



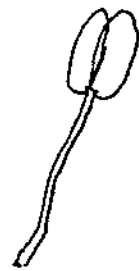
XII - STD

BIOLOGY - BOTANY

THREE MARK

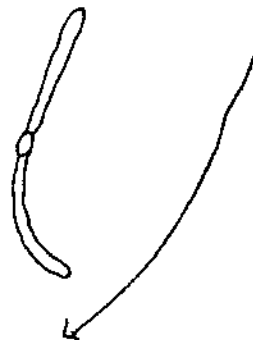


QUESTION
AND
ANSWERS



(Book-back)

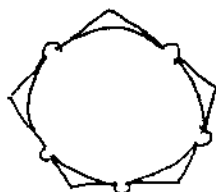
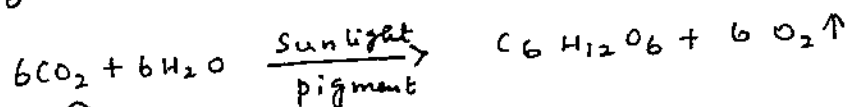
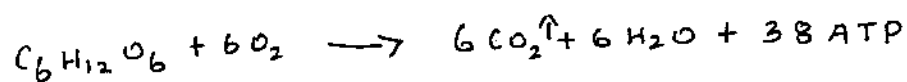
English medium



- ⊗ Read three mark
Question & Answers
Present in the
study material

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Part-II

Short answers (Three mark questions)

①

Lesson-1 TAXONOMY OF ANGIOSPERMS

Model test-I Exercise 2

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Book Questions:

15. What are the defects of artificial system of classification of plants?

a) unrelated plants are brought together in a single group. closely related plants are placed in widely separated groups.

eg: Zingiberaceae (monocots), Anacardiaceae (dicots)

Placed in one group called Monandria (one stamen)

b) No importance was given to either natural or phylogenetic relationships amongst different groups of plants.

16. Define biosystematics.

a) Biosystematics may be defined as taxonomy of living populations.

b) In biosystematics species is taken as basic unit and it is the local breeding population.

17. What is binomial nomenclature?

a) Every plant is called by two names is said to be binomials.

b) Example: *Mangifera indica*.

c) *Mangifera* - Genus name, *indica* - species name.

18. Write the objectives of classification of plants.

i) The first objective is to arrange plants in an orderly sequence based upon their similarities.

ii) The second objective is to establish phylogenetic relationships amongst the different groups of plants.

19. What are the aims of biosystematics?

i) To delimit the naturally occurring biotic community of plant species.

ii) To recognise the various groups as separate biosystematic categories such as ecospecies, ecotypes, cenospecies and companion.

20. How ICBN is evolved?

i) Fifth International Botanical Congress was held at Cambridge, England → frame the rules and regulation for naming plants.

ii) 12th meeting → Leningrad, USSR, July 1975.

iii) Based on the resolutions of 12th meeting, the current ICBN was adapted from 1978

25. What is called author citation?

a) The name of plant should bear the author's abbreviated name at the end of specific epithet who described the species. is said to be author citation.

b) example: Malva Sylvestris Linn.

c) Malva → Genus name, Sylvestris → species name, Linn → Linnaeus first described the species.

26. What is a type specimen?

i) When a new name for family/genus/species is suggested, it is a rule that plant specimens of the same should necessarily be deposited in a recognized herbarium.

ii) Such specimens are called type specimens and it is the most valuable part of the herbarium. They are stored in fire proof cabinets.

iii) The name of the family always based on type specimens.

21. What is called nomen ambiguum?

- a) Naming the plant is from a source of error, it is regarded as ambiguous name/nomen ambiguum.
- b) Ambiguous names are completely ignored from use.

22. Define tautonym.

- a) The generic and the specific names are the same, it is called tautonym.
- b) Example: *Sassafras sassafras*
- c) ICBN not accepted tautonym.

23. Define Herbarium.

- a) Herbarium is a collection of pressed, dried plant specimens, mounted on herbarium sheets, identified and arranged in the order of an approved and well known system of classification.
- b) Example: Royal Botanical garden, Kew, England. Botanical Survey of India, Coimbatore.

24. Write precautions/any measures to be taken during herbarium preparation.

- i) Plants are well dried by keeping them between the folds of old news papers.
- ii) It is necessary to change the news papers at regular intervals, until the plants are well dried.
- iii) To check the growth of fungus the mounted specimens are sprayed with fungicide like 0.1% of Mercuric chloride.
- iv) To check the attack from insects the specimens are sprayed with pesticides like Naphthalene and Carbandisulphide.
- v) The heavy plant parts like seeds and fruits are kept in packets and attached to the sheets.

Model test - II

-X- for Q. NO: 25, 26 See the opposite side of page 11

Book Questions:-

15. Write the countries which still follow the Bentham and Hooker's classification of plants.

- i) India ii) England and iii) several other Commonwealth countries following Bentham and Hooker's system of classification.

16. What are the three classes of Phanerogams?

- i) Dicotyledons
- ii) Gymnospermae
- iii) Monocotyledons

17. Write the families of Gymnosperms as in Bentham and Hooker's classification of Plants.

- i) Cycadaceae ii) Coniferales iii) Gnataceae

18. What is polypetalae?

- a) It is the sub-class of Bentham and Hooker's classification.
- b) In this sub-class plants having flowers with free petals.
- c) Distinct calyx and corolla present.
- d) Polypetalae further divided into three series namely Thalamiflorae, disciflorae and Calyciflorae.

19. Write short notes on monochlamydeae.

- a) It is the third sub-class of Bentham and Hooker's classification.
- b) Plants having flowers with single whorl of perianth.
- c) Incomplete flowers.
- d) Distinct sepals and petals are present.
- e) Calyx or corolla or sometimes both are absent.
- f) It includes 8 series and 34 families. eg: unisexuales - Euphorbiaceae.

20. Briefly mention the systematic position of Laurineae.

- a) Sub class → Monochlamydeae
- b) Series → Daphnales
- c) Order → Laurineae.

But it should be placed in the sub class polypetalae, series thalamiflorae and order - Ranales.

21. Mention the systematic position of Malvaceae

- a) class → Dicotyledons
- b) sub-class → polypetalae
- c) Series → Thalamiflorae
- d) order → Malvales
- e) Family → Malvaceae

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22. Write a note on androecium of Hibiscus rosa-sinensis.

- a) Numerous stamens b) Monadelphous stamens.
- c) Filaments fused form staminal tube around the style.
- d) Monothecous, reniform anthers e) Extrorse
- f) Transverse dehiscence.

23. Describe the gynoecium of Hibiscus rosa-sinensis.

- a) Five carpels, syncarpous, pentalocular.
- b) Superior ovary with axile placentation.
- c) Simple, long style passes through the staminal tube.
- d) Stigma five, capitate and coloured.

24. Name any two fibre plants of malvaceae.

- a) *Gossypium barbadense* and b) *G. hirsutum* yields surface fibres. c) *Hibiscus cannabinus* yields best fibres.

25. Mention the binomiales of any two medicinal plants of malvaceae.

- a) *Abutilon indicum* - roots, - treat fever leaves.
 b) *Malva sylvestris* - roots - treating whooping cough.
 c) *Althaea rosea* - roots - treat dysentery.

26. What is atropine?

- a) Atropine is the powerful alkaloid obtained from the roots of *Atropa belladonna*.
 b) Atropine used to relieve muscular pain.

