Asexual and Sexual Reproduction in Plants

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. Pollen tube was discovered by

a) J.G.Kolreuter b) G.B.Amici

c) E.Strasburger d) E.Hanning

5. Size of pollen grain in Myosotis

a) 10 micrometer b) 20 micrometer

c) 200 micrometer d) 2000 micrometer

6. First cell of male gametophyte in angiosperm is

a) Microspore b) megaspore

c) Nucleus d) Primary Endosperm Nucleus

7. 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

a)I-iv;II-i;III-ii;IV-iii b)I-iii;II-iv;III-i;IV-ii

c)I-iii;II-iv;III-ii,IV-i d)I-iii;II-i;III-iv;IV-ii

8. 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

9. 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

10. Assertion : Sporopollenin preserves pollen in fossil deposits

Reason : Sporopollenin is resistant to physical and biological decomposition

a) assertion is true; reason is false

b) assertion is false; reason is true

c) Both Assertion and reason are not true

d) Both Assertion and reason are true.

11. Choose the correct statement(s) about tenuinucellate ovule

a) Sporogenous cell is hypodermal

b) Ovules have fairly large nucellus

c) sporogenous cell is epidermal

d) ovules have single layer of nucellus tissue

12. Which of the following represent megagametophyte

a) Ovule b)Embryo sac c)Nucellus d)Endosperm

13. In Haplopappus gracilis, number of chromosomes in cells of nucellus is 4 What will be the chromosome number in Primary endosperm cell?

a)8 b)12 c)6 d)2

14. Transmitting tissue is found in

a) Micropylar region of ovule b) Pollen tube wall

c) Stylar region of gynoecium d) Integument

15. The scar left by funiculus in the seed is

a)tegmen b)radicle c)epicotyl d)hilum

16. A Plant called X possesses small flower with reduced perianth and versatile anther. The probable agent for pollination would be

a)water b)air c)butterflies d)beetles

17. Consider the following statement(s)

i) In Protandrous flowers pistil matures earlier

ii) In Protogynous flowers pistil matures earlier

iii) Herkogamy is noticed in unisexual flowers

iv) Distyly is present in Primula

a) i and ii are correct b) ii and iv are correct

c) ii and iii are correct d) i and iv are correct

18. Coelorhiza is found in

a)Paddy b)Bean c)Pea d)Tridax

19. Parthenocarpic fruits lack

a)Endocarp b)Epicarp c)Mesocarp d) seed

20. In majority of plants pollen is liberated at

a) 1 celled stage b) 2 celled stage

c) 3 celled stage d) 4 celled stage

21. What is reproduction?

22. Mention the contribution of Hofmeister towards Embryology.

23. List out two sub-aerial stem modifications with example.

24. What is layering?

25. What are clones?

26. A detached leaf of Bryophyllum produces new plants. How?

27. Differentiate Grafting and Layering.

28. “Tissue culture is the best method for propagating rare and endangered plant species”- Discuss.

29. Distinguish mound layering and air layering.

30. Explain the conventional methods adopted in vegetative propagation of higher plants.

31. Highlight the milestones from the history of plant embryology.

32. Discuss the importance of Modern methods in reproduction of plants.

33. What is Cantharophily.

34. List any two strategy adopted by bisexual flowers to prevent self-pollination.

35. What is endothelium.

36. “The endosperm of angiosperm is different from gymnosperm”. Do you agree. Justify your answer.

37. Define the term Diplospory.

38. What is polyembryony. How it can commercially exploited.

39. Why does the zygote divides only after the division of Primary endosperm cell.

40. What is Mellitophily?

41. "Endothecium is associated with dehiscence of anther" Justify the statement.

42. List out the functions of tapetum.

43. Write short note on Pollen kitt.

44. Distinguish tenuinucellate and crassinucellate ovules.

45. 'Pollination in Gymnosperms is different from Angiosperms' – Give reasons.

46. Write short note on Heterostyly.

47. Enumerate the characteristic features of Entomophilous flowers

48. Discuss the steps involved in Microsporogenesis.

49. With a suitable diagram explain the structure of an ovule.

50. Give a concise account on steps involved in fertilization of an angiosperm plant.

51. What is endosperm. Explain the types.

52. Differentiate the structure of Dicot and Monocot seed.

53. Give a detailed account on parthenocarpy. Add a note on its significance.

CLASSICAL GENETICS

1. Extra nuclear inheritance is a consequence of presence of genes in

a) Mitrochondria and chloroplasts

b) Endoplasmic reticulum and mitrochondria

c) Ribosomes and chloroplast

d) Lysososmes and ribosomes

2. In order to find out the different types of gametes produced by a pea plant having the genotype AaBb, it should be crossed to a plant with the genotype

