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EXCEL BIO - BOTANY 12

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12

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CHAPTER 1

ASEXUAL AND SEXUAL REPRODUCTION IN PLANTS

EVALUATION

1. Choose the correct statement from the following

a) Gametes are involved in asexual reproduction
b) Bacteria reproduce asexually by budding
c) Conidia formation is a method of sexual reproduction
d) Yeast reproduce by budding

2. An eminent Indian embryologist is

a) S.R.Kashyap **b) P.Maheswari** c) M.S. Swaminathan d) K.C.Mehta

3. Identify the correctly matched pair

a) Tuber - Allium cepa b) Sucker – Pistia **c) Rhizome – Musa** d) Stolon - Zingiber

4. Size of pollen grain in Myosotis

a) 10 micrometer b) 20 micrometer c) 200 micrometer d) 2000 micrometer

5. First cell of male gametophyte in angiosperm is

a) Microspore b) megaspore
c) Nucleus d) Primary Endosperm nucleus

6. Match the following

I)	External fertilization	i)	pollen grain
II)	Androecium	ii)	anther wall
III)	Male gametophyte	iii)	algae
IV)	Primary parietal layer	iv)	stamens

	I	II	III	IV
a	iv	i	ii	iii
b	**iii**	**iv**	**i**	**ii**
c	iii	iv	ii	i
d	iii	i	iv	ii

7. Arrange the layers of anther wall from locus to periphery

a) Epidermis, middle layers, tapetum, endothecium
b) Tapetum, middle layers, epidermis, endothecium
c) Endothecium, epidermis, middle layers, tapetum
d) Tapetum, middle layers, endothecium, epidermis.

8. Identify the incorrect pair

a) sporopollenin - exine of pollen grain
b) tapetum – nutritive tissue for developing microspores
c) Nucellus – nutritive tissue for developing embryo
d) obturator – directs the pollen tube into micropyle

9. Assertion : Sporopollenin preserves pollen in fossil deposits
Reason : Sporopollenin is resistant to physical and biological decomposition

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- A pistil derived from a _____ - **Carpel**
- ____ secrete chemotropic substances that help to attract the pollentube - **Synergids**
- ____ guide the pollentube into the egg - **Synergids**
- Example for Epihydrophily - **Vallisneria spiralis**
- ____ is the common type of ovules found in dicots and monocots - **Anatropus**
- Example for monosporic embryo sac - **Polygonum**
- ____ produces (aerial and underground) two types of flowers - **Commelina**
- The plumule is surrounded by a protective sheath called - **Coleoptile**
- ____ The seed of paddy is one seeded and is called - **Caryopsis**
- In ____ reproduction which does not involve meiosis and syngamy - **Apomixis**
- Integumentary tapetum otherwise called - **Endothelium**
- Areca catechu is example for ____ endosperm - **Ruminate endosperm**

Vegetative reproduction in stem

- Rhizome - Musa paradisiaca, Zingiber officinale and curcuma longa
- Corm - Amorphophallus and Colocasia
- Tuber - Solanum tuberosum
- Bulb - Allium cepa and Lilium
- Runner - Centella asiatica
- Stolon - Mentha and Fragaria
- Offset - Pistia and Eichhornia
- Sucker - Chrysanthemum
- Bulbils - Dioscorea and Agave

- ____ also plays an important role in evolution - **Reproduction**
- ____ have been used by man for a long time and are called conventional methods - **Artificial propagation methods**
- In ____ method the stem is girdled at nodal region - **Air layering**
- The protoplast of all tapetal cells coalesces to form a ____ - **Periplasmodium**
- Generally at ____ stage the pollens are liberated from the anther - **2 celled stage**
- The megaspores are usually arranged in a ____ - **linear tetrad**
- Of the four megaspores ____ side one is develop into functional - **Chalaza**
- In ___ plants anthers burst violently and release the pollen into the air - **Utrica**
- Some plants of Araceae are pollinated by ____ - **Snails**
- Pollination by ant is called ____ - **Myrmecophily**
- Lever mechanism pollination occurs in ____ - **Salvia**
- As soon as the ____ disappear the growth of the pollen tubes stops - **Cap block**
- When the pollen tube enters through the integument is called ____ - **Mesogamy**
- _____ is a nutritive tissue and regulatory structure that nourish developing embryo - **Endosperm**

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6. Write reason for mendel choose pea plant for his experiment

- It is an annual plant and has clear contrasting characters that are controlled by a single gene separately
- Self-fertilization occurred under normal conditions in garden pea plants. Mendel used both self-fertilization and cross fertilization
- The flowers are large hence emasculation and pollination are very easy for hybridization.

7. Write the uses of Test cross and Back cross

- Test cross is used to identify whether an individual is homozygous or heterozygous for dominant character each other such that each gametes recevies only one of the two factors.
- A homozygous parent produces similar gametes and a heterozygous parent produces two kinds of gametes each having one allele with equal proportion
- Gametes are never hybrid.
- From this ,the alleles themselves remain discrete and unaltered proving the Mendel's Law of segregation.The phenotypic and genotypic ratio are the same.There is no blending genes
- The recessive back cross helps to identify the heterozygosity of the hybrid.

