12

BIOLOGY - BOTANY

GOVT.PUBLIC EXAMINATIONS QUESTION AND ANSWERS

2020 March	2020 October
2021 March COVID 19	2021 September
2022 May	2022 August
2023 March	2023 June
2024 March	2024 July

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UNIT VI: REPRODUCTION IN PLANTS
CHAPTER 1. ASEXUAL AND SEXUAL REPRODUCTION IN PLANTS

CHOOSE THE CORRECT ANSWERS

1. First cell of Male gametophyte in angiosperms is March' 2020
(a) Primary endosperm **(b) Microspore**
(c) Megaspore (d) Nucleus

2.Parthenocarpic fruits lack Sep' 2021
(a)Mesocarp (b) Endocarp **(c) Seed** (d) Epicarp

3.The first cell of male gametophyte in angiosperm is May' 2022
(a) Nucleus **(b) Microspore**
(c) Primary Endosperm Nucleus (d) Megaspore

4.Coleorhiza is found in Aug' 2022
(a) Paddy (b) Beans (c) Pea (d) Tridax

5.Which of the following represent Mega gametophyte March' 2023
(a) Nucellus (b) Ovule (c) Endosperm **(d) Embryo sac**

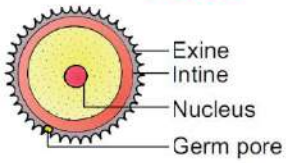
6.The scar left by Funiculus in the seed is June' 2023
(a) tegmen (b) radicle (c) epicotyl **(d) hilum**

7.Size of pollen grain in myosotis is _____ micrometer March' 2024
(a) 10 (b) 2000 (c) 20 (d) 200

8.Transmitting tissue is found in July' 2024
(a) Micropylar region of ovule (b) Pollen tube wall **(c) Stylar region of gynoecium** (d) Integument

TWO MARKS

1. Draw and mark the parts of first cell of male gametophyte. 2020 Oct



2.What is Mellitophily ? 2022 May
Pollination by Bees are called Mellitophily

3.What is myrmecophily? 2022 May
Pollination by **Ant**s are called **myrmecophily**

4.What is Stomium? 2023 March
In T.S of anther , the endothecial cells along the junction of the two sporangia of an anther lobe lack the thickenings. This region is called stomium.

5.What is Pollen kitt? 2023 June
Write short note on pollen kitt July 24

- Pollen kitt is contributed by the tapetum.
- It is yellow or orange coloured.
- The colour given by carotenoids or flavonoids.

- It is an oily layer forming a thick viscous coating over pollen surface.
- It attracts insects and protects damage from UV radiation.

THREE MARKS

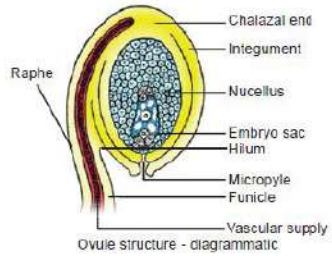
1.Give an account on cryo preservation. 2020 Mar
Give an account on Cryopreservation. 2024 March

The protoplasts, cells, tissues, organelles, organs or any other biological materials are subjected to preservation by cooling to very low temperature of **–196°C** using **liquid nitrogen** are called cryopreservation.

2.Write any three practical applications of polyembryony. 2020 Oct

1.Presence of more than one embryo in a seed
2.The seedlings formed from the nucellar tissue in *Citrus* are found better clones for Orchards.
3.Embryos through polyembryony are found virus free

3.Draw the diagrammatic structure of ovule and label its parts. 2021 Sep , 2024 March

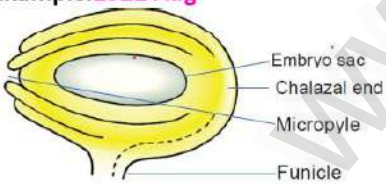


Ovule structure - diagrammatic

4.List out the functions of tapetum. 2022 May , 2023 June (Any 3 points)

- It supplies nutrition to the developing microspores.
- It contributes sporopollenin through ubisch bodies.
- Sporopollenin plays a role in pollen wall formation.
- The pollen kitt material is contributed by tapetal cells.
- Exine proteins derived from tapetal cells responsible for 'rejection reaction'
- It controls the fertility or sterility of the microspores

5.Draw and explain Hemi anatropous Ovule with an example. 2022 Aug



In this, the body of the ovule is placed transversely and at right angles to the funicle. Example: Primulaceae.

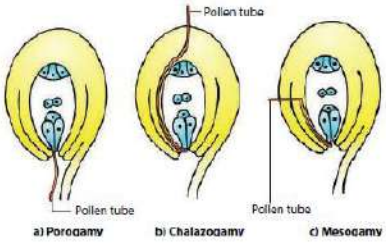
6.Differentiate Grafting and Layering. 2023 March

Grafting	Layering
There is a fusion between tissues of different plants	There is no fusion between tissues of different plants
Stock plant contains a very strong root system.	Roots are formed on a stem of a mother plant
Types: 1.Bud grafting, 2.Approach grafting, 3.Tongue grafting, 4.Crown grafting and 5.Wedge grafting.	Types: 1.Mound layering 2.Air layering are

FIVE MARKS

1.Explain the different mode of entry of pollen tube into the ovule. 2020 Mar

Porogamy : The pollen tube enters through the micropyle.
Chalazogamy: The pollen tube enters through the chalaza.
Mesogamy:The pollen tube enters through the integument.



2.Discuss the steps involved in Microsporogenesis. 2021 Sep, 2024 March

The formation of haploid microspores (n) from diploid microspore mother cell (2n) by meiosis is called Microsporo genesis.

- The primary sporogeneous cells directly, or mitotic divisions to form sporogenous tissue.
- The sporogenous tissue functions as microspore mother cells.
- Each microspore mother cell divides meiotically to form a four haploid microspores (microspore tetrad).
- Microspores remain free and develop into pollen grains.

3.Give a detailed account on parthenocarpy, add a note on its significance. 2022 May,2024 July

- Fruit may develop from the ovary without fertilization. are called parthenocarpic fruits.
- They do not have seeds. Ex: Banana, Grapes and Papaya.

Significance parthenocarpic fruits

- They do not have seeds.
- They have great significance in horticulture.
- They have great commercial importance.
- These are useful for the preparation of jams, jellies, sauces, fruit drinks etc.
- High proportion of edible part is available due to the absence of seeds.

4.Give the characteristic features of Anemophilous plants. 2022 Aug,2023 March

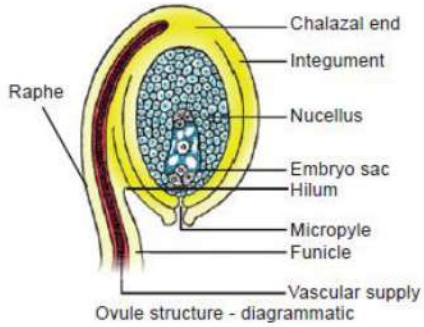
- The perianth is absent or highly reduced.
- The flowers are small, inconspicuous, colour less, not scented, do not secrete nectar.
- The stamens are numerous, filaments are long, exerted and versatile.
- Anthers produce minute, light & dry enormous quantities of pollen grains. so they carried to long distances
- Anthers burst violently and release the pollen into the air. Ex: *Urtica.*
- Stigmas are large, protruding, sometimes branched and feathery, adapted to catch the pollen grains.