Model test - III

15. Give the systematic position of Solanaceae

- a) class: → Dicotyledons
 b) sub-class: → Gamopetalae
 c) series: → Bicarpellatae
 d) order: → Polymoniales
 e) family: → Solanaceae

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16. Write the binomiales of any two medicinally useful plants of Solanaceae

- a) *Atropa belladonna* - roots - Relieving muscular pain
 b) *Solanum trilobatum* - leaves, flowers - treat cough
 c) *Withania somnifera* - roots, leaves - treat nervous disorder, diuretic

17. Describe the gynoecium of members of Solanaceae

- a) 2 carpels, syncarpous, bilocular, superior ovary with axile placentation.
 b) In *Datura* species bilocular becomes tetralocular due to the formation of false septa.
 c) Simple style, bifid or capitate stigma

18. Write the systematic position of Euphorbiaceae

- a) class: Dicotyledons
 b) sub-class: Monochlamydeae
 c) series: unisexuales
 d) family: Euphorbiaceae

19. What is cladode? Give an example. 6
- The stem is modified to perform photosynthesis is said to be cladode.
 - It resembles cactus.
 - Example: *Euphorbia antiquorum*, *Euphorbia tirucalli*.

20. What are the different types of inflorescence seen in Euphorbiaceae? Give examples for each.

- Cyathium - *Euphorbia* species
- Panicle - *Ricinus communis*
- Catkin - *Acalypha indica*
- Simple raceme - *Crotan sparsiflorus*
- Solitar, axillary cyme - *Phyllanthus amarus*.

21. Mention the binomials of two rubber plants of Euphorbiaceae.

- Hevea brasiliensis* (Para rubber)
 - Manihot glaziovii* (Manicoba rubber)
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22. Describe the inflorescence of *Ricinus communis*.

- Terminal panicle or compound raceme inflorescence seen in *Ricinus*.
- Male flowers are arranged lower part of the inflorescence (below)
- Female flowers are arranged near the apex of the inflorescence.

23. Describe the Cyathium inflorescence.

- Cyathium inflorescence is the characteristic feature of the genus *Euphorbia*.
- Cyathium consists of three parts namely involucre, nectaries and flowers.
- It is a collection of unisexual flowers arranged in Cymose manner on a condensed axis.
- Central single female flower surrounded by two - many male flowers.
- Male and female flower represented by stamen and carpel respectively.
- A jointed stalk is seen below the stamen and carpel.

24. Write the systematic position of ~~lathyraceae~~ Musaceae

- Class: Monocotyledons
- Series: ~~Crocotylales~~ Epigynae
- Family: ~~Lathyraceae~~ Musaceae

25. What is polygamous? Give an example.
 i) staminate flower, pistillate flower and bisexual flowers are present in the same plant then it is called polygamous plant.
 ii) Example: *Musa paradisiaca*.

26. What is monocarpic perennial? Give an example.
 i) The plant produces flowers and fruits only once during its life time is called as monocarpic perennial.
 ii) Eg: *Musa paradisiaca*.

27. Explain the gynoecium of *Musa paradisiaca*.
 i) Tricarpellary, syncarpous, trilobular inferior ovary
 ii, Numerous ovules are arranged in axile placentation.
 iii) Simple and filiform style.
 iv) The stigma is three lobed.

28. What is pseudostem? how it is formed in *Musa paradisiaca*?

i) The apparent, unbranched, erect and aerial stem of *Musa* is said to be pseudostem.
 ii) It is formed by the long, stiff and sheathy leaf bases which are rolled around one another.

29. What is shaft?
 The central axis that is concealed at the bottom of the pseudostem of *Musa* is said to be shaft.

30. List out the economic importance of *Musa paradisiaca*?
 i) Fruits of *Musa* is edible.
 ii) Leaves of *Musa* used as plates on festive occasions
 iii) Sap from sheathy leaf base -> antidote for cobra bite.
 iv) ~~involved~~ shaft -> cooked and eaten as vegetable.

31. Floral diagram of bisexual flower of *Musa*, Floral formula.



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$B_7, E_{b+1}, \frac{1}{2}, \overset{\sigma}{\underset{\sigma}{\text{P}}}_{(3+2)+1}, A_{3+3}, \overline{G}_{(3)}$

Lesson: 2 PLANT ANATOMY

(8)

Book Questions

15. Define plant anatomy.

Plant anatomy is the study of internal structure and organization of plants, especially of their parts by means of dissection and microscopic examination.

16. Define a tissue.

- Group of similar cells, which are similar in origin, form and function is said to be a tissue (Morphology)
eg: Parenchyma, Collenchyma, Sclerenchyma
- Group of dissimilar cells that perform a common function is said to be a tissue (Physiology)
eg: xylem conducts water,
Phloem conducts food.

17. What is differentiation?

a) The change from meristematic to permanent tissue of the plant is called differentiation.

b) Meristems, into → Simple tissue
→ Complex tissue

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18. What is an aerenchyma?

- parenchyma tissue with well-developed large intercellular spaces is said to be aerenchyma.
- Aerenchyma seen in the cortex of water plants (Hydrophytes)
- It helps the plant to float in water
- Example: Hydrilla, Nymphaea.

19. What are called macrosclereids?

- Elongated rod shaped sclereids are called macrosclereids.
- Other name: rod cells.
- Found in the outer seed coat of ~~Crotalaria~~ Crotalaria.

20. What is called callose?

- Callose is a substance which blocks the pores of sieve plate.
- It is seen in the mature sieve element.

21. What are called trichoblasts?

- The rhizodermis of root possesses two types of cells namely long and short cells.
- The short cells present in the rhizodermis are called trichoblasts.
- Trichoblast produce the root hairs.

22. What are called guard cells? (9)

- a) The stoma present in the epidermis of leaf surrounded by a pair of bean shaped cells called guard cells.
- b) These guard cells contain chloroplast.
- c) Guard cells help in the opening and closing of stomata.

23. What is a meristematic tissue?

- a) A meristematic tissue is a group of identical cells that are in a continuous state of division.
- b) Some cells produced by the meristems stop dividing and converted into permanent tissues. (differentiation)
- c) The remaining cells retain their meristematic activity.
- d) Meristems are self-perpetuating.

24. What are called lateral meristems?

- a) Lateral meristems are present along the longitudinal axis of stem and root.
- b) Example: Vascular cambium and cork cambium.
- c) Functions: Produces secondary permanent tissues, thickening of root and stem.

25. Define a permanent tissue.

a) The tissue that loses the power of dividing either permanently or temporarily is said to be a permanent tissue.

b) ^{The tissues} formed ~~from~~ from apical meristems are differentiated into permanent tissues.

c) Types: Simple (Parenchyma) -tissue, Complex (Xylem) -tissue.

26. What are types of simple and complex tissue.

a) Simple tissue: The cells of similar structure and function. Types: Parenchyma, Collenchyma, Sclerenchyma.

b) Complex tissue: It consists of several kinds of cells but all of them function together as a single unit. Types: Xylem, Phloem.

Model test - II

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Book Questions.

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25. What is a stellate parenchyma?

- a) Star shaped parenchyma is called stellate parenchyma.
- b) Location: Petioles of banana and Canna.

16. What is a chlorenchyma?

- a) parenchyma cells with chloroplast is said to be chlorenchyma.
- b) Location: Green parts of the plant.
- c) function: Photosynthesis.