a) aaBB b) AaBB c) AABB d) aabb

3. How many different kinds of gametes will be produced by a plant having the genotype AABbCC?

a) Three b) Four c) Nine d) Two

4. Which one of the following is an example of polygenic inheritance?

a) Flower colour in Mirabilis Jalapa

b) Production of male honey bee

c) Pod shape in garden pea

d) Skin Colour in humans

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

a) Only round seeds with green cotyledons

b) Only wrinkled seeds with yellow cotyledons

c) Only wrinkled seeds with green cotyledons

d) Round seeds with yellow cotyledons an wrinkled seeds with yellow cotyledons

6. Test cross involves

a) Crossing between two genotypes with recessive trait

b) Crossing between two F1 hybrids

c) Crossing the F1 hybrid with a double recessive genotype

d) Crossing between two genotypes with dominant trait

7. In pea plants, yellow seeds are dominant to green. If a heterozygous yellow seed pant is crossed with a green seeded plant, what ratio of yellow and green seeded plants would you expect in F1 generation?

a) 9:1 b) 1:3 c) 3:1 d) 50:50

8. The genotype of a plant showing the dominant phenotype can be determined by

a) Back cross b) Test cross

c) Dihybrid corss d) Pedigree analysis

9. Select the correct statement from the ones given below with respect to dihydrid cross

a) Tightly linked genes on the same chromosomes show very few combinations

b) Tightly linked genes on the same chromosomes show higher combinations

c) Genes far apart on the same chromosomes show very few recombinations

d) Genes loosely linked on the same chromosomes show similar recombinations as the tightly linked ones

10. Which Mendelian idea is depicted by a cross in which the F1 generation resembles both the parents

a) Incomplete dominance b) Law of dominance

c) Inheritance of one gene d) Co-dominance

11. Fruit colour in squash is an example of

a) Recessive epistatsis b) Dominant epistasis

c) Complementary genes d) Inhibitory genes

12. In his classic experiments on Pea plants, Mendel did not use

a) Flowering position b) Seed colour

c) Pod length d) Seed shape

13. The epistatic effect, in which the dihybrid cross 9:3:3:1 between AaBb Aabb is modified as

a) Dominance of one allele on another allele of both loci

b) Interaction between two alleles of different loci

c) Dominance of one allele to another alleles of same loci

d) Interaction between two alleles of some loci

14. In a test cross involving F1 dihybrid flies, more parental type offspring were produced than the recombination type offspring. This indicates

a) The two genes are located on two different chromosomes

b) Chromosomes failed to separate during meiosis

c) The two genes are linked and present on the some chromosome

d) Both of the characters are controlled by more than one gene

15. The genes controlling the seven pea characters studied by Mendel are known to be located on how many different chromosomes?

a) Seven b) Six c) Five d) Four

16. Which of the following explains how progeny can posses the combinations of traits that none of the parent possessed?

a) Law of segregation b) Chromosome theory

c) Law of independent assortment

d) Polygenic inheritance

17. "Gametes are never hybrid". This is a statement of

a) Law of dominance

b) Law of independent assortment

c) Law of segregation

d) Law of random fertilization

18. Gene which suppresses other genes activity but does not lie on the same locus is called as

a) Epistatic b) Supplement only

c) Hypostatic d) Codominant

19. Pure tall plants are crossed with pure dwarf plants. In the F1 generation, all plants were tall. These tall plants of F1 generation were selfed and the ratio of tall to dwarf plants obtained was 3:1. This is called

a) Dominance b) Inheritance

c) Codominance d) Heredity

20. The dominant epistatis ratio is

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

21. Select the period for Mendel's hybridization experiments

a) 1856 - 1863 b) 1850 - 1870

c) 1857 - 1869 d) 1870 - 1877

22. Among the following characters which one was not considered by Mendel in his experimentation pea?

a) Stem – Tall or dwarf

b) Trichomal glandular or non-glandular

c) Seed – Green or yellow

d) Pod – Inflated or constricted

23. Name the seven contrasting traits of Mendel.

24. What is meant by true breeding or pure breeding lines / strain?

25. Give the names of the scientists who rediscovered Mendelism.

26. What is back cross?

27. Define Genetics.

28. What are multiple alleles

29. What are the reasons for Mendel's successes in his breeding experiment?

30. Explain the law of dominance in monohybrid cross.

31. Differentiate incomplete dominance and codominance.

32. What is meant by cytoplasmic inheritance

33. Describe dominant epistasis with an example.

34. Explain polygenic inheritance with an example.

35. Differentiate continuous variation with discontinuous variation.

36. Explain with an example how single genes affect multiple traits and alleles the phenotype of an organism.

37. Bring out the inheritance of chloroplast gene with an example.

CHROMOSOMAL BASIS OF INHERITANCE

1. An allohexaploidy contains

a) Six different genomes

b) Six copies of three different genomes

c) Two copies of three different genomes

d) Six copies of one genome

2. The A and B genes are 10 cM apart on a chromosome. If an AB/ab heterozygote is testcrossed to ab/ab, how many of each progeny class would you expect out of 100 total progeny?