6.With suitable diagram explain the structure of an ovule. 2023 June

- Ovule is also called mega sporangium.
- It is protected by one or two covering called integuments.
- Integument encloses the nucellus except at the top and forms a pore called micropyle.

- Opposite to the microhyle the region of the ovule is called as chalaza.
- A mature ovule consists of a stalk called funicle.
- The point of attachment of funicle to the body of the ovule is known as hilum.
- The body of the ovule is made up of a central mass of parenchymatous tissue called nucellus.
- It has large reserve food materials.
- The micropylar end of the nucellus contains large oval, structure called embryo sac or female gametophyte
- It develops from the functional megaspore formed within the nucellus.

Structure of ovule:



Ovule structure - diagrammatic

UNIT VII: GENETICS

CHAPTER 2. CLASSICAL GENETICS

CHOOSE THE CORRECT ANSWERS

1.If a homozygous red flowered plant is crossed with a homozygous white flowered plant then the off- spring will be March' 2020

(a) All red flowered **(b) Pink flowered**
(c) Half red flowered (d) All white flowered

2.Alternative forms of a gene are/is called Oct' 2020

(a) Genome **(b) Alleles** (c) Genotype (d) Genetic code

3. In Mendel's experiments with garden pea, round seed shape (RR) was dominant over wrinkled seeds (rr), Yellow cotyledon (YY) was dominant over green cotyledon (yy). What are the expected phenotypes in the F2 generation of the cross RRYY×rryy? Sep' 2021

a) Only wrinkled seeds with green cotyledons
b) Only round seeds with green cotyledons
c) Round seeds with yellow cotyledons and wrinkled seeds with yellow cotyledons
d) Only wrinkled seeds with yellow cotyledons

4. The Dominant Epistasis ratio is May' 2022

(a) 9: 3 :4 (b) 9 : 3 : 3 : 1 (c) 9 : 6 : 1 **(d) 12 : 3 : 1**

5.The single gene affects multiple traits and alters the phenotype of in the organism. Aug' 2022

(a) Lethal genes **(b) Pleiotropy**
(c) Epistatic (d) Hypostatic

6.Extra nuclear inheritance is a consequence of presence of genes in June' 2023

(a) Mitochondria and chloroplasts
(b) Endoplasmic reticulum and mitochondria
(c) Ribosomes and chloroplasts
(d) Lysosomes and ribosomes a

7.Fruit colour in squash is an example of March' 2024

(a) Complementary genes (b) Recessive epistasis
(c) Inhibitory genes **(d) Dominant epistasis**

TWO MARKS

1.Give any two names of the scientists who rediscovered Mendelism. 2023 June, 2024 March

- Hugo de Vries of Holland,
- Carl Correns of Germany and
- Erich von Tschermak of Austria in 1900.

THREE MARKS

1. In 4 o'clock plant

Pale green leaved plant (Male) × Dark green leaved plant (Female)

↓

?

Explain the type of inheritance. 2020 March

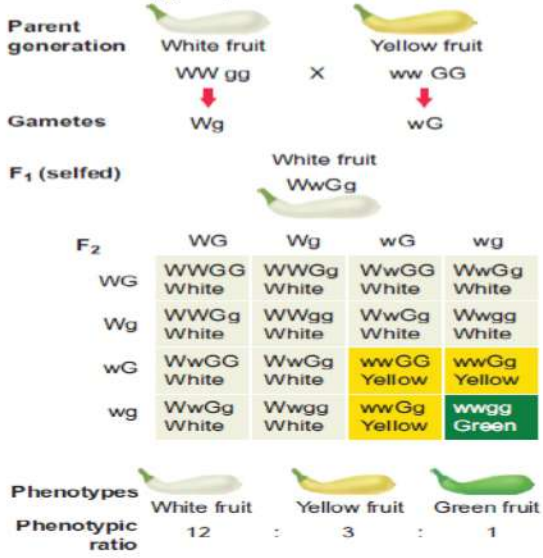
This inheritance is known as extra nuclear inheritance. It is a kind of Non-Mendelian inheritance. It involves cytoplasmic organelle such as chloroplast that act as inheritance vectors, it is called Cytoplasmic inheritance.

FIVE MARKS

1.Explain Intergenic Interaction with an example.2020 Oct
Describe dominant epistasis with an example.2021 Sep, 2024 July

An Intergenic Interaction is Dominant Epistasis.
A gene that masks the effect of another gene is called epistatic gene. A gene whose effect is masked by another gene is called hypostatic gene. When both the genes are present together, the phenotype is determined by the epistatic gene and not by the hypostatic gene.

- In summer squash fruit colours maybe white ,yellow or green .
- White fruits are produced by a dominant epistatic alleleW
- At another locus G for yellow fruits is dominant to its allele g for green fruits
- Dominent white hides the effects of yellow or green .
- The white fruit (WWgg) is crossed with yellow fruit (wwGG).
- The F1 plants have white fruit and are heterozygous (WwGg).
- The F1 heterozygous plants are crossed.



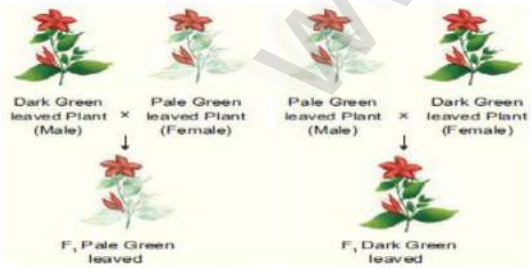
- They give rise to F2 with the phenotypic ratio of 12 white : 3 yellow : 1 green.
- W is epistatic to the alleles 'G' and 'g'.
- White is dominant which masks the effect of yellow or green.
- Homozygous recessive ww genotypes only give the coloured fruits (4/16).
- Double recessive 'wwgg' will give green fruit (1/16).
- The Plants having only 'G' in its genotype (wwGg or wwGG) will give the yellow fruit (3/16).

2.Differentiate incomplete dominance and co-dominance. 2022 May, 2022 Aug, 2023 March

	Incomplete dominance	Co dominance
1	The phenotype of F_1 hybrid does not resemble either of the parent	The phenotype of F_1 hybrid resemble both the parents
2	F1 hybrid possess new phenotype	F1 hybrid does not possess new phenotype.
3	It follows Mendel's particulate theory of inheritance and law of segregation.	It follows Mendel's law of segregation.
4	Neither of the alleles are dominant.	Both alleles are dominant.
5	*Ex.* Flowers of *Mirabilis jalapa*	Ex. Flowers of *Camellia*

3.Bring out the inheritance of chloroplast gene with an example. 2024 March

- Cytoplasmic organelle such as chloroplast that act as inheritance vectors, called Cytoplasmic inheritance.
- It is based on independent, self-replicating extra chromosomal unit called plasmogene located in the cytoplasmic organelles, chloroplast & mitochondrion.
- It is found in 4 O' Clock plant (*Mirabilis jalapa*).
- There are two types of variegated leaves 1.dark green leaved plants and 2.pale green leaved plants.
- When the pollen of **dark green** leaved plant (male) is transferred to the stigma of **pale green** leaved plant (female) and pollen of **pale green** leaved plant is transferred to the stigma of **dark green** leaved plant.
- The F1 generation of both the crosses must be identical as per Mendelian inheritance.
- But in the reciprocal cross the F1 plant differs from each other.