17. Differentiate angular collenchyma from lacunate collenchyma

| Angular collenchyma                                    | Lacunate collenchyma                                                                             |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| a) Cell walls of collenchyma thickened at their angles | a) Cell wall thickening materials are deposited on the walls bordering the intercellular spaces. |
| b) <u>Example</u> : Hypodermis of Datura, Nicotiana    | b) <u>Example</u> : Hypodermis of Ipomea.                                                        |

18. Differentiate sclereids from fibres.

| Sclereids                                    | Fibres                                        |
|----------------------------------------------|-----------------------------------------------|
| a) Vary greatly in shape and thickness       | a) very narrow and long with pointed ends.    |
| b) Lumen is very much reduced                | b) narrow lumen.                              |
| c) Simple or branched pits                   | c) Simple pits are present.                   |
| d) Responsible for rigidity of the seed coat | d) Provide mechanical strength to the plants. |
| e) Stone cells                               | e) Supporting tissue                          |

19. What are brachy sclereids?

- a) Isodiametric sclereids are called brachy sclereids/stone cells
- b) Location: Bark, pith, cortex and hard endocarp.
- c) Example: Pulp of Pyrus.

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20. What are surface fibres?

- a) The fibres found in the seed coat of some seeds are called surface fibres.
- b) Eg: Cotton.
- c) Surface fibres are used for making ropes.

21. What are called Casparian strips?

- a) The radial and inner tangential walls of endodermal cells of root thickened with suberin. These thickening are called Casparian strips.
- b) First noted by the scientist Caspary
- c) function: prevent the re-entry of water into the cortex once water enters the xylem tissue.

22. What are called passage cells?

- a) The endodermal cells of root, opposite to the ~~xylem~~ protoxylem elements are thin walled without Casparian strips. These cells are called Casparian strips
- b) Flow of water, minerals from cortex to xylem takes place through passage cells.

23. What is a rhizodermis?

- a) The outer most layer of the root is said to be rhizodermis.
- b) It is made up of parenchyma.
- c) Cuticle and stomata are absent. Root hairs are present.
- d) Function: Protection, absorption of water and minerals.

(11)

24. What is a hypodermis?

- a) A few layers of cells present below the epidermis is said to be hypodermis.
- b) In dicot stem hypodermis is made up of collenchyma. In monocot stem hypodermis is made up of sclerenchyma.
- c) Function: Hypodermis gives mechanical strength to the plant.

25. What is a protoxylem lacuna?

- a) In a mature vascular bundle, the lowest protoxylem disintegrates and forms a cavity known as protoxylem lacuna.
- b) Protoxylem lacuna formation seen in monocot stem.

26. What is an eustele?

- a) The vascular bundles arranged in a ring around the ~~stem~~ pith. This kind of stele is said to be eustele.
- b) Eustele is present in dicot stems.

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Model test - III

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15. What is a dorsiventral leaf? Give an example.

- a) A leaf showing differentiation in mesophyll (palisade, spongy parenchyma) is designated as dorsiventral leaf.
- b) Dorsiventral leaves are present in dicots.

16. What is an isobilateral leaf? Give an example.

- a) The mesophyll tissue is not differentiated into palisade and spongy parenchyma is said to be isobilateral leaves.
- b) Isobilateral leaves are present in monocots.

17. What is a mesophyll?
 a) The entire tissue lies between the upper and lower epidermis of leaf is called as mesophyll
 b) Mesophyll consists of two regions namely palisade and spongy parenchyma.

18. What are stomata?
 a) Stomata are the minute openings found on the epidermis of stem and leaves.
 b) Stomata are more in number in the lower epidermis of leaf.
 c) Functions: Transpiration, gaseous exchange.

19. What are guard cells?
 a) Guard cells are a pair of bean shaped cells that surround the stoma.
 b) Guard cells contain chloroplast
 c) Functions: Helps in the mechanism of stomatal movement.

20. What are the functions of stomata?

- a) Transpiration
- b) Gaseous exchange
- c) Respiration.

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21. Differentiate palisade parenchyma from spongy parenchyma

<p><u>Palisade parenchyma</u></p> <ul style="list-style-type: none"> a) Seen beneath the upper epidermis b) Elongated cylindrical cells c) Contain more chloroplasts d) <u>Function</u>: Photosynthesis 	}	<p><u>Spongy parenchyma</u></p> <ul style="list-style-type: none"> a) Seen above the lower epidermis. b) Irregularly shaped cells. c) Contain less chloroplasts d) <u>Function</u>: facilitate the exchange of gases.
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22. What is respiratory cavity or sub-stomatal cavity?

- a) The ~~air~~ air space that is found next to the stoma is called respiratory cavity.
- b) Functions: helps in gaseous exchange and transpiration

23. What is bundle sheath or border parenchyma?

- a) Vascular bundles are surrounded by a compact layer of parenchymatous cells called bundle sheath.
- b) It is seen in dicot leaf.

24. What are the functions of veins in a leaf?

- a) Veins supply water and minerals to photosynthetic tissue
- b) Veins form the skeleton of the leaf.
- c) They provide mechanical strength to the leaf

Model test - I

15. What are autosomes?
- Autosomes are the chromosomes control the somatic characteristics of an organism.
 - Autosomes are present in all the cells of the organisms.
 - Example: Human diploid cell contain 44 autosomes.
16. What are sex chromosomes?
- Sex chromosomes are the chromosomes involved in determination of sex.
 - They differ from autosomes in morphology and behaviour.
 - Example: Male - XY, Female XX chromosomes.
17. What are B-chromosomes?
- B-chromosomes are abnormal chromosomes.
 - They are also known as supernumerary and accessory chromosomes.
 - Found only in some individuals in a population.
 - B-chromosomes reduce viability e) Example: Maize.
18. What is a polytene chromosome?
- Discovered by:- C. G. Balbiani.
 - Location: Salivary glands of *Drosophila*.
 - Character: In the length of chromosomes there is a series of dark bands alternate with interbands (light band)
 - It has extremely large puff called Balbiani ring.
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19. Define a gene.
- A gene is a physical and functional unit of heredity.
 - Gene carries informations from one generation to the next.
 - It is a nucleotide sequence that is responsible for the production of a specific protein.
20. Why has one gene one enzyme hypothesis been modified into one gene one polypeptide hypothesis?
- One gene, one enzyme hypothesis is modified into one gene, one polypeptide hypothesis because the product of gene action is always a polypeptide.
21. What is linkage?
- The tendency of genes or characters to be inherited together because of their location on the same chromosome is called linkage.
 - Coupling and repulsion are the two aspects of linkage.

22. What is coupling?

- a) The dominant/recessive alleles are present in the same plant, ~~they~~ tend to remain together resulting in increased parental forms.
- b) The genes are called linked genes and the aspect is said to be coupling.
- c) ratio: 7:1:1:7

23. What is repulsion?

- a) If dominant/recessive alleles are present in different plants, they tend to remain separate, resulting in increased parental forms.
- b) The above mentioned aspect is said to be repulsion.
- c) ratio: 1:7:7:1

24. What is crossing over?

- a) The process, which produces recombination of genes by interchanging the corresponding segments between non-sister chromatids of homologous chromosomes is called crossing over.
- b) It takes place during pachytene stage of Prophase-I of meiosis-I.