a) 25 AB, 25 ab, 25 Ab, 25 aB

b) 10 AB, 10 ab

c) 45 AB, 45 ab

d) 45 AB, 45 ab, 5 Ab, 5aB

3. Match list I with list II

List I	List II
A. A pair of chromosomes extra with diploid	i) monosomy
B. One chromosome extra to the diploid	ii) tetrasomy
C. One chromosome loses from diploid	iii) trisomy
D. Two individual chromosomes lose from diploid	iv) double monosomy

a) A-i, B-iii, C-ii, D-iv b) A-ii, B-iii, C-iv, D-i
c) A-ii, B-iii, C-i, D-iv d) A-iii, B-ii, C-i, D-iv

4. Which of the following sentences are correct?

1. The offspring exhibit only parental combinations due to incomplete linkage

2. The linked genes exhibit some crossing over in complete linkage

3. The separation of two linked genes are possible in incomplete linkage

4. Crossing over is absent in complete linkage

a) 1 and 2 b) 2 and 3 c) 3 and 4 d) 1 and 4

5. Accurate mapping of genes can be done by three point test cross because increases

a) Possibility of single cross over

b) Possibility of double cross over

c) Possibility of multiple cross over

d) Possibility of recombination frequency

6. Due to incomplete linkage in maize, the ratio of parental and recombinants are

a) 50:50 b) 7:1:1:7 c) 96.4: 3.6 d) 1:7:7:1

7. Genes G S L H are located on same chromosome. The recombination percentage is between L and G is 15%, S and L is 50%, H and S are 20%. The correct order of genes is

a) GHSL b) SHGL c) SGHL d) HSLG

8. The point mutation sequence for transition, transition, transversion and transversion in DNA are

a) A to T, T to A, C to G and G to C

b) A to G, C to T, C to G and T to A

c) C to G, A to G, T to A and G to A

d) G to C, A to T, T to A and C to G

9. If haploid number in a cell is 18. The double monosomic and trisomic number will be

a) 35 and 37 b) 34 and 35

c) 37 and 35 d) 17 and 19

10. Changing the codon AGC to AGA represents

a) missense mutation b) nonsense mutation

c) frameshift mutation d) deletion mutation

11. Assertion (A): Gamma rays are generally use to induce mutation in wheat varieties.

Reason (R): Because they carry lower energy to non-ionize electrons from atom

a) A is correct. R is correct explanation of A

b) A is correct. R is not correct explanation of A

c) A is correct. R is wrong explanation of A

d) A and R is wrong

12. How many map units separate two alleles A and B if the recombination frequency is 0.09?

a) 900 cM b) 90 cM c) 9 cM d) 0.9 cM

13. When two different genes came from same parent they tend to remain together.

i) What is the name of this phenomenon?

ii) Draw the cross with suitable example.

iii) Write the observed phenotypic ratio.

14. If you cross dominant genotype PV/PV male Drosophila with double recessive female and obtain F1 hybrid. Now you cross F1 male with double recessive female.

i) What type of linkage is seen?

ii) Draw the cross with correct genotype.

iii) What is the possible genotype in F2 generation?

15.

S. no	Gamete types	Number of progenies
1.	ABC	349
2.	Abc	114
3.	abC	124
4.	AbC	5
5.	aBc	4
6.	aBC	116
7.	ABc	128
8.	abc	360

i) What is the name of this test cross?

ii) How will you construct gene mapping from the above given data?

iii) Find out the correct order of genes.

16. What is the difference between missense and nonsense mutation?

17. 

From the above figure identify the type of mutation and explain it.

18. Write the salient features of Sutton and Boveri concept.

19. Explain the mechanism of crossing over.

20. Write the steps involved in molecular mechanism of DNA recombination with diagram.

21. How is Nicotiana exhibit selfincompatibility. Explain its mechanism.

22. How sex is determined in monoecious plants. write their genes involved in it.

23. What is gene mapping? Write its uses.

24. Draw the diagram of different types of aneuploidy.

25. Mention the name of man-made cereal. How it is formed?

PRINCIPLES AND PROCESSES OF BIOTECHNOLOGY

1. Restriction enzymes are

a. Not always required in genetic engineering

b. Essential tools in genetic engineering

c. Nucleases that cleave DNA at specific sites

d. both b and c

2. Plasmids are

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

3. EcoRI cleaves DNA at

a. AGGGTT b. GTATATC

c. GAATTC d. TATAGC

4. Genetic engineering is

a. making artificial genes.

b. hybridization of DNA of one organism to that of the others.

c. production of alcohol by using micro organisms.

d. making artificial limbs, diagnostic instruments such as ECG, EEG etc.,

5. Consider the following statements:

I. Recombinant DNA technology is popularly known as genetic engineering is a stream of biotechnology which deals with the manipulation of genetic materials by man invitro