- In each cross, the F1 plant reveals the character of the plant which is used as female plant.
- This inheritance is not through nuclear gene.
- It is due to the chloroplast gene found in the ovum of the female plant.
- It contributes the cytoplasm during fertilization.
- since the male gamete contribute only the nucleus but not cytoplasm.

UNIT VII: GENETICS
CHAPTER 3.
CHROMOSOMAL BASIS OF INHERITANCE

CHOOSE THE CORRECT ANSWERS

1.Name the plant which is pest resistant and saline tolerant March' 2020

(a) Sonalika (b) Triticale
(c) Rhaphanobrassica **(d) Atomita-2**

2.Assertion (A): Increase in temperature increases the rate of mutation.
Reason (R): Rise in temperature breaks the hydrogen bonds between the nucleotides. Oct' 2020
(a) (A) is not correct (R) is correct
(b) (A) is correct but (R) is not correct
(c) (A) is correct (R) is correct explanation of (A)
(d) (A) and (R) are wrong

3.Assertion (A) : Gamma rays are generally used to induce mutation in wheat varieties.
Reason : Because they carry lower energy to non-ionize electrons from atom. March' 2024
(a) (A) is wrong, (R) is correct (b) (A) & (R) are correct
(c) (A) &(R) are wrong **(d) (A) is correct, (R) is wrong**

4.An allohexaploidy contains July' 2024
(a) Six different genomes
(b) Six copies of three different genomes
(c) Two copies of three different genomes
(d) Six copies of one genome

TWO MARKS

1.Define multiple alleles. 2021 Sep
Three or more allelic forms of a gene occupy the same locus in a given pair of homologous chromosomes, are called multiple alleles

2.What is C-value? 2022 Aug (Old Book)
The 'constant' value of haploid DNA content per nucleus is called C-value. It is typically measured in picograms.

3.Give the types of Synapsis. 2022 Aug , 2023 March

- **Procentric synapsis:** Pairing starts from middle of the chromosome.
- **Proterminal synapsis:** Pairing starts from the telomeres.
- **Random synapsis:** Pairing may start from anywhere.

4.What is the difference between missense and nonsense mutation? 2022 May,2023 June (3 marks) July 24 (2 Marks)

Missense mutation	**Nonsense mutation**.
The mutation where the codon for one amino acid is changed into a codon for another amino acid is called **Missense or non-synonymous mutations**	The mutations where codon for one amino acid is changed into a termination or stop codon is called **Nonsense mutation**.

THREE MARKS

1. P $2n=4x=28 \times 2n=2x=14$

G [A] [n=x=7]

(A) Write gametic condition.

[2n=3x=21]

[B]

(B) Write the name of the plant. 2020 Oct

(A). The gametic condition is **n=2x=14**

(B). The plant name is *Triticale* **2n=6x=42**

2. Give the significance of ploidy. 2022 Aug, 2023 March

(Write any three points)

- More vigorous and more adaptable than diploids.
- Many ornamental plants have larger flowers and longer flowering duration than diploids. (auto tetraploids)
- Usually have higher in fresh weight due to more water content. (Auto polyploids)
- Useful to determine the phenotypic effects of loss or gain of different chromosomes. (Aneuploids)
- They play a role in the evolution of plants.

FIVE MARKS

1.What is gene mapping and write its uses.2020 Mar,2024 March (3 Marks)

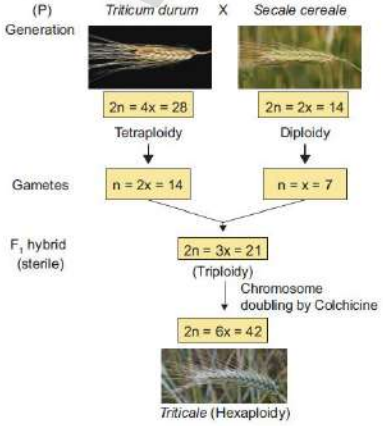
- The diagrammatic representation of position of genes and related distances between the adjacent genes is called genetic mapping / linkage map.

Uses

- Determine gene order.
- Identify the locus of a gene.
- Calculate the distances between genes.
- Useful in predicting results of dihybrid & trihybrid crosses.
- To understand the overall genetic complexity of particular organism.

2. Mention the name of man-made Cereal. How it is formed.? 2021 Sep, 2024 July (3 Marks) 2023 June (5 Marks) .

- ***Triticale*** is the successful first man made cereal.
- Hexaploidy *Triticale* hybrid plants demonstrate characteristics of both macaroni wheat and rye
- For example, they combine the high-protein content of wheat with rye's high content of the amino acid lysine, which is low in wheat.
- It can be explained by chart below



UNIT VIII: BIOTECHNOLOGY
CHAPTER. 4
PRINCIPLES & PROCESSES OF BIOTECHNOLOGY

CHOOSE THE CORRECT ANSWERS.

1.Which is frequently used as reporter of expression? March' 2020

(a) GMF (b) Circular protein **(c) GFP** (d) PLA

2.Find the mismatch pair Oct' 2020.

(a) Ti-plasmid - Agrobacterium tumefaciens
(b) Plasmid - E. Coli
(c) pBR 322 - Reconstructed plasmid
(d) Transfection - Virus

3.Restriction enzymes are Sep' 2021

(a) Not always required in genetic engineering
(b) Essential tools in genetic engineering
(c) Nucleases that cleave DNA at specific sites
(d) Both (b) and (c)

4.In which techniques Ethidium Bromide is used? May' 2022

(a) Polymerised Chain Reaction
(b) Southern Blotting Techniques
(c) Agarose Gel Electrophoresis
(d) Western Blotting Techniques

5.EcoRI cleaves DNA at May' 2022

(a) GAATTC (b) AGGGTT (c) TATAGC (d) GTATATC

6.The bacteria responsible for inducing tumours in several dicot plants are Aug' 2022

(a) Candida utilis (b) Spirulina
(c) Chlorella **(d) Agrobacterium tumifaciens**

7.The bacteria responsible for causing Crown Gall March' 2023

(a) Escherichia coli (b) Bacillus subtilis
(c) Bacillus thuringiensis
(d) Agrobacterium tumefaciens

8.In pBR 322, pBR stands for June' 2023

(a) Plasmid Bacterial Recombination
(b) Plasmid Bacterial Replication
(c) Plasmid Boliver and Rodriguez
(d) Plasmid Baltimore and Rodriguez

9.Plasmids are March' 2024

(a) tiny bacteria
(b) circular protein molecules
(c) confer resistance to antibiotics
(d) required by bacteria c

TWO MARKS

1.Name the enzymes involved in genetic engineering 2020 Mar , 2024 March

The enzymes involved are the Restriction enzymes, DNA ligase and Alkaline phosphatase.