25. What is a genetic map.

The diagrammatic representation of location and arrangement of genes and relative distance between linked genes of a chromosome is called genetic or linkage map.

26. What are the uses of gene mapping?

- a) It is useful to determine the location and arrangement of genes in a chromosome.
- b) gene mapping is also used to find linkage
- c) It is useful to predict the results of dihybrid and trihybrid crosses.

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Model paper - II

15. What are tightly linked genes?

Gene pairs that have very low percentage of recombination are known as tightly linked genes.
eg: Coupling - 88% Parental combination 12% recombination.

16. What are loosely linked genes?

The gene pairs with higher percentage of recombinations are termed as loosely linked genes.
eg: repulsion - 88% recombinants, 12% parents.

17. What is mutation?

- a) Sudden change in the genetic set up of an organism is defined as mutation.
- b) The term mutation coined by Hugo DeVries.
- c) He reported mutation in *Oenothera lamarckiana*.

18. what is a biochemical mutation? Give an example.

- a) The mutation that affect the biochemical reactions are called biochemical mutation.
- b) Biochemical mutants of Neurospora failed to synthesize certain aminoacids.

19. what is a lethal mutation? Give an example.

- a) The mutations drastically influence the genes and cause death to the individual are described as lethal mutations.
- b) These mutations are reported in ~~the~~ Sorghum
 - 1) In sorghum, the recessive mutant fail to produce chlorophyll and therefore they die in the seedling stage.

20. Define a gene mutation.

- a) Gene mutation is a sudden change in a small segment of DNA either a single nucleotide or a nucleotide pair.
- b) Types: Deletion, addition, Substitution (Transition, transversion)

21. what is a transition substitution mutation?

- a) It is a kind of substitution mutation.
- b) When a purine or a pyrimidine is replaced by another purine or pyrimidine respectively this kind of substitution is called transition.
- c) Purine \rightleftharpoons Purine / pyrimidine \rightleftharpoons pyrimidine.
- d) It is of great genetic significance because it can alter the phenotype.

22. what is a chromosomal aberrations?

- a) Any visible abnormality in chromosome number or structure from the diploid set of an organism is said to be chromosomal aberrations.
- b) classification based on structure:- Deletion, duplication, Inversion, Translocation.
- c) Number: Euploidy, Aneuploidy

23. what is duplication?

- a) When a segment of a chromosome is present more than once in a chromosome, it is called duplication.
- b) a, b, c, d, e, f, g \rightarrow a, b, c, d, e, f, g, f, g.
- c) Example: Drosophila, Corn, peas.
- d) It is useful in the evolution of organisms.

24. what is a hypoploidy?

- a) Decrease in one/two chromosomes from the diploid set is described as hypoploidy.
- b) Types: $2n-1 \rightarrow$ Monosomy
 $2n-2 \rightarrow$ Nullisomy

25. write any two significances of ploidy.
- a) ploidy plays a significant role in the evolution of new species.
 - b) polyploids are vigorous invaders of new habitats
 - c) Both euploidy and aneuploidy in man cause congenital diseases.

26. What is a strain - S streptococcus?
- a) strain - S is a virulent strain of Streptococcus.
 - b) It causes the disease pneumonia
 - c) S-strain synthesize a smooth polysaccharide coat and produce a smooth colony.

Model paper - III

15) what are the empirical rules of ~~Chargaff~~ Chargaff regarding the composition of bases in DNA.

- a) The nitrogenous bases pair in specific manner. Adenine always pairs with Thymine and Guanine pairs with cytosine.
- b) Total purine nucleotides is always equal to the total pyrimidine nucleotides. $A + G = T + C$.
- c) Adenine equal to Thymine and Guanine equal to Cytosine
- d) But the $A + T \neq G + C$.

16) what are isoacceptor tRNAs?

- a) The tRNA's specific for a particular amino acid are called iso acceptor tRNA's.
- b) Example: Four / five tRNA's.

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17) What are the four loops found in the clover leaf structure of tRNA?

- a) Amino acid acceptor arm
- b) TΨC loop
- c) Anticodon loop
- d) D-loop.

Additional Questions:-

(17)

1. What are Balbiani rings?

- a) The extremely large puff present in the polytene chromosome is called Balbiani ring.
- b) It is also known as chromosomal puff.
- c) It is formed due to repeated replication of DNA.

2. Define Chiasma?

a) During crossing over the adjacent non-sister chromatids are joined together at certain points called Chiasma.

b) At each chiasma, the two non-sister chromatids break, exchange their segments and rejoin resulting the

3. What is locus?

- Crossing over

The point in a ~~gene~~ chromosome where the gene is located is called locus.

4. Define one morgan

a) Morgan / centimorgan is the unit of genetic map.

b) When the percentage of crossing over between two linked genes is one percent, then the map distance between the linked genes is one morgan.

5. Write the significance of Crossing over.

a) Crossing over leads to the production of new combination of genes and provides basis for obtaining new variety of plants.

b) Plays an important role in the process of evolution.

c) The crossing over frequency helps in the construction of genetic maps of the chromosomes.

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Model paper-I

Book Questions:

15. Define recombinant DNA

- a) The process of manipulating DNA to form new genes, or inserting altered genes in different organisms is called genetic engineering.
- b) Such genetically modified DNA fragments are termed recombinant DNA.

16. Name the enzymes involved in the making of a DNA hybrid.

- a) Restriction endonuclease / Restriction Enzyme which act as a molecular scissor and cut the DNA.
- b) DNA ligase which act as a paste. It fuse the donor and vector DNA ~~and~~ leads to the formation of a hybrid DNA.

17. What are restriction endonucleases?

- a) Restriction endonucleases cleave DNA at very specific places along its length.

b) It is isolated from bacterium *E. coli*.

c) Example: *ECORI*.

d) It act as a molecular scissor in genetic engineering.

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18. What is the importance of *Escherichia coli* in biotechnology?

a) *E. coli* bacterium has become one of the potentially most powerful tool in gene manipulation.

b) It act as host in genetic engineering.

c) The circular DNA, Plasmid present in *E. coli* act as a vector in genetic engineering.

d) The ~~molecular~~ ^{restriction enzyme} scissor *ECORI* obtained from *E. coli* act as a molecular scissor.

19. What is the role of restriction enzymes in bacteria?

a) Restriction enzyme in bacteria help in the very survival of the bacterial species against the invading bacterial viruses / Bacteriophages.

b) Restriction enzymes can chop up and render harmless invading viral DNA.

(1) example: *ECORI*

20. Define biopesticides.

- a) Biological agents that are used for control of insects, weeds and pathogens produced from living organisms are called biopesticides.
- b) Example: Bacillus thuringiensis, Pyrethrum powder from Chrysanthemum plant.

21. Define transgenic plants.

- a) The genetically engineered or ~~foreign~~ foreign gene introduced plants, used for the commercial production of proteins, hormones etc are called transgenic plants.
 - Dicots → Nicotiana tabacum
 - Monocots → Oryza sativa
- b) Example:

22. What is the importance of Agrobacterium tumefaciens?

- a) In genetic engineering Agrobacterium mainly involved in transfer of foreign gene.
- b) It is a soil inhabiting bacterium.
- c) The Ti plasmid present in the Agrobacterium used in the transfer of foreign genes.