II. pBR322 is the first artificial cloning vector developed in 1977 by Boliver and Rodriguez from E.coli plasmid

III. Restriction enzymes belongs to a classof enzymes called nucleases.

Choose the correct option regarding above statements

a. I & II b. I & III c. II & III d. I,II & III

6. The process of recombinant DNA technology has the following steps

I. amplication of the gene

II. Insertion of recombinant DNA into the host cells

III. Cutting of DNA at specific location using restriction enzyme .

IV. Isolation of genetic material (DNA) Pick out the correct sequence of step for recombinant DNA technology.

a. II, III, IV, I b. IV, II, III, I

c. I, II, III, IV d. IV, III, I, II

7. Which one of the following palindromic base sequence in DNA can be easily cut at about the middle by some particular restriction enzymes?

a. 5 CGTTCG 3 3 ATCGTA 5

b. 5 GATATG 3 3 CTACTA 5

c. 5 GAATTC 3 3 CTTAAG 5

d. 5 CACGTA 3 3 CTCAGT 5

8. pBR 322, BR stands for

a. Plasmid Bacterial Recombination

b. Plasmid Bacterial Replication

c. Plasmid Boliver and Rodriguez

d. Plasmid Baltimore and Rodriguez

9. Which of the following one is used as a Biosensors?

a. Electrophoresis b. Bioreactors

c. Vectors d. Electroporation

10. Match the following :

Column A	Column B
1 Exonuclease	a. add or remove phosphate
2 Endonuclease	b. binding the DNA fragments
3 Alkaline Phosphatase	c. cut the DNA at terminus
4 Ligase	d. cut the DNA at middle

	1	2	3	4
A)	a	b	c	d
B)	c	d	b	a
C)	a	c	b	d
D)	c	d	a	b

11. In which techniques Ethidium Bromide is used?

a. Southern Blotting techniques

b. Western Blotting techniques

c. Polymerase Chain Reaction

d. Agrose Gel Electroporosis

12. Assertion : Agrobacterium tumifaciens is popular in genetic engineering because this bacteriumis associated with the root nodules of all cereals and pulse crops

Reason: A gene incorporated in the bacterial chromosomal genome gets atomatically transferred to the cross with which bacterium is associated.

a) Both assertion and reason are true. But reason is correct explanation of assertion.

b) Both assertion and reason are true. But reason is not correct explanation of assertion.

c) Assertion is true, but reason is false.

d) Assertion is false, but reason is true.

e) Both assertion and reason are false.

13 Which one of the following is not correct statement.

a) Ti plasmid causes the bunchy top disease

b) Multiple cloning site is known as Polylinker

c) Non viral method transfection of Nucleic acid in cell

d) Polylactic acid is a kind of biodegradable and bioactive thermoplastic.

14. An analysis of chromosomal DNA using the southern hybridisation technique does not use

a) Electrophoresis b) Blotting

c) Autoradiography

d) Polymerase Chain Reaction

15. An antibiotic gene in a vector usually helps in the selection of

a) Competent cells b) Transformed cells

c) Recombinant cells d) None of the above

16. Some of the characteristics of Bt cotton are

a) Long fibre and resistant to aphids

b) Medium yield, long fibre and resistant to beetle pests

c) high yield and production of toxic protein crystals which kill dipteran pests.

d) High yield and resistant to ball worms

17. How do you use the biotechnology in modern practice?

18. What are the materials used to grow microorganism like Spirulina?

19. You are working in a biotechnology lab with a becterium namely E.coli. How will you cut the nucleotide sequence? explain it.

20. What are the enzymes you can used to cut terminal end and internal phospho di ester bond of nucleotide sequence?

21. Name the chemicals used in gene transfer.

22. What do you know about the word pBR332?

23. Mention the application of Biotechnology.

24. What are restriction enzyme. Mention their type with role in Biotechnology.

25. Is their any possibilities to transfer a suitable desirable gene to host plant without vector? Justify your answer.

26. How will you identify a vectors?

27. Compare the various types of Blotting techniques.

28. Write the advantages of herbicide tolerant crops.

29. Write the advantages and disadvantages of Bt cotton.

30. What is bioremediation? give some examples of bioremediation.

31. Write the benefits and risk of Genetically Modified Foods.

PLANT TISSUE CULTURE

Choose the correct answer from the given option:

1. Totipotency refers to

a) capacity to generate genetically identical plants.

b) capacity to generate a whole plant from any plant cell / explant.

c) capacity to generate hybrid protoplasts.

d) recovery of healthy plants from diseased plants.

2. Micro propagation involves

a) vegetative multiplication of plants by using micro-organisms.

b) vegetative multiplication of plants by using small explants.

c) vegetative multiplication of plants by using microspores.

d) Non-vegetative multiplication of plants by using microspores and megaspores.