2.Name the chemicals used in gene transfer. 2021 Sep , 2023 March
Polyethylene glycol (PEG) and Dextran sulphate are the chemicals used in gene transfer.

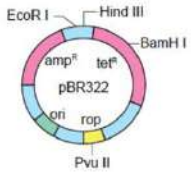
3.What are the enzymes you can use to cut terminal end and internal phosphodiester bond of nucleotide sequence? 2022 May
Exonucleases: It removes nucleotides one at a time from the end of a DNA molecule. Ex: Bal 31, Exonuclease III.
Endonucleases: It breaks the internal Phosphodiester bonds within a DNA molecule. Ex: Hind II, EcoRI , Pvul, BamHI, TaqI

4.What is bio-remediation? 2023 June, 2024 July
The use of microorganisms or plants to clean up environmental pollution is called bioremediation .

THREE MARKS

1.What are the materials used to grow microorganism like Spirulina ? 2021 Sep, 2023 March
Spirulina can be grown easily on materials like waste water from potato processing plants, straw, molasses, animal manure and even sewage.

2.What do you know about the word pBR 322 ? 2020 Mar 2022 May, 2024 July
- pBR 322 plasmid is a reconstructed plasmid.
- It is most widely used as cloning vector.
- It contains 4361 base pairs.
- In pBR, ***p*** for plasmid, ***B***and ***R*** for scientist **B**oliver and **R**odriguez.**322** is the number of plasmid developed from their laboratory.



amp^R - Ampicillin Resistance Gene
tet^R - Tetracycline Resistance Gene

- It contains ampR and tetR two different antibiotic resistance genes .
- It is a recognition sites for several restriction enzymes(*Hind III, EcoRI, BamH I, Sal I, Pvu II, Pst I, Cla I*), ori and antibiotic resistance genes.
- Rop codes for the proteins involved in the replication of the plasmid.

3.What is bio-remediation ? Give an example. 2022 Aug
The use of microorganisms or plants to clean up environmental pollution is called bioremediation .
Some examples :
- **Phytoremediation** - use of plants for remediation.
- **Mycoremediation** - use of fungi for remediation.

FIVE MARKS

1.List out any five applications of Biotechnology.
2020 Oct , 2024 July (any five)
- It has wide applications in various sectors like agriculture, medicine, environment and commercial industries.
- This science has an invaluable outcome like **transgenic varieties** of plants e.g. Bt-cotton, rice, tomato etc .
- The development of transgenics as pesticide, stress and disease resistant varieties of agricultural crops.
- The synthesis of **human insulin** and blood protein in *E.coli*
- Products of accines, enzymes, antibiotics, dairy products and beverages.
- **Biochip** based biological computer is one of the successes of biotechnology.
- Genetic engineering involves genetic manipulation, tissue culture under controlled atmospheric conditions.
- **Single cell protein** from *Spirulina* is utilized in food industries.
- Production of **secondary metabolites**, biofertilizers, biopesticides and enzymes.
- Biomass energy, biofuel, Bioremediation, phytoremediation for environmental biotechnology.

2.What is single cell protein? Mention its applications.
2024 March
The dried cells of microorganism that are used as protein supplement in human foods or animal feeds are called Single cell proteins.
Applications:
- It is used as protein supplement .
- It is used in cosmetics products for healthy hair and skin.
- It is used in poultry as the excellent source of proteins and other nutrients,
- It is widely used for feeding cattle, birds, fishes etc.
- It is used in food industry as aroma carriers, vitamin carrier, emulsifying agents to improve the nutritive value of baked products, in soups, in ready-to-serve-meals, in diet recipes
- It is used in industries like paper processing, leather processing as foam stabilizers.

UNIT VIII: BIOTECHNOLOGY
CHAPTER 5. PLANT TISSUE CULTURE

CHOOSE THE CORRECT ANSWERS

1.Virus free plants are developed from March' 2020
(a) Cell suspension culture (b) Organ-culture
(c) Meristem culture (d) Protoplast culture

2.Solidifying agent used in plant tissue culture is
Oct' 2020
(a) Nicotinic acid (b) Cobaltous chloride
(c) EDTA **(d) Agar**

3.Match the following Sep' 2021
(1) Totipotency (i) Reversion of mature cells into meristem
(2) Dedifferentiation (ii) Bio-chemical and structural changes of cells
(3) Explant (iii) Properties of living cells develops into entire plant
(4) Differentiation (iv) Selected plant tissue transferred to culture medium
(a) (1)-(ii), (2)-(i), (3)-(iv), (4)-(iii)
(b) (1)-(iii), (2)-(i), (3)-(iv), (4)-(ii)
(c) (1)-(iv), (2)-(ii), (3)-(iii), (4)-(i)
(d) (1)-(i), (2)-(iii), (3)-(ii), (4)-(iv) b

4.The time duration for sterilization process by using autoclave in.....minutes and the temperature is .....
Aug' 2022
(a) 10-30 minutes, 125°C **(b) 15-30 minutes, 121°C**
(c) 15-20 minutes, 125°C (d) 10-20 minutes, 121°C

5.Virus free plants are developed from March' 2023
(a) Meristem culture (b) Cell suspension culture
(c) Protoplast culture (d) Organ culture a

6.Soldifying agent used in plant tissue culture is July' 2024
(a) Nicotinic acid (b) Cobaltous chloride c) EDTA **(d) Agar**

TWO MARKS

1.Define Cybrid. 2020 Mar
The fusion product of protoplasts without nucleus of different cells is called a cybrid.

2.What are embryoids? 2020 Oct , 2023 June , 2024 March
The callus cells under goes differentiation and produces somatic embryos, known as **Embryoids**. The embryoids are sub-cultured to produce plantlets.

THREE MARKS

1.How are artificial seeds produced ? 2020 Oct
Artificial seeds or synthetic seeds (syn seeds) are produced by encapsulation of embryoids in agarose gel or calcium alginate obtained through in vitro culture.

FIVE MARKS

1.Explain the basic concepts involved in plant tissue culture. 2021 Sep
Basic concepts of plant tissue culture are totipotency, differentiation, dedifferentiation and redifferentiation.
Totipotency
Totipotency is the genetic potential of a cell to produce the entire organism when cultured in nutrient medium.
Differentiation
The process of biochemical and structural changes by which cells become specialized in form & function. (Meristematic tissue into mature cells i.e simple or complex tissue).
Redifferentiation
The component cells of callus have the ability to form a whole plant in a nutrient medium is called redifferentiation. (Callus into whole plant)
Dedifferentiation
The reversion of mature cells to the meristematic state leading to the formation of callus is called dedifferentiation. Mature cells into the meristematic i.e formation of callus

2.Write the applications of plant tissue culture. 2022 May
- **Improved hybrids** production through somatic hybridization.
- Somatic embryoids produce **synthetic seeds** (syn seeds).
- It helps in conservation of plant biodiversity.
- Production of **disease resistant plants** through meristem and shoot tip culture.
- Production of **stress resistant plants** like herbicide tolerant, heat tolerant plants.
- **Micropropagation technique** to obtain both crop and tree species.
- It is useful in forestry within a **short span of time** and all through the year.
- Production of **secondary metabolites** from cell culture utilized in pharmaceutical, cosmetic and food industries.