8. Name the three types of Allelic interaction

1. Dominant relationship 2. Lethal genes 3. Multiple alleles

9. Write the types of lethal genes

1. Dominant lethals 2. Recessive lethals 3. Conditional lethals
4. Sex linked lethals 5. Balanced lethals

10. Write three examples for Codominance

1. Red and white flowers of camellia
2. Inheritance of sickle cell haemoglobin
3. ABO blood group system in humanbeings

11. What is meant by Dominant Epistasis?

It is a gene interaction in which two alleles of a gene at one locus interfere and suppress or mask the phenotypic expression of a different pair of alleles of another gene at another locus.

12. Differentiate Epistatic and Hypostatic

- The gene suppresses or mask the phenotypic expression of a gene at another locus known as epistatic
- The gene whose expression is interfered by non-allelic genes and prevents from exhibiting its character is known as hypostatic.

13. Cytoplasmic inheritance is not through nuclear gene. Justify

It is due to the chloroplast gene found in the ovum of the female plant which contributes the cytoplasm during fertilization since the male gamete contribute only the nucleus but not cytoplasm.

14. Define Plasmogenes

- It is independent, self replicating extra chromosomal unit
- It is located in the cytoplasmic organelles,(In chloroplast and mitochondrion) responsible for cytoplasmic inheritance. Such genes are called Plasmogene.

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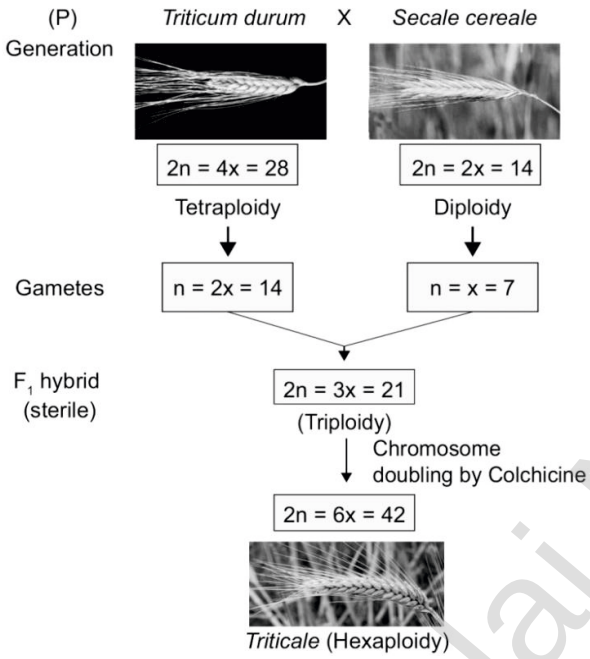

ADDITIONAL QUESTIONS AND ANSWERS

- The term 'Ecosystem' was proposed by _____ - **A.G. Tansley(1935)**
- An organism which possesses two complete basic set of chromosome are known as - **Diploid**
- _____ postulated that the chromosomes of a cell are responsible for transferring heredity - **Wilhelm Roux**
- _____ supported the idea that the chromosomes contain determiners - **T. Boveri**
- _____ & _____independently proposed the chromosome theory of inheritance - **Sutton & Boveri**
- The genes which determine the character of an individual are carried by the _____ - **Chromosomes**
- Lathyrus odoratus commonly called _____ - **Sweet pea**
- Unlinked genes are otherwise called _____ - **Syntenic genes**
- _____ linkage was observed and reported in maize by Hutchinson - **Incomplete linkage**
- The term 'crossing over' was coined by _____ - **Morgan**
- _____ takes place during pachytene stage of prophase I of meiosis - **Crossing over**
- After _____ formation, the crossing over occurs in pachytene stage - **Tetrad**
- The unit of distance in a _____ is called a map unit - **Genetic map**
- One map unit is also called a _____ in honour of T.H.Morgan - **Centimorgan**
- The term mutation was introduced by - **Hugo de Vries**
- The plant Oenothera lamarkiana commonly called _____ - **Evening primrose**
- Mutational events that take place within individuals genes are called - **Gene mutations**
- Gene mutations otherwise called _____ - **Point mutations**

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62. Identify the correct statement regarding Restriction Enzymes

1. Exonucleases enzymes remove nucleotides from one end
2. Endonucleases enzymes break the internal phosphodiester bonds within DNA molecule
3. It joins the sugar and phosphate molecules
4. They function as a part of bacteria defence mechanism

a. 1 and 3 b. 1,2 and 3 c. 1,3 and 4 **d. 1,2 and 4**

63. Identify the wrong statement regarding Alkaline phosphatase

1. It is otherwise called molecular scissors
2. It is a DNA modifying enzyme
3. It prevents self ligation
4. It is purified from bacteria and calf intestine

a. 1 and 4 b. 2 and 3 c. 3 alone **d. 1 alone**

64. Select the correct restriction enzyme which breaks the phosphodiaster bond within a DNA molecule

1. Bal 31 2. Hind II 3. BamHI 4. Pvul

a. 1 and 3 b. 3 and 4 c. 1,2 and 3 **d. 2,3 and 4**

65. _____ is an alternative to liquid fossil fuels,the petroleum products

a. Algal fuel b. Algal biofuel c. Algal oil **d. All the above**

66. Cohesive ends are _____

a. Sticky ends b. Blunt end c. Flush end d. Symmetric cuts

67. Number of base pairs does pBR 322 plasmid contains _____

a. 2345 b. 3461 **c. 4361** d. 2322

68. Self ligation prevented by _____ in genetic engineering

a. Endonuclease **b. Alkaline phosphatase**

c. DNA ligase d. Exonuclease

69. Today more than _____ restriction enzymes have been isolated

a. 600 b. 360 c. 760 **d. 900**

70. A Vector is _____

a. Self-replication b. Used as a carrier

c. Transporter of DNA fragment **d. All the above**

Match the following:

71.