23. What is gene gun method of delivery of DNA?

- a) Gene gun method used to deliver DNA on microscopic particles into target tissue or cells.
- b) It is also used to introduce new genes into a range of bacterial, fungal and mammalian species.
- c) It is a method of choice for genetic engineering of many plant species like Rice, wheat etc.

24. Give the binomials of at least two dicot transgenic plants.

- a) Nicotiana tabacum
- b) Beta vulgaris
- c) Helianthus annuus.

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25. Define callus.

- (a) The callus is an unorganized mass of undifferentiated tissue formed during tissue culture.
- (b) Callus formation due to the activity of auxins and cytokinins
- (c) Auxin induces cell elongation and cytokinin induces cell division

26. What is a somatic embryo? ✓

The embryos arise from somatic callus tissue are called somatic embryos or embryoids or somoclonal embryos.

Model paper - II
Book questions.

15. Write a note on totipotency.
a) The inherent potential of any living plant cell to develop into entire organism is said to be totipotency
b) Totipotency is unique to plant cells and not seen in animal cells.

16. What is dedifferentiation?
a) Reversion of mature tissue into meristematic state is called dedifferentiation.
b) It leads to the formation of callus

17. Mention the two media of plant tissue culture.
a) Murashige and Skoog medium (MS medium)
b) Gamborg medium (B5 medium)
c) White medium (W-medium)

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18. What is sterilization?
a) Sterilization is a technique employed to get rid of the microbes such as bacteria and fungi in the culture medium and plant tissues.
b) Plant tissue is to be surface sterilized.
c) The culture medium can be sterilized by keeping it in an autoclave and maintaining the temperature of 121°C for 15 minutes

19. Define inoculation.
a) Transfer of explant (root, leaf, stem etc) on to a culture medium is called inoculation.
b) Inoculation done under aseptic conditions in an apparatus called laminar air flow chamber.
c) For the transfer of explant, flamed and cooled forceps are used.

20. Define SCP
a) The dried cells of microorganisms used as food or feed for animals are known as SCP or Microbial Proteins.
b) The isolated protein or the total cell material is also called as single cell protein (SCP)
c) Example: chlorococcum, yeast, pseudomonas

21. What is somatic hybridization?
a) A hybrid produced by fusion of somatic cells of two varieties or species is called somatic hybrid.
b) The process of producing somatic hybrid is known as somatic hybridization.
c) Example: potato + Tomato → pomato

22. What is a bioreactor (or) fermentor?

a) Bio-reactor or fermentor is a special sterilized vessel used in the production of single cell protein (SCP)

b) The biomass produced in the fermentor would be ideal supplement for conventional food.

23. What is PEG?

a) PEG means poly ethylene glycol.

b) In protoplasmic fusion it act as a fusogenic agent and used to fuse the isolated parent protoplast.

24. How do you remove cell wall from intact cells?

a) Cell wall is removed from the intact cells by mechanical or enzymatic method.

b) Mechanical method: Cells \rightarrow kept in plasmolyticum \rightarrow \rightarrow plasmolysis \rightarrow cut with a knife \rightarrow removal of cell wall

c) Enzymatic method: 0.5% macerzyme, 2% cellulase in 13% sorbitol or mannitol a pH 5 used to remove the intact cell wall.

25. Why is SCP is not popular for human consumption?

a) High cost ^{of} production

b) The high nucleic acid content (Algae 4-6%, Yeast 6-10%) can cause uric acid formation, kidney stones and rheumatism in human beings.

c) Toxic / carcinogenic substances absorbed from the microbial growth substrate may be present.

d) Slow digestion of microbial cell wall in the digestive tract may cause allergy, vomiting and indigestion.

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Lesson-5 PLANT PHYSIOLOGY

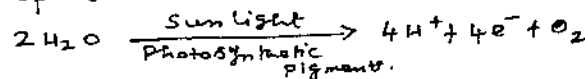
Model paper-I

15. What are generally called accessory pigments?

- a) Photosynthetic pigments other than chlorophyll-a are generally called accessory pigments.
- b) Example: Chlorophyll-b, carotenoids and xanthophylls.

16. What is photolysis of water?

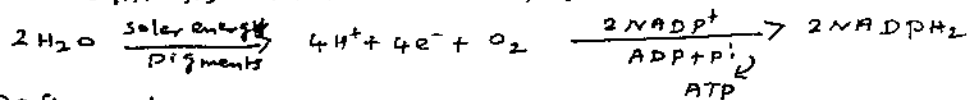
The light dependent splitting of water molecules into protons, electrons and oxygen is said to be photolysis of water.



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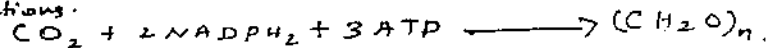
17. Define light reaction.

The reactions involving pigments, solar energy and water that produce ATP and NADPH₂ during photosynthesis are called light reaction.



18. Define dark reaction.

The photosynthetic reactions in which CO₂ is reduced to carbohydrates making use of ATP and NADPH₂ generated by light reactions are collectively called dark reactions.

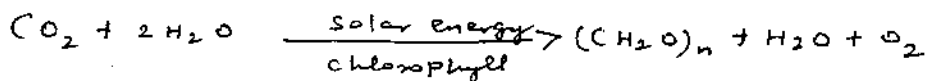


19. State the conditions under which cyclic photophosphorylation occurs.

- i) PSI only remains active
- ii) Photolysis of water does not take place
- iii) requirement of ATP is more
- iv) non-availability of NADP⁺

are the conditions under which cyclic photophosphorylation occurs.

20. Write the overall reaction of photosynthesis



23

21. Why are chloroplasts in C_4 plants called dimorphic chloroplasts?

a) In C_4 plants like sugarcane two types of chloroplasts are present.

b) Granal chloroplast present in mesophyll cells and

Agranal chloroplast present in bundle sheath cells.

c) Such chloroplast is said to be dimorphic chloroplast.

d) Light reaction occurs in granal and dark reaction takes place in agranal chloroplast.

22. Define photorespiration

a) Respiration that occurs in photosynthetic tissue in the presence of light and results in increased rate of CO_2 evolution is called photorespiration/light respiration.

b) It involves three organelles namely chloroplasts, peroxisomes and mitochondria.

23. Differentiate photorespiration and dark respiration.

Photorespiration	Dark respiration
a) It takes place only in photosynthetic cells in the presence of light	a) occurs in all living cells in the mitochondria
b) Light dependent reaction	b) It is independent of light
c) It is function of chloroplasts, peroxisomes, mitochondria	c) It is the function of mitochondria.

24. What are called total parasites?

a) Some plants completely lack chlorophyll and do not grow in soil. They totally dependent on the host stem for food, water and minerals

b) The above mentioned plants are called as total parasites.

c) Example: *Cuscuta*.

25. Define chemosynthesis.

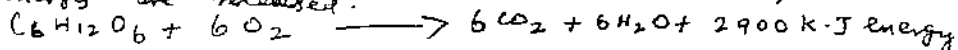
a) Chemosynthesis is a process by which certain organisms synthesize carbohydrates by using energy obtained by the oxidation of inorganic substances.

b) Example: Nitrosomonas, Beggiatoa.

26. Define respiration.

a) The phenomenon of release of energy by oxidation of various organic molecules is known as respiration.

b) In respiration oxygen is utilized and CO_2 , water and energy are released.