3.What are Artificial Seeds ? Give the advantages of Artificial Seeds. 2022 Aug
Artificial seeds or synthetic seeds(syn seeds) are produced by encapsulation of embryoids in agarose gel or calcium alginate obtained through in vitro culture.
Advantages:
- Millions of artificial seeds can be produced at any time at low cost.
- They provide an easy method to produce genetically engineered plants with desirable traits.
- It is easy to test the genotype of plants.
- They can potentially store for long time under cryopreservation method.
- Artificial seeds produce identical plants.
- The period of dormancy is greatly reduced and growth is faster with a shortened life cycle.

UNIT IX: PLANT ECOLOGY
CHAPTER 6. PRINCIPLES OF ECOLOGY

CHOOSE THE CORRECT ANSWERS

1.Match the following March' 2020
(1) Stenobathic (i) Salinity
(2) Stenoecious (ii) Depth of water/habitat
(3) Stenohaline (iii) Food
(4) Stenophagic (iv) Habitat selection
(a) (1)-(iv), (2)-(i), (3)-(iii), (4)-(ii)
(b) (1)-(iii), (2)-(i), (3)-(ii), (4)-(iv)
(c) (1)-(ii), (2)-(i), (3)-(iv), (4)-(iii)
(d) (1)-(ii), (2)-(iv), (3)-(i), (4)-(iii)

2.Orobanche is a Oct' 2020
(a) Saprophyte (b) Autotroph
(c) Partial parasite **(d) Total parasite**

3. A specific place in an ecosystem, where an organism lives and performs its functions is Sep' 2021
(a) landscape (b) habitat (c) biome **(d) niche**

4.Pedogenesis refers to May' 2022
(a) Population (b) Fossils **(c) Soil** (d) Water

5.In soil, water available for plants is Aug' 2022
(a) Gravitational water (b) Chemically bound water
(c) Capillary water (d) Hygroscopic water

6.The ideal soil for Cultivation is March' 2023
(a) Loamy soil (b) Clayey soil
(d) Silt soil (c) Sandy soil

7.In soil, water available for plants is July' 2024
(a) Gravitational water (b) Chemically bound water
(c) Capillary water (d) Hygroscopic water

TWO MARKS

1.Write any four uses of Seedball. 2020 Mar
- Encasing seeds in a mixture of clay, cow dung and soil humus called Seed ball.
- These are scattering on to suitable ground, not planting of trees manually.

- This method is suitable for barren and degraded lands for tree regeneration.
- This vegetation before monsoon period where the suitable dispersal agents become rare.

2.What is Co-evolution? 2021 Sep , 2023 March

The interaction between organisms, when continues for generations, involves reciprocal changes in genetic and morphological characters of both organisms.This type of evolution is called Co-evolution.

3.Differentiate Biotope and Ecotope. 2022 Aug

The environment of any community is called Biotope.
The habitat and niche of any organism is called Ecotope

4.What is called phyto remediation? 2024 March

The plants soya bean ,tomato ,rice and *Eichhornia* can be used to remove cadmium from contaminated soil, and this make suitable for cultivation is known as Phytoremediation.

5.What is vivipary? Name a plant group which exhibits vivipary. July 24

Seeds germinate in the fruits of mother plant itself are called Vivipary. It is exhibited in halophytes.

THREE MARKS

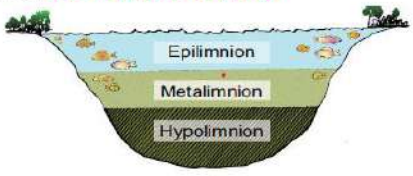
1.Write the three differences between Habitat and Niche. 2020 Mar, 2022 May , 2024 March

	Habitat	Niche
1	A specific physical space occupied by an organism (species)	A functional space occupied by an organism in the same eco-system
2	Same habitat may be shared by many organisms (species)	A single niche is occupied by a single species
3	Habitat specificity is exhibited by organism.	Organisms may change their niche with time and season.

2.Differentiate cladode from phyllode with example. 2021 Sep

Cladode	phyllode
The single or occasionally two internodes modified into fleshy green structure called**cladode.**Ex:*Asparagus*.	The petiole is modified into a fleshy leaf like structure called **phyllode.**Ex:*Acacia melanoxylon*.

3.Draw and explain the thermal stratification of a pond. 2022 Aug **What is thermal stratification? Mention their types.**2023 June , 2024 July



The change in the temperature profile with increasing depth in a water body is called **thermal stratification**. The three kinds of thermal stratifications are

1. **Epilimniotn** – The upper layer of warmer water.
2. **Metalimnion** – The middle layer with a zone of gradual decrease in temperature.
3. **Hypolimnion** - The bottom layer of colder water.

FIVE MARKS

1.Water is essential for life. State the reason. Write any four features for plants which enable them to survive in water scarcity environment. 2020 Oct

- The adaptations of plants to water scarcity are as follows:
- Root system is well developed and is greater than that of shoot system.
- Stomata is Sunken shaped only in the lower epidermis, it minimize water loss through transpiration.
- Leaves reduced to spines.
- Mesophyll is well differentiated into palisade and spongy parenchyma.
- Vascular bundles are well developed with several layered bundle sheath.

2.Enumerate the anatomical adaptations of Xerophytes. 2023 March

- Presence of multilayered epidermis with heavy cuticle to prevent water loss due to transpiration.
- Hypodermis is well developed with sclerenchymatous tissues.
- Sunken shaped stomata are present only in the lower epidermis with hairs in the sunken pits.
- Scoto active type of stomata found in succulent plants.
- Vascular bundles are well developed with several layered bundle sheath.
- Mesophyll is well differentiated into palisade and spongy parenchyma.
- In succulents the stem possesses a water storage region

3.What are the advantages of seed dispersal ? 2023 June

- Seeds escape from mortality near the parent plants due to predation by animals and getting diseases and also avoiding competition.
- Dispersal gives a chance to occupy favourable sites for growth.
- This is the only method available for self-fertilized flowers and maternally transmitted genes in out crossing plants.
- Seed dispersal by animals help in conservation of many species even in human altered ecosystems.
- It acts as a key for proper functioning and establishment of many ecosystems from deserts to evergreen forests
- The maintenance of biodiversity conservation and restoration of ecosystems.

UNIT IX: PLANT ECOLOGY
CHAPTER .7 ECOSYSTEM

CHOOSE THE CORRECT ANSWERS

1.The quantity of energy present in the universe is constant. It is stated in Oct' 2020

(a) Third law of Thermodynamics
(b) Second law of Thermodynamics.
(c) First law of Thermodynamics
(d) Community productivity

2.In a fresh water environment like pond, rooted autotrophs are June' 2023

(a) Nymphaea & Typha (b) Ceratophyllum & Utricularia

(c) Wolffia & Pistia (d) Azolla & Lemna

3. Which of the following is not a Sedimentary cycle? June' 2023

(a) Nitrogen cycle (b) Phosphorous cycle
(c) Sulphur cycle (d) Calcium cycle

4.The wavelength of photosynthetically active radiation lies between the range of March' 2024

(a) 200 - 700 nm (b) 300 - 700 nm
(c) 500 - 700 nm **(d) 400 - 700 nm**

5.Which of the following is not a sedimentary cycle? July' 2024

(a) Nitrogen cycle (b) Phosphorous cycle
(c) Sulphur cycle (d) Calcium cycle

TWO MARKS

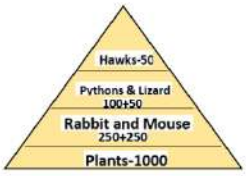
1.What is Leaching? 2020 Oct

The movement of decomposed, water soluble organic and inorganic compounds from the surface to the lower layer of soil or the carrying away of the same by water is called leaching or eluviation.