1.Southern Blotting - a. Transfer of Proteins
2. Northern Blotting - b. Cloning DNA
3. Western Blotting - c. Transfer of DNA
4. Vector - d. Transfer of RNA

a. 1-d, 2-b, 3-c, 4-a b. 1-a, 2-b, 3-c, 4-d **c. 1-c, 2-d, 3-a, 4-b** d. 1-d, 2-c, 3-b, 4-a

72.

1. Herbicide Tolerant - a. Golden rice
2. Insect resistance - b. FlavrSavr Tomato
3. Genetic engineering - c. Basta
4. Biofortification - d. Bt Crops

a. 1-c, 2-d, 3-b, 4-a b. 1-a, 2-b, 3-c, 4-d c. 1-c, 2-d, 3-a, 4-b d. 1-d, 2-c, 3-b, 4-a

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- Since this bacterium has the natural ability to transfer T-DNA region of its plasmid into plant genome, upon infection of cells at the wound site, it is also known as the natural genetic engineer of plants.

28. Advantages of Agarose GEL Electrophoresis

- The DNA bands can be readily detected at high sensitivity
- The bands of DNA in the gel are stained with the dye **Ethidium Bromide** and DNA can be detected as visible flourescence illuminated in UV light will give orange fluorescence, which can be photographed.

29. What is ELISA(Enzyme Linked Immuno Sorbent Assay)? write it use.

- Elisa is a diagnostic tool for identification of pathogen species by using antibodies and diagnostic agents
- Use of ELISA in plant pathology especially for weeding out virus infected plants from large scale planting is well known

30. Autoradiography

A technique that captures the image formed in a photographic emulsion due to emission of light or radioactivity from a labelled component placed together with unexposed film

31. Genome editing and CRISPR cas9

- Genome editing is a group of technologies that has the ability to change and organism'DNA
- These technologies allow genetic material to be added, removed, or altered at particular locations in the genome

32. What are the ways by which crops can be modified to be glyphosate-tolerant?

- One strategy is to incorporate a soil bacterium gene that produces a glyphosate tolerant form of EPSPS(5-enopyruvate shikimate-3 phosphate synthase)
- Another way is to incorporate a different soil bacterium gene that produces a glyphosate degrading enzyme.

33. Write the role of Cry group of endotoxin

- When insects eat the cotton plant the Cry toxin are dissolved in the insect's stomach
- The epithelial membranes of the gut block certain vital nutrients thereby sufficient regulation of potassium ions are lost in the insects and results in the death of epithelial cells in the intestine membrane which leads to the death of the larvae

34. Disadvantages of Bt cotton

- Cost of Bt cotton seed is high
- Effectiveness up to 120 days after that efficiency is reduced
- Affects pollinating insects and thus yield

35. Write the method of normal Brinjal converted into Bt Brinjal

The insertion of the crystal protein gene(Cry1Ac), along with other genetic elements such as promoters, terminators and an antibiotic resistance marker gene into the brinjal plant is accomplished using Agrobacterium-mediated genetic transformation.

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2. **Selectable marker:** In addition to **ori** the vector requires a selectable marker, which helps in identifying and eliminating non-transformants and selectively permitting the growth of the transformants

3. **Cloning sites:** In order to link the alien DNA, the vector needs to have very few, preferably single, recognition sites for the commonly used restriction enzymes.

4. Explain Replica plating technique

- A technique in which the pattern of colonies growing on a culture plate is copied
- A sterile filter plate is pressed against the culture plate and then lifted. Then the filter is pressed against a second sterile culture plate
- This results in the new plate being infected with cell in the same relative positions as the colonies in the original plate
- Usually, the medium used in the second plate will differ from that used in the first
- It may include an antibiotic or exclude a growth factor. In this way, transformed cells can be selected.
- Then it is incubated at a specific temperature for the specified time
- The incubation may either be aerobic or anaerobic
- Withdrawal of product using downstream processing methods

5. Explain Insertional Inactivation - Blue-White Colony Selection Method.

- It is a powerful method used for screening of recombinant plasmid
- In this method, a reported gene **lacZ** is inserted in the vector.
- The lacZ encodes the - β galactosidase and contains several recognition sites for restriction enzyme
- β - galactosidase breaks a synthetic substrate called X-gal (5bromo-4-chloro-indolyl- - D-galacto-pyranoside) into an insoluble blue coloured product
- If a foreign gene will be inactivated. Therefore, no-blue colour will develop(white) because -galactosidase is not synthesized due to activation of lacZ
- Therefore, the host cell containing r-DNA form white coloured colonies on the medium contain X-gal, whereas the other cells containing non-recombinant DNA will develop the blue coloured colonies
- On the basis of colony colour, the recombinants can be selected.