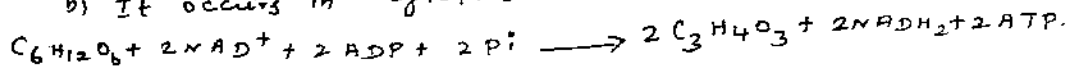
Model test - II

24

Basic Questions.

15. What is glycolysis?

- The process by which the glucose (6C compound) is split into two molecules of Pyruvic acid (3C compound) is called glycolysis.
- It occurs in cytoplasm.



16. What is the role of aldolase in the process of glycolysis?

In glycolysis the enzyme aldolase cleave one Fructose 1,6 bis phosphate into 2 molecules of 3C compounds dihydroxy acetone phosphate (DHAP) and 3-phosphoglyceraldehyde.

17. What is Kreb's cycle?

- The series of cyclic reactions involved in converting pyruvic acid to CO_2 and water in mitochondria is called Kreb's cycle.
- Discovered by Sir Hans Kreb.
- Other names: Citric acid cycle / TCA cycle.

18. What is the role of aconitase in Kreb's cycle?

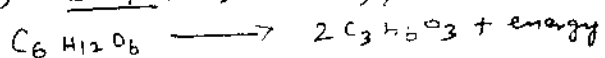
- In Kreb's cycle in the presence of aconitase Citric acid is converted into cis aconitic acid by dehydration.
- Aconitase is also catalyzes the formation of isocitric acid from cis aconitic acid by the addition of a molecule of water.

19. What is oxidative phosphorylation?

- Transfer of electrons and protons from $NADH_2$, $FADH_2$ to oxygen through a series of components like flavoproteins, cytochrome is called electron transport chain.
- This process leads to coupling of electrons to form high energy phosphate bonds in the form of ATP from ADP is called oxidative phosphorylation.

20. Define anaerobic respiration

- The respiration which takes place in the absence of free oxygen molecules is called anaerobic respiration.
- Example: Bacteria, yeast



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21. Define respiratory quotient.

a) The ratio between the volume of CO_2 given out and oxygen consumed during respiration is said to be respiratory quotient.

b) The value ~~of it~~ depends upon the nature of respiratory substrate and its rate of oxidation.

$$R.Q = \frac{\text{Volume of } \text{CO}_2 \text{ evolved}}{\text{Volume of } \text{O}_2 \text{ consumed}}$$

22. The respiratory quotient for anaerobic respiration is infinity. Give reasons.

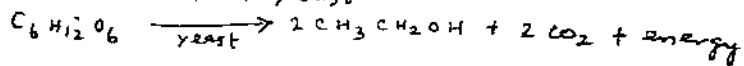
a) In anaerobic respiration, CO_2 is evolved but oxygen is not consumed. Therefore, the R.Q. in such case is infinity.

b) Example: Respiratory quotient of glucose = $\frac{2 \text{ moles of } \text{CO}_2}{\text{Zero moles of } \text{O}_2} = \infty$
 $\text{C}_6\text{H}_{12}\text{O}_6 \rightarrow 2\text{C}_2\text{H}_5\text{OH} + 2\text{CO}_2 + \text{energy}$

23. What is fermentation?

a) The anaerobic breakdown of glucose to carbon dioxide and ethanol is a form of respiration referred to as fermentation.

b) Example: yeast



24. What is a growth inhibitor? Give an example.

a) The organic substances produced in the plant inhibit the plant growth are called growth inhibitors.

b) They inhibit the elongation of roots, stems and leaves.

c) Example: Ethylene - potent inhibitor of bud growth.

ABA - inhibits lateral bud growth in tomato

25. Write any two/three physiological effects of Abscisic acid.

a) Abscisic acid causes closure of stomata

b) ABA acts as a growth inhibitor and induces bud dormancy in a variety of plants

c) ABA controls geotropic responses of roots. It stimulates positive geotropism in roots.

d) stimulates abscission

26. What is Richmond Lang effect?

a) Application of cytokinin delays the process of ageing in plants.

b) This effect is known as Richmond Lang effect.

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Model test - III

Book Questions

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15. Define Bolting.

- a) The sudden elongation of stem followed by flowering is said to be bolting.
- b) Bolting caused by the hormone gibberellins
- c) Application of gibberellins during conditions of rosette growth stimulates the plant to bolt and flower.

16. What is apical dominance?

- a) Suppression of growth in lateral bud by apical bud is said to be apical dominance.
- b) The ^{hormone} auxin present in the apical bud inhibits the growth of lateral buds.
- c) The lateral bud grows rapidly on removal of apical bud.

17. Define growth regulator.

- a) Growth regulator is a hormone like synthetic organic compound.
- b) In small amounts, it modifies the growth and development either by promoting or inhibiting the growth.
- c) Naphthalene acetic acid (NAA)

18. What are called phytohormones?

- a) Phytohormones are the organic substances produced by the plant. They are very active in very minute quantities.
- b) Phytohormones influence specific physiological, biochemical and morphological changes.
- c) Example: Auxins, cytokinins, Ethylene etc.

19. What is Sigmoid Curve?

- a) The growth in size or increase in number of cells if plotted against time the graph shows "S" shaped curve known as sigmoid growth curve.
- c) Phases: Lag Phase, log Phase and Steady state phase.

~~20.~~

20. Define Photoperiodism.

- a) The response of a plant to the relative lengths of light and dark periods is known as photoperiodism.
- b) Classification of plants on the basis of photoperiodism.
i) Long day plants ii) Short day plants iii) Day neutral plants.

21. What are called long day plants?

- a) The plants requiring longer exposure to light than their critical period are known as long day plants.
- b) Example: Wheat and oats

22. What is a short day plant?

- a) The plants requiring light for a shorter period than their critical period are known as short day plants.
- b) Example: Tobacco, chrysanthemum.

23. Define vernalization.

- a) The biennials and perennials are induced to flower at low temperature range of 1°C - 10°C is known as vernalization.
- b) The term introduced by T.D. Lysenko
- c) Types: Inductive and non-inductive types.

24. Write about the techniques of vernalization.

- a) First step: Seeds are allowed to germinate and subjected to cold treatment for varying period of time depending on the species.
- b) Second step: Germinated seeds after this treatment are allowed to dry.
- c) Third step: Seeds are sown.

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25. What is devernalization?

- a) Reversal of the effect of vernalization is called devernalization.
- b) Subjecting the plants to higher temperature after a cold treatment brings about devernalization.

26. Write any two advantages of vernalization.

- a) Crops can be produced earlier by vernalization.
- b) Vernalization helps to accelerate the plant breeding.
- c) Vernalized plants can be cultivated in places where they naturally do not grow.

Lesson-6 BIOLOGY IN HUMAN WELFARE

Model test-I Book Questions

15. What are mutagens?

- a) Mutagens are the substances used to develop new variety of crops.
- b) Example:- UV short wave, x-rays, chemicals like Caesium, Ethyl methane Sulphonate, nitromethyl urea.
- c) Induced mutation produced in Atomita 2-rice, Groundnuts

16. What is genetic ~~engineering~~ ^{engineering}?

Genetic engineering can be defined as the formation of new combinations of heritable material by the insertion of foreign nucleic acid molecule from other sources.

17. Define clonal selection.

- a) Clonal selection is a method employed to select improved ~~variety~~ variety from a mixed population (clones)
- b) plants are selected on the basis of their phenotypic appearance
- c) Selected plants multiplied through vegetative propagation.
- d) The genotype of clone remain unchanged for a long period.
- e) Example:- Sugarcane, potato, Banana.