2.Pyramid of energy is always up right. Give reasons. 2021Sep , 2024 March

- The bottom of the pyramid of energy is occupied by the producers.
- There is a gradual decrease in energy transfer at successive tropic levels from producers to the upper levels.
- Therefore, the pyramid of energy is always upright.

3.Draw a pyramid from following details and name the type of pyramid. Quantities of organisms are given Hawks-50, Plants-1000, Rabbit and Mouse 250+250. Pythons and Lizard 100+50 respectively. 2022 May , 2023 June



The name the type of pyramid is pyramid of number in grassland ecosystem

4.What is PAR? 2022 Aug , 2023 March

- The amount of light available for photosynthesis of plants is called **P**hotosynthetically **A**ctive **R**adiation (PAR)
- 400-700 nm wave length is essential for photosynthesis and plant growth.

THREE MARKS

1.Differentiate Autotrophic components from Heterotrophic components. 2020 Oct

Autotrophic components	Heterotrophic components
The organisms which can manufacture the organic compounds from simple inorganic components. Autotrophs are called producers. Ex. Green plants	The organisms which consume the producers. They are Macroconsumers, Microconsumers (decomposers). Ex: Bacteria, Actinomycetes and Fungi.

FIVE MARKS

1.Generally human activities are against to the ecosystem, where as a student, how will you help to protect ecosystem? 2024 July Any 3 points .3 Marks

1.How to protect the ecosystem ? 2020 Mar

"If we fail to protect environment, we will fail to save posterity". Therefore, we have to practice the following in our day today life:

- Buy and use only eco-friendly products and recycle them.
- Grow more trees & Reduce the use of natural resources.
- Choose sustained farm products (vegetables, fruits)
- Reduce consumption of water and electricity.
- Reduce the use of house-hold chemicals and pesticides.
- Maintain your cars and vehicles properly. (to reduce carbon emission)
- Create awareness and educate your friends and family members.

2.Explain the types of succession. 2021 Sep

1.Primary succession

- Developing in barren area
- Initiated by biological or any other external factors
- No soil, while primary succession starts
- Pioneer species come from outside environment
- It takes more time to complete

Ex: Microbes, Lichen, Mosses.

2.Secondary succession

- Developing in disturbed area
- Starts due to external factors only
- It starts where soil covers is already present
- Pioneer species develop from existing environment
- It takes comparatively less time to complete

Ex : The forest destroyed by fire and excessive lumbering may be re-occupied by herbs over a period of times.

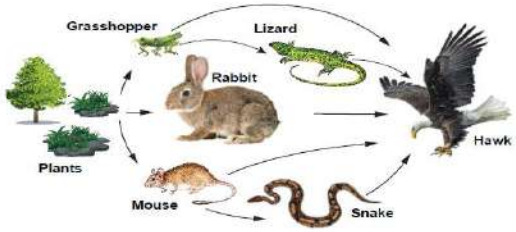
3. Allogenic succession

- Occurs as a result of abiotic factors.
- The replacement of existing community is caused by other external factors (soil erosion, leaching, etc.,) and not by existing organisms.

Ex: In a forest ecosystem soil erosion and leaching alter the nutrient value of the soil leading to the change of vegetation in that area.

3.Explain the food web with an example. Give its significance. 2022 Aug

- The inter-locking pattern of food chain form a web like arrangement is called food web.
- It maintain its stability in nature. It is called homeostasis. **Ex:** In a grazing food chain of a grass land, in the absence of a rabbit, a mouse may also eat food grains.
- The mouse in turn may be eaten directly by a hawk or by a snake and the snake may be directly eaten by hawks.



4.Significance of food web

- Food web is constructed to describe species interaction called direct interaction.
- It can be used to illustrate indirect interactions among different species.
- It can be used to study bottom-up or topdown control of community structure.
- It can be used to reveal different patterns of energy transfer in terrestrial and aquatic ecosystems.

UNIT IX - PLANT ECOLOGY
CHAPTER 8. ENVIRONMENTAL ISSUES

CHOOSE THE CORRECT ANSWERS

1.Some of the major species cultivated in Agroforestry for commercial use March' 2020
(a) Erythrina, Albizzia **(b) Malaivembu, Kadambu**
(c) Acacia, Azadirachta Indica (d) Sesbania, Acacia

2.The Ozone layer of troposphere is called March' 2020
(a) Middle Ozone (b) Ozone Shield
(c) Bad Ozone (d) Good Ozone

3.The unit for measuring ozone thickness Sep' 2021
(a) Dobson (b) Joule (c) Watt (d) Kilo

4. Deforestation means May' 2022
(a) growing plants and trees in a pond.
(b) growing plants and trees in an area where there is no forest.
(c) removal of plants and trees.
(d) growing plants and trees in an area where the forest is removed.

5.Depletion of which gas in the atmosphere can lead to an increased incidence of skin Cancer? July' 2022
(a) Ammonia (b) Methane (c) Nitrous Oxide **(d) Ozone**

6.Deforestation does not lead to March' 2023
(a) alteration of local weather conditions
(b) quick nutrient cycling
(c) destruction of natural habitat weather conditions
(d) soil erosion

7.People's Movement for the protection of environment in Sirsi of Karnataka is June' 2023
(a) Chipko Movement (b) Amirtha Devi Bishwas Movement
(c) Appiko Movement (d) None of the above c

8.The unit for measuring ozone thickness is March' 2024
(a) Watt **(b) Dobson** (c) Kilo (d) Joule

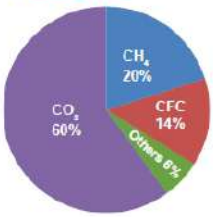
9.Depletion of which gas in the atmosphere can lead to an increased incidence of Skin Cancer July' 2024
(a) Ammonia (b) Methane (c) Nitrous oxide **(d) Ozone**

TWO MARKS

1.What are the objectives of clean development mechanism? 2020 Mar
1). To prevent dangerous climate change.
2). To reduce greenhouse gas emissions.

THREE MARKS

1.What is Green House Effect ? Draw the relative contributions of green house gases. 2020 Mar



Radiant heat from the sun is captured by gases in the atmosphere that increase the temperature of the earth called greenhouse effect. **Ex:** CO_2, CH_4, N_2O and CFC.