6. Write the differences between three types of Blotting Techniques.

	Southern blotting	Northern blotting	Western blotting
Name	Southern name of the inventor	Northern a misnomer	Western a misnomer
Separation of	DNA	RNA	Proteins
Denaturation	Needed	Not needed	Needed
Membrane	Nitrocellulose/ nylon	Amino benzyloxymethyl	Nitrocellulose
Hybridisaiton	DNA-DNA	RNA-DNA	Protein-antibody
Visualising	Autoradiogram	Autoradiogram	Dark room

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39. Identify wrong statement regarding culture of protoplast

1. The cultures are incubated in light 1000-2000 lux at 25 ºC
2. The cell wall formation occurs within 24-48 hours
3. New cells occurs between 2-7 days of culture
4. For solidification a gelling agent such as agar is added

a. 1 and 2 b. 3 and 4 c.1,2 and 3 **d. 4 alone**

40. Match the following:

I. Explant - a. Selected plant tissue transferred to culture medium
II. Differentiation- - b. Reversion of mature cells into meristem
III. Dedifferentiation - c. A cell develop into entire plant
IV. Totipotency - d. Biochemical and structural changes of cells

a. I-a,II-b,III-c,IV-d b. I-d, II-c,III-a,IV-b **c. I-a,II-d,III-b,IV-c** d. I-c,II-d, III-a,IV--b

41. The prevention of large scale loss of biological integrity _____

a. Biopatent **b. Biosafety** c. Bioethics d. Biofuel

41. The phenomenon of reversion of mature cells to meristematic state leading to callus formation is _____

a. Cell suspension culture b. Differentiation
c. Dedifferentiation d. Both b and c

42. Identify the wrong statement:

1. Glasswares and accessories are autoclaved
2. Culture rooms are UV radiated for 15 minutes
3. Explant are surface sterilized
d. Nutrient media must be elctrophoresed

a. 1 only b. 3 and 4 c. 2 and 3 **d. d only**

43. _____ can be useful for the production of secondary metabolites

a. organ culture b. Meristem culture
c. Protoplast culture **d. Cell suspension culture**

44. Which statement is wrong, Regarding laboratory facilities for plant Tissue culture?

a. Washing facilities for glassware
b. Medium preparation room with elctrophoresis
c. High Efficiency Particulate Air filter to maintain aseptic condition
d. Explant culture in a relative humidity of about 60%

45. Identify the correct sequence regarding steps involved in PTC

a. Inoculation - Induction - Sterilization - Hardening - Embryogenesis
b. Sterilization - Incubation - Inoculation - Embryogenesis - Hardening
c. Induction - Incubation - Inoculation - Hardening - Sterilization
d. Sterilization - Inoculation - Incubation - Embryogenesis - Hardening

46. Which of the following statement is correct related to protoplast?

a. Protoplasts are cells with a cell wall
b. It unable to regenerate whole plants from single cell
c. Protoplast not bound by plasma membrane
d. Protoplast develop somatic hybrids

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10. Embryoids

Somatic embryogenesis is the formation of embryos from the callus tissue directly and these embryos are called Embryoids.

11. Define Organogenesis

The morphological changes occur in the callus leading to the formation of shoot and roots is called organogenesis

12. Artificial Seeds

Artificial seeds or synthetic seeds are produced by using embryoids obtained through in vitro culture

13. What are the inert materials are used for coating the somatic embryoids to prepare artificial seeds?

1. Agrose 2. Sodium alginate

14. What is Biosafety?

Biosafety is the prevention of large-scale loss of biological integrity, focusing both on ecology and human health.

15. Define Bioethics

Bioethics refers to the study of ethical issues emerging from advances in biology and medicine

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16. What are the fundamental principles used for Plant Tissue Culture technology?

1. The plant part or explant must be selected and isolated from the rest of plant body
2. The explant must be maintained in controlled physically and chemically defined conditions

17. Write about sterile room in plant tissue culture.

Transfer area sterile room with laminar air-flow bench and a positive pressure ventilation unit called High Efficiency Particulate Air (HEPA) filter to maintain aseptic condition.

18. Write the factors for the success of tissue culture

The success of tissue culture lies in the composition of the growth medium, plant growth regulators and culture conditions such as temperature,pH, light and humidity

19. Uses of Cell Suspension Culture

- Production of secondary metabolites like alkaloids, flavonoids, terpenoids,phenolic compounds
- Production of recombinant proteins

20. Germplasm conservation

Germplasm conservation refers to the conservation of living genetic resources like pollen, seeds or tissue of plant material maintained (OR) Germplasm conservation resources is a part of collection of seeds and pollen that are stored in seed or pollen banks.