18. What is pure line selection?

- a) A pure line is a collection of plants obtained as a result of repeated self pollination from a single homozygous individual.
- b) This variety formed by this method show more homozygosity.
- c) Disadvantage:- new genotypes are never created by this method.

19. Define bio fertilizer

- a) The term biofertilizer denotes all the nutrient inputs of biological origin for plant growth.
- b) Biological origin refers to microbes producing nitrogen compounds
- c) Example:- Azotobacter, Bacillus, Oscillatoria, Nostoc etc.

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20. What is bioinsecticide?

- a) Biological agents that are used for control of insects are called bioinsecticides.
- b) Bioinsecticides are non-hazardous, non-phytotoxic and are selective in their action.
- c) Examples: Bacillus thuringiensis, Pyrethrum from Chrysanthemum.

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21. Define biomedicine

- a) The medicinally valuable compounds obtained from the medicinal plants are called biomedicines.
- b) Example:
 - i) Morphine - papaver somniferum - strongest pain killer.
 - ii) Ephedrine - Ephedra sinica - Mental, Physical stress relaxing drug
 - iii) Digoxin - Digitalis - treat heart diseases.

22. Write an account on Aegle marmelos.

- a) ~~name~~ ^{Trade} name - baer fruit belongs to the family Rutaceae.
- b) Tamil name - vilvum
- c) Aromatic tree, axillary panicle inflorescence.
- d) The medicinal activity of vilvum due to the chemicals Marmelosin, Coumarin and terpenoids.
- e) uses:
 - i) unripe pod used to treat problems of stomach indigestion. kills intestinal parasites.
 - ii) used to cure chronic diarrhoea and dysentery.
 - iii) used as a tonic for the betterment of heart and brain.

23. Write the medicinal uses of Solanum nigrum

- a) Tamil name manithakkali belongs to the family solanaceae
- b) Trade name - black night shade.
- c) ~~Plant~~ Habit: Erect, much branched herb.
- d) Extra axillary cymose inflorescence
- e) Active medicinal compounds like solamin and saponin extracted from this plant.
- f) uses:
 - i) herb extract used to treat liver cirrhosis.
 - ii) The plant also cures fever, dysentery
 - iii) It also promotes urination.

24. What is humulin?

- i) The human insulin ~~is~~ produced by the E. coli bacterium is said to be humulin.
- ii) Through genetic manipulation and introduction of human gene now ~~is~~ E. coli bacterium producing humulin.

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Additional Questions:

25. Give short note on *Acalypha indica*.

- a) Common name: Kuppaimeni, trade name is Indian *Acalypha* belongs to the family Euphorbiaceae.
- b) Common herb contain unisexual flowers in axillary spikes.
- c) The medicinal compounds like Acalyphine and Triacetoneamine
- d) uses:
 - i) leaf extract applied to burns
 - ii) leaf juice cure diseases caused by ringworms
 - iii) fresh leaf juice + oil + salt is used to treat Rheumatid arthritis.

26. write the medicinal importance of *Cissus quadrangularis*

- a) Tamil name - Pirandai and trade name is Hadjar-bone Joiner.
- b) Common shrub with tendrils.
- c) Steroids like prescene and tetracyclic triterpenoids are the active chemicals present in this plant.
- d) uses:
 - i) paste from stem, root - used in bone fracture.
 - ii) whole plant - to treat asthma and stomach troubles.
 - iii) stem - treatment of piles.

27. Give short note on "Touch me not" plant.

- a) Binomial name - *Mimosa pudica*, ~~Pongamia~~ Tamil name - thottal Chiumgi belongs to the family mimosaceae.
- b) It is a small erect herb with prickles.
- c) Axillary head inflorescence.
- d) Mimosine is an alkaloid obtained from this plant.
- e) uses:
 - i) Plant - useful for curing piles, minor skin wounds.
 - ii) plant is also used to treat whooping cough.

28. Write the major aspects of Plant breeding.

- a) Creation of useful variation in the cultivable crops.
 - b) Selection of better crops.
 - c) Carrying out breeding experiments to assess the quality of the crop.
 - d) Release the variety after extensive multiplication.
- are the major aspects of plant breeding.

29. Define a hybrid.

- (a) Hybrids are the products of first generation obtained by crossing genetically unrelated parents.
(or)
- (b) Crossing of two varieties/species/genera having desirable genes and breeding them together of the desirable traits into one progeny, which is called the hybrid.

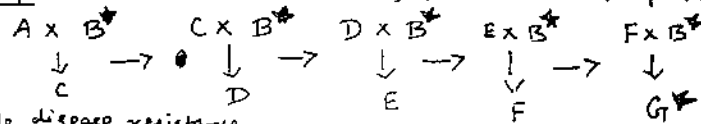
30. What is heterosis?

- a) The superiority of the F₁ hybrid in performance over its parents is called heterosis or hybrid vigour.
- b) Vigour refers to increase in growth, yield, resistance to diseases, pests and drought.
- c) Vegetative propagation is the best suited measure for maintaining hybrid vigour.

31. Define a recurrent parent.

Repeated back crosses are attempted with the parent crop with more desirable characters and such a crop is known as recurrent parent.

Example: A - non-recurrent, B - recurrent parent



* desirable disease resistance.

with disease resistance

32. Give examples for green manures.

- a) *Crotalaria juncea*
- b) *Glycine max*
- c) *Acacia nilotica*
- d) *Lathyrus odoratus*

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33. What is mycorrhiza?

- a) Mycorrhiza is a root inhabiting fungus around the roots of many plants.
- b) Types:
 - i) Ectophytic mycorrhiza (Basidiomycetes)
 - ii) Endophytic mycorrhiza (VAM fungi)

Medicinal Plants including microbes.

1) 70,000 medicinal plants 2) 500 plants have been studied.

3) India :- 1100 species used in different systems of medicine.

Biomedicines:- Medicinally valuable compounds obtained from the plants.

Examples:

Sl.No.	Medicine	Plant	Uses
1.	Morphine	<i>Papaver somniferum</i> (opium poppy)	Strongest pain killer
2.	Quinine	<i>Cinchona officinalis</i> <i>Cinchona calisaya</i>	i) Antimalarial drug ii) controls all types of fever
3.	Digoxin	<i>Digitalis</i>	Treat heart diseases
4.	Ephedrine	<i>Ephedra sinica</i>	Treat cough
5.	Ginseng	<i>Panax ginseng</i>	Mental and physical stress relaxing drug

MICROBES IN MEDICINE

Antibiotics:- The substance produced by a living organism, which inhibits the growth and metabolic activities of pathogenic organisms without affecting the metabolism of host.

Sl.No.	Antibiotic	Plant/ Bacteria (Fungi)	Uses
1.	Penicillin	<i>Penicillium notatum</i> (Blue green mould)	Effective against Gram-positive bacteria
2.	Streptomycin	<i>Streptomyces griseus</i> (filamentous actinomycetes)	Cures urinary infections, tuberculosis, meningitis, pneumonia
3.	Aureomycin	<i>Streptomyces aureofaciens</i> (Actinomycetes)	Treatment of osteomyelitis, Whooping cough, eye infections
4.	Chloromycetin	<i>Streptomyces Venezuelae</i> (Actinomycetes)	Cures typhoid and kills bacillus bacteria
5.		<i>Aspergillus fumigates</i> (Fungi)	Used against typhoid and dysentery
6.	Bacitracin	<i>Bacillus licheniformis</i>	To treat syphilis, diabetes
7.	HORMONE -HUMULIN	<i>E.coli</i>	Insulin production (humulin) treat diabetes

Bacillus subtilis produces 60 different antibiotics.