3. Match the following :

Column A	Column B
1) Totipotency	A) Reversion of mature cells into meristerm
2) Dedifferentiation	B) Biochemical and structural changes of cells
3) Explant	C) Properties of living cells develops into entire plant
4) Differentiation	D) Selected plant tissue transferred to culture medium

	1	2	3	4
a)	C	A	D	B
b)	A	C	B	D
c)	B	A	D	C
d)	D	B	C	A

4. The time duration for sterilization process by using autoclave is _____ minutes and the temperature is _____

a) 10 to 30 minutes and 125° C

b) 15 to 30 minutes and 121° C

c) 15 to 20 minutes and 125° C

d) 10 to 20 minutes and 121° C

5. Which of the following statement is correct

a) Agar is not extracted from marine algae such as seaweeds.

b) Callus undergoes differentiation and produces somatic embryoids.

c) Surface sterilization of explants is done by using mercuric bromide

d) PH of the culture medium is 5.0 to 6.0 6. Select the incorrect statement from given statement

a) A tonic used for cardiac arrest is obtained from Digitalis purpuria

b) Medicine used to treat Rheumatic pain is extracted from Capsicum annum

c) An anti malarial drug is isolated from Cinchona officinalis.

d) Anti-cancinogenic property is not seen in Catharanthus roseus.

7. Virus free plants are developed from

a) Organ culture b) Meristem culture

c) Protoplast culture d) Cell suspension culture

8. The prevention of large scale loss of biological interity

a) Biopatent b) Bioethics c) Biosafety d) Biofuel

9. Cryopreservation means it is a process to preserve plant cells, tissues or organs

a) at very low temperature by using ether.

b) at very high temperature by using liquid nitrogen

c) at very low temperature of -196 by using liquid nitrogen

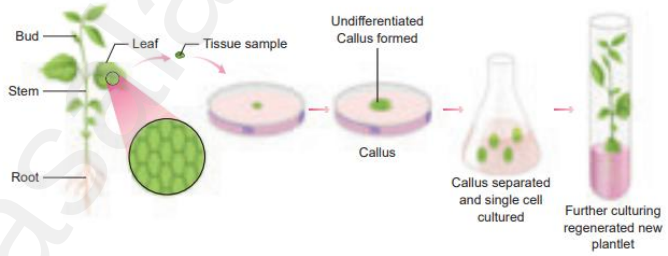
d) at very low temperature by using liquid nitrogen

10. Solidifying agent used in plant tissue culture is

a) Nicotinic acid b) Cobaltous chloride

c) EDTA d) Agar

11. What is the name of the process given below? Write its 4 types.



12. How will you avoid the growing of microbes in nutrient medium during culture process? What are the techniques used to remove the microbes?

13. Write the various steps involved in cell suspension culture.

14. What do you mean Embryoids? Write its application.

15. Give the examples for micro propagation performed plants .

16. Explain the basic concepts involved in plant tissue culture.

17. Based on the material used, how will you classify the culture technology? Explain it.

18. Give an account on Cryopreservation.

19. What do you know about Germplasm conservation. Describe it.

20. Write the protocol for artificial seed preparation.

PRINCIPLES OF ECOLOGY

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.

a) Both statements A and B are incorrect.

b) Statement A is correct but statement B is incorrect.

c) Both statements A and B are correct but statement B is not the correct explanation of statement A.

d) Both statements A and B are correct and statement B is the correct explanation of statement A.

8. In soil water available for plants is

a) gravitational water b) chemically bound water

c) capillary water d) hygroscopic water

9. Read the following statements and fill up the blanks with correct option.

i) Total soil water content in soil is called _____

ii) Soil water not available to plants is called _____

iii) Soil water available to plants is called _____

	(i)	(ii)	(iii)
(a)	Holard	Echard	Chresard
(b)	Echard	Holard	Chresard
(c)	Chresard	Echard	Holard
(d)	Holard	Chresard	Echard

10. Column I represent the size of the soil particles and Column II represents type of soil components. Which of the following is correct match for the Column I and Column IL

Column - I	Column - II
I). 0.2 to 2.00 mm	i) Slit soil
II) Less than 0.002 mm	ii) Clayey soil
III) 0.002 to 0.02 mm	iii) Sandy soil
IV) 0.002 to 0.2 mm	iv) Loamy soil

	I	II	III	IV
a)	ii	iii	iv	i
b)	iv	i	iii	ii
c)	iii	ii	i	iv
d)	None of the above			

11. The plant of this group are adapted to live partly in water and partly above substratum and free from water

a) Xerophytes b) Mesophytes

c) Hydrophytes d) Halophytes

12 . Identify the A, B, C and D in the given table

Interaction	Effects on species X	Effects on species Y
Mutualism	A	(+)
B	(+)	(-)
Competition	(-)	C
D	(-)	0