21. Name the two banks involve in germplasm conservation

1. Gene bank 2. DNA bank

22. Cryoprotectants

Protective agents like dimethyl sulphoxide, glycerol or sucrose are added before cryopreservation process. These protective agents are called cryoprotectants

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CHAPTER 6

PRINCIPLES OF ECOLOGY

EVALUATION

1. Arrange the correct sequence of ecological hierarchy starting from lower to higher level.

a) Individual organism → Population Landscape → Ecosystem

b) Landscape → Ecosystem → Biome → Biosphere

c) Community → Ecosystem → Landscape → Biome

d) Population → organism → Biome → Landscape

2. Ecology is the study of an individual species is called

i) Community ecology ii) Autecology iii) Species ecology iv) Synecology

a) i only b) ii only c) i and iv only **d) ii and iii only**

3. A specific place in an ecosystem, where an organism lives and performs its functions is

a) habitat **b) niche** c) landscape d) biome

4. Read the given statements and select the correct option.

i) Hydrophytes possess aerenchyma to support themselves in water.

ii) Seeds of Viscum are positively photoblastic as they germinate only in presence of light.

iii)Hygroscopic water is the only soil water available to roots of plant growing in soil as it is present inside the micropores.

iv)High temperature reduces use of water and solute absorption by roots.

a) i, ii, and iii only b) ii, iii and iv

c) ii and iii only **d) i and ii only**

5. Which of the given plant produces cardiac glycosides?

a) Calotropis b) Acacia c) Nepenthes d) Utricularia

6. Read the given statements and select the correct option.

i) Loamy soil is best suited for plant growth as it contains a mixture of silt, sand and clay.

ii) The process of humification is slow in case of organic remains containing a large amount of lignin and cellulose.

iii)Capillary water is the only water available to plant roots as it is present inside the micropores.

iv)Leaves of shade plant have more total chlorophyll per reaction centre, low ratio of chl a and chl b are usually thinner leaves.

a) i, ii and iii only b) ii, iii and iv only c) i, ii and iv only d) ii and iii only.

7. Read the given statements and select the correct option.

Statement A : Cattle do not graze on weeds of Calotropis.

Statement B : Calotropis have thorns and spines, as defense against herbivores.

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41. How is rhytidome act as the structural defence by plants against fire?

- Rhytidome is the structural defense by plants against fire.
- It is composed of multiple layers of suberized periderm, cortical and phloem tissues.
- It protects the stem against fire , water loss, invasion of insects and prevents infections by microorganisms.

42. What is myrmecophily?

- Sometimes, ants take their shelter on some trees such as Mango, Litchi, Jamun, Acacia etc.
- These ants act as body guards of the plants against any disturbing agent. the plants in turn provide food and shelter to these ants. this phenomenon is known as myrmecophily.
- Ex : Acacia and acacia ants.

43. What is seed ball?

- Seed ball is an ancient Japanese technique.
- Encasing seeds in a mixture of clay and soil humus (also in cow dung).
- This method is suitable for barren and degraded lands for tree regeneration.

44. How is anemochory differ from zoochory?

Anemochory	Zoochory
The dispersal fruits and seeds by wind	The dispersal fruits and seeds by Birds, animals and human.
Seeds are minute, have wings, feathery appendages etc.. for wind dispersal.	Seeds and fruit surface may have hooks, sticky hairs etc.. for dispersal

45. What is co evolution?

- 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.
- Eg : Corolla length and proboscis length of butterflies and moths.

46. Explain Raunkiaer classification in the world‟s vegetation based on the temperature.

- Raunkiaer classification in the world‟s vegetation based on the temperature are four types.
  - Megatherms
  - Mesotherms
  - Microtherms
  - Hekistotherms.
- Based on the range of thermal tolerance, organisms are divided into eurythermals and stenothermals.

Eurythermal

- Organisms which can tolerate a wide range of temperature fluctuations.
- Example : Zostera

Stenothermal

- Organisms which can tolerate only small range of temperature variations.
- Example : Mango
- Mango plant does not grow in temperate countries like Canada and Germany.

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8. Define Ecosystem services proposed by Constanza et al.

Ecosystem services are the benefits provided to human,through the transformation of resources (or) Environmental assets including land, water, vegetation and atmosphere into a flow of essential goods and services

9. Name the various type of succession

1. Primary succession
2. Secondary succession
3. Autogenic succession
4. Allogenic succession
5. Autotropic succession
6. Heterotrohic succession

10. Name the three types of plant succession

1. Hydrosere 2. Mesosere 3. Xerosere

11. Name the three types of Xerosere

1. Lithosere 2. Halosere 3. Psammosere

12. Catabolism

The decomposers produce some extracellular enzymes in their surroundings to break down complex organic and inorganic compounds in to simpler ones, This is called catabolism

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13. How can decomposers helpful for plants?

- Decomposers are organisms that decompose the dead plants and animals to release organic and inorganic nutrients into the environment which are again reused by plants
- Ex. Bacteria and Fungi

14. Is energy dissipated during transfer in each trophic level? Justify

- Yes
- Part of the energy obtained from the sun by producers is transferred to consumers and decomposers through each trophic level, while some amount of energy is dissipated in the form of heat.