2.Write the uses of silvopasture system. 2020 Oct

- The trees and shrubs may be used primarily to produce fodder for livestock .Ex. *Erythrina* spp., *Acacia* sp.
- Hedges are planted as live fence to protect the property

3.Give four examples of plants cultivated in commercial agroforestry. 202 Sep , 2023 March
The examples of plants cultivated in commercial agroforestry are *1.Casuarina 2. Eucalyptus*, 3.Malai Vembu 4.Teak and 5. Kadambu

4.What is CCS ? 2022 May
CCS --Carbon Capture and Storage
A technology of capturing carbon di oxide and injects it deep into the underground geological formations such as declining oil fields, gas fields saline aquifers and un mineable coal have been suggested as storage sites are called Carbon capture and storage.

5.What is Green house effect? What are the gases involved in it? 2022 Aug
Radiant heat from the sun is captured by gases in the atmosphere that increase the temperature of the earth called greenhouse effect. **Ex:** CO_2, CH_4, N_2O and CFC

6.Write short notes on Bio-monitoring. 2023 March
The act of observing and assessing the current state and ongoing changes in ecosystem. biodiversity components, landscape including natural habitats, populations and species. **(OR)**

- An unmanned aerial Vehicle for formers.
- It helps increased crop production & monitor growth.
- Let farmers see their fields from the sky.
- It reveal irrigation problems, soil variation and pest and fungal infestations.
- Cost effective safe method of spraying pesticides and fertilizers.

7.How do sacred groves help in the conservation of biodiversity? 2023 June

- Sacred groves are the patches of cultivated trees which are community protected.
- They are based on strong religious belief systems.
- Each grove is an abode of a deity mostly village God or Goddesses like Aiyanar or Amman.
- These protecting watershed, fodder, medicinal plants and micro climate control. .
- 448 grooves were documented throughout Tamil Nadu.
- So sacred groves help in the conservation of biodiversity

8.How do forests help in maintaining the climate? 2024 March

- Forests are a stabilising force for the climate.
- Regulate ecosystems.
- Increasing Rainfall and O_2 level.
- Reducing the carbon di oxide in the atmosphere
- It reduces the global warming.
- So forests are most important help in the maintaining the climate.

9.Suggest a solution to water crisis and explain its advantages. 2024 July

- Rain water harvesting is a solution to water crisis.
- Accumulation and storage of rain water for reuse in-site rather than allowing it to run off is called rainwater harvesting.

Advantages

- Promotes adequacy of underground water.
- Mitigates the effect of drought.
- Reduces soil erosion .
- Reduces flood hazards.
- Improves groundwater quality and decreases salinity.
- Storing water underground is an eco-friendly measure.

UNIT X: ECONOMIC BOTANY
CHAPTER 9 PLANT BREEDING

CHOOSE THE CORRECT ANSWERS

1.The term Green Revolution was coined by Oct' 2020
(a) William S. Gaud (b) Dr. B.P. Pal
(c) N.E. Borlang (d) M.S. Swaminathan

2.The oldest and basic method of plant breeding is Oct' 2020
(a) Introduction **(b) Selection**
(c) Hybridization (d) Mutation Breeding

3. _____ was the first scientist to use the term heterosis. Sep' 2021
(a) Muller and Stadler (b) Cotton Mather
(c) G.H. Shull (d) William S. Gaud

4.Crosses between the plants of the same variety are called _____ May' 2022
(a) intravarietal (b) interspecific
(c) intergeneric (d) intervarietal

5.....are a collection of method that could increase and accelerate the development of new traits in plant breeding. July' 2022
(a) NBT (b) Trichoderma
(c) Bio Pesticide (d) Enzymes

6. .....is called as "Father of Indian Green Revolution". March' 2023
(a) M.S. Swaminathan (b) P. Maheswari
(c) Mendel (d) Nel Jayaraman

7. Tephrosia purpurea is a March' 2023
(a) Bio-herbicide (b) Bio-fertilizer
(c) Green manure (d) Bio-pesticide

8. Dwarfing gene of Wheat is June' 2023
(a) Pal 1 (b) Atomita 1 **(c) Norin 10** (d) Pelita 2

9.Match the following March' 2024

Column - I	Column - II
(1) Cowpea	(i) Pusa Sadabahar
(2) Wheat	(ii) Pusa Swarnim
(3) Chilli	(iii) Himgiri
(4) Brassica	(iv) Pusa Komal

(a) (1)-(iv), (2)-(i), (3)-(ii), (4)-(iii)
(b) (1)-(ii), (2)-(iv), (3)-(i), (4)-(iii)
(c) (1)-(ii), (2)-(i), (3)-(iv), (4)-(iii)
(d) (1)-(iv), (2)-(iii), (3)-(i), (4)-(ii)

10. Dwarfing gene of wheat is July' 2024
(a) Pal 1 (b) Atomita 1 **(c) Norin 10** (d) Pelita 2

TWO MARKS

1.Define - Organic farming. 2020 Mar , 2022 May

- Organic farming is an alternative agricultural system.
- The plants/crops are cultivated in natural ways by using biological inputs.
- This maintains soil fertility and ecological balance
- This minimizing pollution and wastage.

2.Write short notes on Sonara 64. 2020 Oct

Sonora 64 is a dwarf wheat variety that was developed in Mexico. It was one of the first plants in the Green Revolution and was bred by Nobel Prize winner Norman Borlaug.

3.Define Heterosis. 2020 Oct, 2023 June , July 24

- The superiority of the F1 hybrid in performance over its parents is called heterosis or hybrid vigour.
- Vigour refers to increase in growth, yield, greater adaptability of resistance to diseases, pest and drought.

4.Differentiate primary introduction from secondary introduction. 2021 Sep , 2023 March

Primary introduction	Secondary introduction
The introduced variety is well adapted to the new environment without any alternation to the original genotype.	The introduced variety is subjected to selection to isolate a superior variety and hybridized with a local variety to transfer one or a few characters to them.

5.What is SLF? 2022 Aug

SLF - Seaweed Liquid Fertilizer

- It is made from kelp (brown algae) & produce alginates .
- It contains cytokinin, gibberellins and auxin apart from macro and micro nutrients.
- It is not only organic but also eco-friendly.
- It promotes vigorous growth.

6.What will happen when Rhizobium bacteria is applied to the soil ? 2020 Oct

How are microbial inoculants used to increase the soil fertility? 2022 May , 2024 March

- Microbial innoculants also called biofertilizers.

- Rhizobium bacteria are called rhizobium bio-fertilizer.
- Rhizobium Symbiotic bacteria convert the atmospheric nitrogen and increase the soil fertility.
- So it increases the yield by 15 – 40% in paddy fields.

FIVE MARKS

1.Ramu and Somu are farmers. Ramu cultivated the crops by self fertilization method. Somu cultivated the crops from mixed population. (i) Who will get new variety ? (ii) Write the advantages and disadvantages of their selection. 2020 Mar

(i). Somu will get new variety

(ii). Advantages of mixed population

- It increases genetic diversity.
- It can provide plants with higher yield, disease resistance, and environmental tolerance.
- The F1 hybrid are more vigorous than its parents.
- This hybrid vigour can in increase growth rate, earlier flowering, and increased yield.

Disadvantage:

- Species mixtures can reduce soil fertility and productivity.
- The improper choice of plant species can increase the risk of disease outbreaks.