	A	B	C	D
a)	(+)	Parasitism	(-)	Amensalism
b)	(-)	Mutalism	(+)	Competition
c)	(+)	Competition	(0)	Mutalism
d)	(0)	Amensalism	(+)	Parasitism

13. Ophrys an orchid resembling the female of an insect so as to able to get pollinated is due to phenomenon of

a) Myrmecophily b) Ecological equivalents

c) Mimicry d) None of these

14. A free living nitrogen fixing cyanobacterium which can also form symbiotic association with the water fern Azolla

a) Nostoc b) Anabaena c) chlorella d) Rhizobium

15. Pedogenesis refers to

a) Fossils b) Water c) Population d) Soil

16. Mycorrhiza promotes plant growth by

a) Serving as a plant growth regulators

b) Absorbing inorganic ions from soil

c) Helping the plant in utilizing atmospheric nitrogen

d) Protecting the plant from infection

17. Which of the following plant has a nonsucculent xerophytic and thick leathery leaves with waxy coating

a) Bryophyllum b) Ruscus

c) Nerium d) Calotropis

18. In a fresh water environment like pond, rooted autotrophs are

a) Nymphaea and typha

b) Ceratophyllum and Utricularia

c) Wolffia and pistia d) Azolla and lemna

19. Match the following and choose the correct combination from the options given below:

Column I (Interaction)	Column II (Examples)
I. Mutualism	i). *Trichoderma* and *Penicillium*
II. Commensalism	ii). *Balanophora*, *Orobanche*
III. Parasitism	iii). *Orchids* and *Ferns*
IV. Predation	iv). *Lichen* and *Mycorrhiza*
V. Amensalism	v). *Nepenthes* and *Diaonaea*

	I	II	III	IV	V
a)	i	ii	iii	iv	v
b)	ii	iii	iv	v	i
c)	iii	iv	v	i	ii
d)	iv	iii	ii	v	i

20. Strong, sharp spines that get attached to animal's feet are found in the fruits of

a) Argemone b) Ecballium

c) Heritier d) Crossandra

21. Sticky glands of Boerhaavia and Cleome support

a) Anemochory b) Zoochory

c) Autochory d) Hydrochory

22. Define ecology.

23. What is ecological hierarchy? Name the levels of ecological hierarchy.

24. What are ecological equivalents? Give one example .

25. Distinguish habitat and niche

26. Why are some organisms called as eurythermals and some others as stenohaline ?

27. 'Green algae are not likely to be found in the deepest strata of the ocean'. Give at least one

28. What is Phytoremediation ?

29. What is Albedo effect and write their effects?

30. The organic horizon is generally absent from agricultural soils because tilling, e.g., plowing, buries organic matter. Why is an organic horizon generally absent in desert soils ?

31. Soil formation can be initiated by biological organisms. Explain how?

32. Sandy soil is not suitable for cultivation. Explain why?

33. Describe the mutual relationship between the fig and wasp and comment on the phenomenon that operates in this relationship.

34. Lichen is considered as a good example of obligate mutualism. Explain.

35. What is mutualism? Mention any two example where the organisms involved are commercially exploited in modern agriculture.

36. List any two adaptive features evolved in parasites enabling them to live successfully on their host?

37. Mention any two significant roles of predation plays in nature.

38. How does an orchid ophrys ensures its pollination by bees ?

39. Water is very essential for life. Write any three features for plants which enable them to survive in water scarce environment.