15. What is the basic unit of an ecosystem? what is its role?

- Food web is the basic unit if an ecosystem,to maintain its stability in nature
- Which is also called homeostasis

16. Why the pyramid of biomass in pond ecosystem is always inverted? justify

In pond ecosystem, the bottom of the pyramid is occupied by producers, which comprise very small organisms possessing the least biomass and so, the value gradually increases towards the tip of the pyramid. Therefore, the pyramid of biomass is always inverted in shape

17. Define Ecosystem Management

It is a process that integrates ecological, socio economic and institutional factors into a comprehensive strategy in order to sustain and enhance the quality of the ecosystem to meet current and future needs

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5. Strategy of ecosystem management

- It is used to maintain biodiversity of ecosystems
- It helps in indicating the damaged ecosystem
- It is used to recognize the inevitability of ecosystem change and plan accordingly
- It one of the tools used for achieving sustainability of ecosystem through sustainable development programme
- It is also helpful in identifying ecosystems which are in need of rehabilitation

6. Characteristics of ecological succession

- It is a systematic process which causes changes in specific structure of plant community
- It is resultant of changes of abiotic and biotic factors
- It transforms unstable community into a stable community
- It progress from simple food chain to complex food web
- It modifies the lower and simple life form to the higher life forms
- It creates inter-dependence of plants and animals

7. Write the differences between primary and secondary succession

	Primary succession	Secondary succession
1	Developing in an barren area	Developing in disturbed area
2	Initiated due to a biological or any other external factors	Starts due to external factors only
3	No soil, while primary succession starts	It starts where soil covers is already present
4	Pioneer species come from outside environment	Pioneer species develop from existing environment
5	It takes more time to complete	It takes comparatively less time to complete

Table 1: Differences between primary and secondary succession

8. Write short note on Biogeochemical cycle

- Exchange of nutrients between organisms and their environment is one of the essential aspects of an ecosystem
- All organisms require nutrients for their growth,development, maintenance and reproduction
- Circulation of nutrients within the ecosystem or biosphere is known as biogeochemical cycle There are two basic types

1. **Gaseous cycle -** It includes atmospheric oxygen,carbon and nitrogen cycles
2. **Sedimentory cycle -** It includes the cycles of phosphrus, sulphur and calcium - which are present as sediments of earth

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- Nutrient cycling between species improves and organic matter is maintained.
- Trees provide micro climate for crops.
- Maintain O2 – CO2 balanced, atmospheric temperature and relative humidity.
- Suitable for dry land. (rainfall is minimum) It is a good system for alternate land use pattern.
- Multipurpose trees are used for wood pulp, tanning, paper and firewood industries.
- Ex : Acacia.
- It can be used as farm forestry, mixed forestry, shelter belts and linear strip plantation.

ADDITIONAL QUESTIONS AND ANSWERS

- The gases that capture heat are called _____ - **Green House Gases**
- Coral bleaching observed in _____ of Tamil Nadu - **Gulf of Mannar**
- Methane is _____ times as effective as Co2 at trapping heat in the atmosphere - **20 times**
- _____ is produced by cars with catalytic converter - **N2O**
- _____ is a region of Earth's atmosphere that absorbs Sun's UV rays - **Ozone layer**
- The thickness of the ozone is measured in terms of _____ - **Dobson Units**
- World Ozone Day is _____ - **September 16**
- Clean Development Mechanism is defined in the _____ protocol - **Kyoto protocol**
- The production of woody plants combined with pasture is referred to _____ system - **Silvopasture**
- The Tank foreshore plantations have been a major source of _____ in T.N - **Firewood**
- The man who single handedly created a dense forest is _____ - **Jadav "Molai" Payeng**
- Forest man of India - **Jadav Payeng**
- Forest man of India award given by - **Indian Institute of forest Management**
- In 2015 he was honoured with - **Padma Shri Award**
- Eichhornia plant decreases the oxygen content of the waterbodies leads - **Eutrophication**
- Chipko movement started by - **Sundarla Bahuguna**
- Number of sacred grooves were documented throughout Tamil Nadu - **448**
- Appiko movement started in _____ state - **Karnataka**
- Any species found restricted to a specified geographical area is referred - **Endemic**
- Carbon capture and storage is also known as _____ - **Geological sequestration**
- _____ is a kind of charcoal used as a soil amendment - **Biochar**
- _____ is a satellite navigation system used to determine the ground position of an object - **Geographic Information system**

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16. Write about the advantages of Alien invasive species - i.e Prosopis juliflora

- It is used to arrest wind erosion and stabilize sand dunes on coastal and desert areas
- It can absorb hazardous chemicals from soil and it is the main source of charcoal

17. What is In-situ conservation ? Write with examples

- It means conservation and management of genetic resources in their natural habitats
- Here the plant or animal species are protected within the existing habitat
- Ex. Forest trees, medicinal and aromatic plants under threat are conserved by this method

17. Uses of sacred groves

These groves provide a number of ecosystem services to the neighbourhood like protecting watershed, fodder, medicinal plants and micro climate control

18. Ex-situ conservation

- It is method of conservation where species are protected outside their natural environment
- This includes establishment of botanical gardens, zoological parks, conservation strategies such as gene, pollen, seed, in-vitro conservation, cryo preservation, seedling, tissue culture and DNA banks