CROP DISEASES AND CONTROL

1. Prophylaxis:- Protection of the host from exposure to the pathogen, from infection/ from environmental factors favourable to disease development.

2. Disease resistance:- Improvement of resistance of the host to infection and to disease development.

SPECIFIC DISEASES

Sl.No.	Disease,Causal agent, class affected plant	Pathogen Characters	Symptoms	Control Measures
1.	<p>a) Blast disease of Rice b) <i>Pyricularia oryzae</i> c) Deuteromycetes d) Paddy(Rice)</p> <p>Collateral Host <i>Digitaria marginata</i></p>	<p><i>Pyricularia oryzae</i></p> <p>i) Septate - mycelium ii) Olive brown colour iii) Conidium with basal appendage</p>	<p>a) green-necrotic lesions on the leaf blade rachis b) Drying of the leaves, seedlings wither and die c) After transplantation necrotic lesions appear in leaf lamina and leaf sheath</p>	<p>a) cultivation of disease resistant, high yielding varieties b) Plant debris should be collected and destroyed. c) Seed treatment:- Immersion of seeds in 0.2% solution of Kalimat-B(24 hours) d) Application of seed protectants cerasan, spergon and agrosan GN e) Sparying BORDEAUS mixture f) Organo mercuric compound dustings</p>
2.	<p>a) Tikka disease of ground.nut b) <i>Cercospora personata</i> c) Deuteromycetes d) Ground nut</p>	<p><i>Cercospora personata</i></p> <p>i) Septate branched brown colour mycelium ii) haustoria absorb food materials from the host tissue iii) Each conidiophores produces single conidium iv) conidia dispersed by wind</p>	<p>a) Lesions on the leaves in July b) Lesions are darkbrown/Black in colour(1-6 mm in dia) c) Yellow halo develops around the spot (lesions)</p>	<p>a) Sanitation and Crop rotation b) Sowing of resistant varieties c) Effective measure - Sulphur dusting d) Disease reduced by the use of phosphatic and potassic manures.</p>

Sl.No.	Disease,Causal agent, class affected plant	Pathogen Characters	Symptoms	Control Measures
3.	a) Citrus Canker b) <i>xanthomonas -Citrii</i> c) Schizomycetes d) Citrus	<i>Xanthomonas Citrii</i> a) Commonly found during the rains b) usually affects the leave, twigs, thorns and fruits. c)Entry:through stomata and wounds d) Multiplication in the cortex	a)Brown scabby spots surrounded by dark-brown glossy margins in all green parts and maturing fruits. b) The lesions may enlarge to a diameter of 3-4 mm and turn brown	i) Spraying Bordeaux mixture ii) Removal of infected branches iii) Streptocycline antibiotic spary 3-4 times in a season
4.	a) Tungro disease of Rice b) Rice Tungro Virus c) Paddy d) Vector / transmitter of virus leafhoppers	Rice Tungro Virus	i) Mild interveinal chlorosis (emerging leaf) ii) Mild-mottling , Yellowing iii) Stunted growth iv) Dark brown spots on the leaves	

BORDEUX MIXTURE FORMULA

- i) Copper sulphate :- 9 Kgs
- ii) Quick lime :- 9 Kgs
- iii) Water :- 250 litres

BIOPESTICIDES

1. Biological agents that are used for control of insects, weds and pathogens produced from living organisms are called biopesticides.
2. Bio pesticides are obtained from viruses, bacteria, fungi, protozoa and mites.
3. The suitable preparations from micro organisms for control of insects are called as microbial insecticides.
4. The most frequently used bio-control agent is *Bacillus thuringiensis*, Pyrethrum from *chrysanthemum* (Asteraceae family Plants)

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5. Advantages of microbial insecticides:-

- a) Non-hazardous , non-phytotoxic and are selective in action
- b) Eco- friendly
- c) Not responsible for environmental degradation.

6. *B.thuringiensis* bacterium is harmful to Lepidoptera insects because it secretes several toxins such as exotoxins and endotoxins in crystallized form.

7. Side effects of chemicals used as insecticides/ pesticides

- a) Serin (Carbaryl) → Kill more than 100 types of insects attacking 100 different crops.(useful / harmful)
- b) Bringing about considerable damages to living organisms and environment.

COMMONLY AVAILABLE MEDICINAL PLANTS

Sl.No.	Botanical Name, Family	Vernacular Name	Trade Name	Habit	Uses
1.	<i>Acalypha indica</i> (<i>Euphorbiaceae</i>)	Kuppaimeni/ Ponnamayaki	Indian acalypha	i) Herbs ii) Ovate leaves iii) axillary spike inflorescence iv) unisexual flowers	a) Leaf Paste → treat burns b) Leaf Juice + lime → used to cure ringworm disease c) Powdered leaves → Cure bed sores, Infectious wound d) Leaf fresh juice + Oil + salt → scab Rheumatid artl e) Medicinal compound: Acalyphine, Triacetohexamine, cyanogenic glucoside - alkal
2.	<i>Aegle marmelos</i> (<i>Rutaceae</i>)	Vilvam	Baer fruit	i) Aromatic tree ii) Tri (or) Penta foliate leaves are Present iii) Sweet scented flowers are present iv) Axillary panicles are present	a) unripe fruit: Uses: → Stomach indigestion → Kills internal parasites → Cure chronic diarrhoea → Tonic for the betterment of heart and brain . b) Medicinal compounds:- Marmelosin , coumarin, and triterpeno

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Sl.No.	Botanical Name, Family	Vernacular Name	Trade Name	Habit	Uses
3.	<i>Cissus quadrangularis</i> Vitaceae	Priandai	Hadjor bone joiner	<ul style="list-style-type: none"> i) Shrub with tendrils ii) Angular winged stem iii) Leathery, Simple leaves iv) chemicals in the Plant: (Steroids) Presence, tetracyclic terpenoids 	<ul style="list-style-type: none"> a) Paste from the powdered stem, root → bone fracture b) Whole Plant → treat asthma, stomach troubles c) Stem → treatment of piles and bleeding of nose
4.	<i>Mimosa pudica</i> Mimosaceae	Thottal Chirungi / Thottal surungi	Touch me not	<ul style="list-style-type: none"> i) Small herb with prickles ii) Leaf left arranged in two rows iii) Axillary head inflorescence iv) pink coloured flowers v) Leaves are sensitive to touch 	<ul style="list-style-type: none"> a) An alkaloid mimosine extracted from this plant b) root extract → relieve asthma, diarrhoea c) Plant → Curing Piles, whooping cough, minor skin wounds
5.	<i>Solanum nigrum</i> Solanaceae	Manithakkali / Manathakkali	Black night shade	<ul style="list-style-type: none"> i) Annual branched unarmed herb ii) ovate leaves iii) extra axillary cyme iv) Black coloured Berry fruit 	<ul style="list-style-type: none"> a) herb extract: treatment of cirrhosis of liver b) Plant body → cures fever, dysentery and promotes urination. c) Medicinal compounds: Solanin, saponin

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