40. Why do submerged plants receive weak illumination than exposed floating plants in a lake?

41. What is vivipary? Name a plant group which exhibits vivipary

42. What is thermal stratification? Mention their types.

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

44. What is myrmecophily?

45. What is seed ball?

46. How is anemochory differ from zoochory?

47. What is co evolution?

48. Explain Raunkiaer classification in the world's vegetation based on the temperature.

49. List out the effects of fire to plants.

50. What is soil profile? Explain the characters of different soil horizons.

51. Give an account of various types of parasitism with examples.

52. Explain different types of hydrophytes with examples.

53. Enumerate the anatomical adaptations of xerophytes.

54. List out any five morphological adaptations of halophytes.

55. What are the advantages of seed dispersal?

56. Describe dispersal of fruit and seeds by animals

ECOSYSTEM

I Choose the most suitable answer

1. Which of the following is not a abiotic component of the ecosystem?

a) Bacteria b) Humus

c) Organic compounds d) Inorganic compounds

2. Which of the following is / are not a natural ecosystem?

a) Forest ecosystem b) Rice field

c) Grassland ecosystem d) Desert ecosystem

3. Pond is a type of

a) forest ecosystem b) grassland ecosystem

c) marine ecosystem d) fresh water ecosystem

4. Pond ecosystem is

a) not self sufficient and self regulating

b) partially self sufficient and self regulating

c) self sufficient and not self regulating

d) self sufficient and self regulating

5. Profundal zone is predominated by heterotrophs in a pond ecosystem, because of

a) with effective light penetration

b) no effective light penetration

c) complete absence of light d) a and b

6. Solar energy used by green plants for photosynthesis is only

a) 2 – 8% b) 2 – 10% c) 3 – 10% d) 2 – 9%

7. Which of the following ecosystem has the highest primary productivity?

a) Pond ecosystem b) Lake ecosystem

c) Grassland ecosystem d) Forest ecosystem

8. Ecosystem consists of

a) decomposers b) producers

c) consumers d) all of the above

9. Which one is in descending order of a food chain

a) Producers → Secondary consumers → Primary consumers → Tertiary consumers

b) Tertiary consumers → Primary consumers → Secondary consumers → Producers

c) Tertiary consumers → Secondary consumers → Primary consumers → Producers

d) Tertiary consumers → Producers → Primary consumers → Secondary consumers

10. Significance of food web is / are

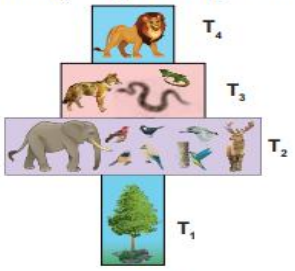
a) it does not maintain stability in nature

b) it shows patterns of energy transfer

c) it explains species interaction

d) b and c

11. The following diagram represents



a) pyramid of number in a grassland ecosystem

b) pyramid of number in a pond ecosystem

c) pyramid of number in a forest ecosystem

d) pyramid of biomass in a pond ecosystem

12. Which of the following is / are not the mechanism of decomposition

a) Eluviation b) Catabolism

c) Anabolism d) Fragmentation

13. Which of the following is not a sedimentary cycle

a) Nitrogen cycle b) Phosphorous cycle

c) Sulphur cycle d) Calcium cycle

14. Which of the following are not regulating services of ecosystem services

i) Genetic resources

ii) Recreation and aesthetic values

iii) Invasion resistance iv) Climatic regulation

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

15. Productivity of profundal zone will be low. Why?

16. Discuss the gross primary productivity is more efficient than net primary productivity.

17. Pyramid of energy is always upright. Give reasons

18. What will happen if all producers are removed from ecosystem?

19. Construct the food chain with the following data. Hawk, plants, frog, snake, grasshopper.

20. Name of the food chain which is generally present in all type of ecosystem. Explain and write their significance.

21. Shape of pyramid in a particular ecosystem is always different in shape. Explain with example.

22. Generally human activities are against to the ecosystem, where as you a student how will you help to protect ecosystem?

23. Generally in summer the forest are affected by natural fire. Over a period of time it recovers itself by the process of successions . Find out the types of succession and explain.

24. Draw a pyramid from following details and explain in brief. Quantities of organisms are given-Hawks-50, plants-1000.rabbit and mouse-250 +250, pythons and lizard- 100 + 50 respectively.

25. Various stages of succession are given bellow. From that rearrange them accordingly. Find out the type of succession and explain in detail. Reed-swamp stage, phytoplankton stage, shrub stage, submerged plant stage, forest stage, submerged free floating stage, marsh medow stage.

ENVIRONMENTAL ISSUES

1. Which of the following would most likely help to slow down the greenhouse effect.

a) Converting tropical forests into grazing land for cattle.

b) Ensuring that all excess paper packaging is buried to ashes.

c) Redesigning landfill dumps to allow methane to be collected.

d) Promoting the use of private rather than public transport.

2. With respect to Eichhornia

Statement A: It drains off oxygen from water and is seen growing in standing water.

Statement B: It is an indigenous species of our country.

a) Statement A is correct and Statement B is wrong.

b) Both Statements A and B are correct.

c) Statement A is correct and Statement B is wrong.

d) Both statements A and B are wrong.

3. Find the wrongly matched pair.

a) Endemism	-	Species confined to a region and not found anywhere else.
b) Hotspots	-	Western ghats
c) Ex-situ Conservation	-	Zoological parks
d) Sacred groves	-	Saintri hills of Rajasthan
e) Alien sp. Of India	-	Water hyacinth

4. Depletion of which gas in the atmosphere can lead to an increased incidence of skin cancer?

a) Ammonia b) Methane

c) Nitrous oxide d) Ozone

5. One green house gas contributes 14% of total global warming and another contributes 6%. These are respectively identified as