19. What are the important reasons for threatened majority of endemic species?

Majority of endemic species are threatened due to their narrow specific habitat, reduced seed production, low dispersal rate, less viable nature and human interferences

20. Name the plant types have ability to mitigate carbon-di-oxide

1. Macroalgae 2. Marine grasses 3. Mangroves

21. Carbon sink

- Any system having the capacity to accumulate more atmospheric carbon during a given time interval than releasing Co2
- Ex. Forest and Landfills

22. Can lakes sequestration of carbon? Write other services of lakes

- Yes. lakes can sequestration of carbon
- In terms of services lakes offer sustainable solutions to key issues of water management and climatic influences and benefits like nutrient retention, influencing local rainfall, removal of pollutants, phosphorus and nitrogen and carbon sequestration

23. Define Environmental Impact Assessment(EIA)

- Environmental Impact Assessment is an environmental management tool
- It helps to regulate and recommended optimal use of natural resources with minimum impact on ecosystem and biotic communities

24. What is Biodiversity Impact Assessment?

Biodiversity Impact Assessment can be defined as a decision supporting tool to help biodiversity inclusive of development, planning and implementation

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40. Identify the correct statements regarding Hybridization

1. self pollinated crops - Intravarietal hybridization
2. self pollinated and cross pollinated crops - Intervarietal hybridization
3. Gossypium hirsutum X Gossypium arboreum - Intergeneric hybridization
4. Crosses between two different genera is Interspecific hybridization

a. 1 and 3 b. 2 and 4 **c. 1 and 2** d. 3 and 4

41. Identify the incorrect statements regarding polyploidy breeding

1. Polyploidy often increased heterozygosity
2. Decreased tolerance to both biotic and abiotic stresses
3. Buffering of deleterious mutations
4. It reduced fertility due to meiotic error

a. 1 and 3 b. 2 and 4 **c.** 1 and 2 **d. 2 alone**

42. Fine the correct statement regarding seedweed liquid fertilizer

1. It is organic and also eco-friendly 2. It react with metal in the soil
3. It is useful for organic gardening 4. Improves resistance of plants to frost and disease

a. All the above b. 1,2 and 3 c. 2 and 4 d. 1 alone

Match the following:

43.

1. Liquid fertilizer - a. Trichoderma
2. Bio-pesticides - b. provides crabohydrates
3. Green Maunring - c. Increase nitrogen in the soil
4. Beauveria - d. Entomo-pathogenic fungus

a. 1-b, 2-a, 3-d, 4-c b. 1-d, 2-d, 3-b, 4-a **c. 1-b, 2-a, 3-c, 4-d** d. 1-c, 2-d, 3-a, 4-b

44. Identify the wrong pair

a. N2 fixing biofertilizer - Amantia
b. P. Solubilizing biofertilizer - Penicillium
c. P. Mobilizing Biofertilizers - Glomus
d. N2 fixing Bio fertilizer - Anabaena azolla

Find out the ODD word

45. a. Mass selection b. Clonal selection c. Pure-line selection **d. Natural selection**

46. a. Emasculation c. **Bagging** c. Crossing **d. Green manuring**

47. Azolla is best suited biofertilizer for cultivation

a. Wheat b. Cotton c. Sugar cane **d. Paddy**

48. Superiority of hybrids over parents only in vegetative growth but not in yield and adaptation

a. Euheterosis b. Mutational Euheterosis
c. Balanced Euheterosis **d. Pseudoheterosis**

49. Species are renewable sources that have provided food and other benefits to human

a. Domesticated b. Wild c. Amphibious d. Xerophytic

50. Plant breeding methods

a. Genetic Engineering b.Plant tissue culture
c. Protoplasmic fusion **d. All the above**

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FOR CENTUM SCORERS

11. Relationship between humans and plants

- From the every early times, human beings have co-existed with plants which played a vital role in their survival
- Through a long process of trial and error, our ancestors have selected hundreds of wild plants from the various parts of the world for their specific use
- The knowledge of the plants and its applications have led to the development of the humans and their civilization in many ways

12. Differentiate Green in-situ manuring and Green leaf manuring

- Green in-situ manuring refers to the growing of green manuring crops in the border rows or as intercrops along with the main crops. Ex. Green gram
- Green leaf manuring is the application of green leaves and twigs of trees, shrubs, plants growing in wastelands and field bunds. Ex. Pongamia

13. Name the techniques were designed to develop improved crop varieties based on the principles of genetics and cytognetics breeding methods

♦ Selection ♦ Introduction ♦ Hybridization ♦ Ploidy ♦ Mutation ♦ Tissue culture

14. Conventional Plant Breeding Methods

It develops new plant varieties by the process of selection and seeks to achieve expression of genetic material which is already present within the species

15. How can be examined during Plant Introduction? Justify

- All the introductions must be free from presence of weeds, insects and disease causing organisms . This has be carefully examined by the process called ' quarantine'
- Quarantine, a strict isolation imposed to prevent the spread of disease

16. What is Secondary introduction?

When the introduced variety is subjected to selection to isolate a superior variety and hybridised with a local variety to transfer one or a few characters to them