2.List out the new breeding techniques involved in developing new traits in plant breeding. 2023 June

- NBT are a collection of methods that could increase and accelerate the development of new traits in plant breeding.
- These techniques often involve genome editing, to modify DNA at specific locations within the plants to produce new traits in crop plants.

The various methods of achieving these changes in traits include the following.

- Cutting and modifying the genome during the repair process by tools like CRISPR /Cas.
- Genome editing to introduce changes in few base pairs using a technique called Oligonucleotide-directed mutagenesis (ODM).
- Transferring a gene from an identical or closely related species (cis genesis)
- Organising processes that alter gene activity without altering the DNA itself (epigenetic methods).

UNIT X: ECONOMIC BOTANY

CHAPTER 10. ECONOMICALLY USEFUL PLANTS & ENTREPRENEURIAL BOTANY

CHOOSE THE CORRECT ANSWERS

1.**Nilavembu belongs to the family _____** Sep' 2021

(a) Acanthaceae (b) Euphorbiaceae
(c) Vitaceae (d) Lamiaceae

2. Tectona grandis is coming under the family May' 2022

(a) Dipterocaipaceae **(b) Lamiaceae**
(c) Ebenaceae (d) Fabaceae

3. Observe the following statements and pick out the correct option from the following:

Statement I: The drug sources of Siddha include plants, animals, Ores and minerals.
Statement II: Minerals are used for preparing drugs with long shelf-life. July' 2022

(a) Statement I is correct (b) Statement II is correct
(c) Both statements are correct
(d) Both statements are incorrect

4.Cardamom belongs to the family March' 2023

(a) Solanaceae (b) Piperaceae
(c) Fabaceae **(d) Zingiberaceae**

5.Find out the correctly matched pair June' 2023

(a) Rubber - Shorea robusta
(b) Dye - Lawsonia inermis
(c) Timber - Cyperus papyrus
(d) Pulp - Hevea brasiliensis

6. The native of groundnut is March' 2024

(a) North America (b) Philippines **(c) Brazil** (d) India

7.**Assertion:** Turmeric fights various kinds of cancer.
Reason : Curcumin is an anti-oxidant present in turmeric. July' 2024

(a) Assertion is correct, Reason is wrong
(b) Assertion is wrong. Reason is correct
(c) Both are correct
(d) Both are wrong

TWO MARKS

1.Write the Botanical name and family of Nilavembu. Write any one of its uses. 2020 Mar

Botanical name - *Andrographis paniculata* - King of Bitters.

Uses.

- It is widely used to treat liver disorders.
- Concoction of *Andrographis paniculata* and eight other herbs (Nilavembu Kudineer) is effectively used to treat malaria and dengue.

2.Name the humors that are responsible for the health of human beings. 2021 Sep

The humors that are responsible for the health of human beings are Vātam ,Pittam and Kapam.

3.What is Bio-pest repellent? 2022 Aug

A natural substance used to repel pests that can damage crops, plants, or human environments are called bio pest repellents. Bio repellents are extracted from the neem leaves.

4.Write the role of Jasmine in perfuming. 2023 June

- Jasmine oil is valued for its soothing, relaxing, antidepressant qualities.
- Jasmine blends well with other perfumes.
- It is much used in modern perfumery and cosmetics.
- It used in air freshners, anti-perspirants, talcum powders, shampoos and deodorants.

5.Differentiate bio-medicines and botanical medicines.
July 24

Biomedicines	Botanical medicines.
Medicinally useful molecules obtained from plants that are marketed as drugs are called Biomedicines.	Medicinal plants which are marketed as powders or in other modified forms are known as Botanical medicines.

FIVE MARKS

1.(i) Write the botanical name of State Tree of Tamil Nadu. (ii) From where it is originated? (iii) Write its three uses.
2020 Oct

(i) . Palmyra is State tree of Tamil Nadu
Botanical name: *Borassus flabellifer.* Family: Arecaceae

(ii). Origin
Native to tropical regions of Africa, Asia and New Guinea.

(III). Uses
- Sap from Inflorescence is used for preparing palm sugar.
- Sap from Inflorescence is used as health drink.
- Sap is processed to get palm jaggery.
- Sap is fermented to give toddy.
- Endosperm is used as a refreshing summer food.
- Germinated seeds have fleshy scale leaf which is edible.

2.What are the King and Queen of spices? Write their uses. 2022 May
- Black Pepper is referred to as the "King of Spices".
- Cardamom is called as "Queen of Spices".

Uses of black pepper
- The characteristic pungency is due to the presence of alkaloid Piperine.
- Two types of pepper namely black and white pepper.
- It is used for flavouring in the preparation of sauces, soups, curry powder and pickles.
- It is used in medicine as an aromatic stimulant for enhancing salivary and gastric secretions. and stomachic.
- Pepper also enhances the bio-absorption of medicines.

Uses of cardamom
- The seeds have a pleasing aroma and a characteristic warm, slightly pungent taste.
- It is used for flavouring confectionaries, bakery products and beverages.
- The seeds are used in the preparation of curry powder, pickles and cakes.
- Medicinally, it as a stimulant and carminative.
- It is also chewed as a mouth freshener.

3.Give an account of active principle and medicinal values of any two plants you have studied. 2023 March
Two plants we have studied is
1.Keezhanelli - *Phyllanthus amarus*-
Family: Euphorbiaceae Now in Phyllanthaceae
Active principle:
Phyllanthin is the major chemical component.
Medicinal values:
Phyllanthus is hepato-protective plant used in Tamil Nadu for the treatment of Jaundice.
2.Nilavembu- *Andrographis paniculata*
Family : Acanthaceae
Active principle:
Andrographolides is the major chemical component.
Medicinal values
- Andrographis is a potent hepatoprotective.
- It is widely used to treat liver disorders.
- Concoction of *Andrographis paniculata* and eight other herbs (Nilavembu Kudineer) is effectively used to treat malaria and dengue.

4.What are Millets? What are its types? Give an example for each type. 2024 March
- It is a variety of very small seeds.
- Originally cultivated by ancient people in Africa and Asia.
- They are gluten free and have less glycemic index.

Types and examples
- Finger Millet – Ragi - *Eleusine coracana*
- Foxtail Millet- Thinai - *Setaria italic*
- Kodo Millet- varagu - *Paspalum scrobiculatum*

5.How will you prepare an organic pesticide for your home garden with the vegetables available from your kitchen ? 2024 July
- Mix 120 g of hot chillies with 110 g of garlic or onion.
- Chop them thoroughly.
- Blend the vegetables together manually or using an grinder till it forms a thick paste.
- Add the vegetable paste to 500 ml of warm water and stir.
- Pour the solution into a glass container and leave it undisturbed for 24 hours.
- Strain the mixture. This filtrate is the pesticide.
- Either discard the vegetables or use it as a compost.
- Pour the pesticide into a squirt bottle.
- Spray bottle has first been cleaned with warm water and soap to get rid it of any potential contaminants.
- Spray pesticide every 4 to 5 days with the solution.
- After 3 or 4 treatments, the pest will be eliminated.

உலகம் உன்னை அறிவதை விட, உன்னை உலகிற்கு அறிமுகம் செய்துகொள். - கலாம்

"Take care of the trees, they will take care of you."