is ecological succession? 1

Ans: An orderly sequence of communities of organisms over a period of time at the same place is known as ecological logical succession. It is the natural process by which the same locality become successive leaf colonized by different groups for plant communities**.**

b. Write the types of plant succession. 2

Ans: Various types of succession have been classified are followings:

- Primary and secondary succession-
  When an area colonized by organism for the first time the situation is called primary succession. If the success and starts on area previously colonized but has been cleared of it is called secondary succession

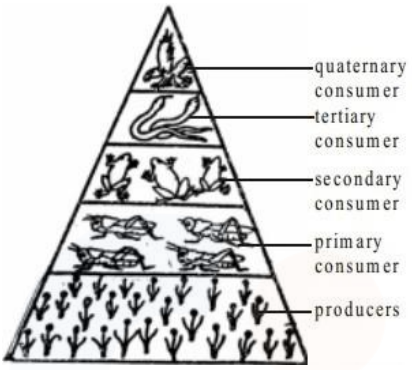
- Autogenic and allogenic succession.
  When a community replaces The Other due to modification of environment by community itself the succession is called autogenic when a community replaces the other community

largely two forces other than effects of community on Environment the succession is called allergenic

- Autotrophic and heterotrophic succession.

c) Represent pyramid of number in grassland ecosystem.

2



PYRAMID OF NUMBER

36) Explain mutualism with example.

Ans: Mutualism is an interaction between two species in which both are benefited it may be synbiotic in which organisms live together in close physical access Association in such interaction there that's a close and open permanent and obligated contacts more or less essential for survival of both the two populations enter into some sort of physiological relationship like its mycorrhizae symbiotic nitrogen fixers are example of Symbiosis. The most spectacular and evolutionary fascinating examples of mutualism are found in plant animal relationships. Plant need to help animal for pollinating their flower and dispersion disease in return plants offer reward in form of Pollen and nectar for pollinators juicy and nutritious fruits for seeds dispersed .Such interaction of a involve co-evolution of the mutualist that is evolution of flower and its pollinated species are tightly linked with one another**.**

37) Write a brief account of electrostatics precipitated with neat labelled diagram.

Ans: An electrostatic precipitator (ESP) is an device that removes dust particles from a flowing gas (such as air) using the force of an induced electrostatic attraction (i.e, like charges repel; unlike charges attract).It allow the flow of gases through the device, and can easily remove fine particulate matter such as dust and smoke from the air stream.IT widely used to trap fine particulate matter in applications where a large amount of gas needs treatment and where a wet scrubber is not appropriate. Coal-burning electric generating plants, primary and secondary

smelters, and incinerators often use electrostatic precipitators in which particles are removed when the dirty gas stream passes across high-voltage wires usually carrying a large negative DC voltage. The particles are electrically charged as they pass these electrodes and then migrate through the electrostatic field to a grounded collection electrode. The collection electrode can be either a cylindrical pipe surrounding the high-voltage charging wire or a flat plate. In either case, it must be periodically rapped with small hammer-heads to loosen the collected particles from its surface.