17. Define Mass selection

In mass selection a large number of plants of similar phenotype or morphological characters are selected and their seeds are mixed together to constitute a new variety

18. Disadvantage of pureline selection

- This type is that the new genotypes are never created
- Never created and they are less adaptable and
- Less stable to the environmental fluctuations

19. Mutational Euheterosis

Simplest type of euheterosis and results from the sheltering or eliminating of the deleterious, unfavourable often lethal, recessive, mutant genes by their adaptively superior dominant alleles in cross pollinated crops

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CHAPTER 10 ECONOMICALLY USEFUL PLANTS AND ENTREPRENEURIAL BOTANY

EVALUATION

1. Consider the following statements and choose the right option.
i) Cereals are members of grass family.
ii) Most of the food grains come from monocotyledon.
a) (i) is correct and (ii) is wrong **b) Both (i) and (ii) are correct**
c) (i) is wrong and (ii) is correct d) Both (i) and (ii) are wrong

2. Assertion : Vegetables are important part of healthy eating.
Reason : Vegetables are succulent structures of plants with pleasant aroma and flavours.
a) Assertion is correct, Reason is wrong b) Assertion is wrong, Reason is correct
c) Both are correct and reason is the correct explanation for assertion.
d) Both are correct and reason is not the correct explanation for assertion.

3. Groundnut is native of
a) Philippines b) India c) North America **d) Brazil**

4. Statement A: Coffee contains caffeine Statement B: Drinking coffee enhances cancer
a) A is correct, B is wrong b) A and B – Both are correct
c) A is wrong, B is correct d) A and B – Both are wrong

5. Tectona grandis is coming under family
a) Lamiaceae b) Fabaceae c) Dipterocaipaceae d) Ebenaceae

6. Tamarindus indica is indigenous to
a) Tropical African region b) South India, Sri Lanka
c) South America, Greece d) India alone

7. New world species of cotton
a) Gossipium arboretum b) G.herbaceum
c) Both a and b **d) G.barbadense**

8. Assertion : Turmeric fights various kinds of cancer
Reason : Curcumin is an anti-oxidant present in turmeric
a) Assertion is correct, Reason is wrong b) Assertion is wrong, Reason is correct
c) Both are correct d) Both are wrong

9. Find out the correctly matched pair.
a) Rubber - Shorea robusta **b) Dye - Lawsonia inermis**
c) Timber - Cyperus papyrus d) Pulp - Hevea brasiliensis

10. Observe the following statements and pick out the right option from the following
Statement I – Perfumes are manufactured from essential oils.
Statement II – Essential oils are formed at different parts of the plants.

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67. Identify the correct statements regarding Sorghum

1. Rich in calcium and Iron
2. Source of fermented alcoholic beverage
3. Have less glycemic index
4. Popular nutrient drink

a. 1 and 2 b. 3 and 4 c. 1,2 and 3 d. 1,2 and 4

68. Identify the wrong statement regarding Foxtail millet

1. Strenthening of heart
2. Given to lactating mother
3. Reduce blood sugar
4. Good diuretic and cures constipation

a. 1 and 2 **b. 3 and 4** c. 1,2 and 3 d. 1,2 and 4

69. Identify the correct statement

a. Pepper also enhances the bio-absorption of medicines
b. Curcumin is a very good anti-oxidant
c. Capsaicin used in pain reliving palms
d. All the above

70. Aloe vera has these properties such as

1. Antibacterial 2. Antioxidant 3. Antifungal 4. Antiseptic

a. 1 and 2 b. 3 and 4 c. 1,2 and 3 **d. All the above**

Match the following :

71.
1. Coffee - a. Poaceae
2. Groundnut - b. Arecaceae
3. Palmyra - c. Fabaceaee
4. Sugarcane - d. Rubiaceae

a. 1-a, 2-b, 3-c, 4-d b. 1-d, 2-c, 3-a, 4-b **c. 1-d, 2-c, 3-b, 4-a** d. 1-b, 2-a, 3-d, 4-c

72.
1. Turmeric - a. Solanaceae
2. Chillies - b. Piperaceae
3. Cardamom - c. Malvaceae
4. Cotton - d. Zingiberaceae

a. 1-a, 2-b, 3-c, 4-d **b. 1-d, 2-a, 3-d, 4-c** c. 1-d, 2-c, 3-b, 4-a d. 1-b, 2-a, 3-d, 4-c

73. 1. King of Spices - a. Cardamom 2. Dates of India - b. Nilavembu
3. King of Bitter - c. Tamarind 4. Mouth freshener - d. Pepper

a. 1-a, 2-b, 3-c, 4-d b. 1-d, 2-c, 3-a, 4-b **c. 1-d, 2-c, 3-b, 4-a** d. 1-b, 2-a, 3-d, 4-c

Very Short Answers (2 Marks)

1. Name the nutrients provided by cereals

The nutrients provided by cereals include carbohydrates, proteins, fibres and a wide range of vitamins and minerals

2. Name the two types of cereals

1. Major cereals 2. Minor cereals

3. Write the uses of Foxtail millet

- It supports in strengthening of heart and improves eye sight
- Thinai porridge is given to lactating mother

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