a) N20 and CO2 b) CFCs and N20

c) CH4 and CO2 d) CH4 and CFCS

6. One of the chief reasons among the following for the depletion in the number of species making endangered is

a) over hunting and poaching

b) green house effect

c) competition and predation

d) habitat destruction

7. Deforestation means

a) growing plants and trees in an area where there is no forest

b) growing plants and trees in an area where the forest is removed

c) growing plants and trees in a pond

d) removal of plants and trees

8. Deforestation does not lead to

a) Quick nutrient cycling b) soil erosion

c) alternation of local weather conditions

d) Destruction of natural habitat weather conditions

9. The unit for measuring ozone thickness

a) Joule b) Kilos c) Dobson d) Watt

10. People's movement for the protection of environment in Sirsi of Karnataka is

a) Chipko movement

b) Amirtha Devi Bishwas movement

c) Appiko movement

d) None of the above

11. The plants which are grown in silivpasture system are

a) Sesbania and Acacia

b) Solenum and Crotalaria

c) Clitoria and Begonia

d) Teak and sandal

12. What is ozone hole?

13. Give four examples of plants cultivated in commercial agroforestry.

14. Expand CCS.

15. How do forests help in maintaining the climate?

16. How do sacred groves help in the conservation of biodiversity?

17. Which one gas is most abundant out of the four commonest greenhouse gases? Discuss the effect of this gas on the growth of plants?

18. Suggest a solution to water crisis and explain its advantages.

19. Explain afforestation with case studies.

20. What are the effects of deforestation and benefits of agroforesty?

PLANT BREEDING

1. Assertion: Genetic variation provides the raw material for selection

Reason: Genetic variations are differences in genotypes of the individuals.

a) Assertion is right and reason is wrong.

b) Assertion is wrong and reason is right.

c) Both reason and assertion is right.

d) Both reason and assertion is wrong.

2. While studying the history of domestication of various cultivated plants _____ were recognized earlier

a) Centres of origin b) Centres of domestication

c) Centres of hybrid d) Centres of variation

3. Pick out the odd pair.

a) Mass selection - Morphological characters

b) Purline selection - Repeated self pollination

c) Clonal selection - Sexually propagated

d) Natural selection - Involves nature

4. Match Column I with Column II

Column I	Column II
i) William S. Gaud	I) Heterosis
ii) Shull	II) Mutation breeding
iii) Cotton Mather	III) Green revolution
iv) Muller and Stadler	IV) Natural hybridization

a) i – I, ii – II, iii – III, iv – IV

b) i – III, ii – I, iii – IV, iv – II

c) i – IV, ii – II, iii – I, iv – IV

d) i – II, ii – IV, iii – III, iv – I

5. The quickest method of plant breeding is

a) Introduction b) Selection

c) Hybridization d) Mutation breeding

6. Desired improved variety of economically useful crops are raised by

a) Natural Selection b) hybridization

c) mutation d) biofertilisers

7. Plants having similar genotypes produced by plant breeding are called

a) clone b) haploid c) autopolyploid d) genome

8. Importing better varieties and plants from outside and acclimatising them to local environment is called

a) cloning b) heterosis c) selection d) introduction

9. Dwarfing gene of wheat is

a) pal 1 b) Atomita 1 c) Norin 10 d) pelita 2 10. Crosses between the plants of the same variety are called

a) interspecific b) inter varietal

c) intra varietal d) inter generic

11. Progeny obtained as a result of repeat self pollination a cross pollinated crop to called

a) pure line b) pedigree line

c) inbreed line d) heterosis

12. Jaya and Ratna are the semi dwarf varieties of

a) wheat b) rice c) cowpea d) mustard

13. Which one of the following are the species that are crossed to give sugarcane varieties with high sugar, high yield, thick stems and ability to grow in the sugarcane belt of North India?

a) Saccharum robustum and Saccharum officinarum

b) Saccharum barberi and Saccharum officinarum

c) Saccharum sinense and Saccharum officinarum

d) Saccharum barberi and Saccharum robustum

14. Match column I (crop) with column II (Corresponding disease resistant variety) and select the correct option from the given codes.

Column I	Column II
I) Cowpea	i) Himgiri
II) Wheat	ii) Pusa komal
III) Chilli	iii) Pusa Sadabahar
IV) Brassica	iv) Pusa Swarnim

a) iv iii ii i b) ii i iii iv c) ii iv i iii d) i iii iv ii

15. A wheat variety, Atlas 66 which has been used as a donor for improving cultivated wheat, which is rich in

a) iron b) carbohydrates c) proteins d) vitamins

16. Which one of the following crop varieties correct matches with its resistance to a disease?

Variety	Resistance to disease
a) Pusa Komal	Bacterial blight
b) Pusa Sadabahar	White rust
c) Pusa Shubhra	Chilli mosaic virus
d) Brassica	Pusa swarnim

17. Which of the following is incorrectly paired?

a) Wheat - Himgiri
b) Milch breed - Sahiwal
c) Rice - Ratna
d) Pusa Komal - Brassica

18. Match list I with list II

List I Biofertilizer	List II Organisms
i) Free living N2	a) *Aspergillus*
ii) Symbiotic N2	b) *Amanita*
iii) P Solubilizing	c) *Anabaena azollae*
iv) P Mobilizing	d) *Azotobactor*

a. ic, iia, iiib, ivd b. id, iic, iiia, ivb.
c. ia, iic, iiib, ivd c. ib, iia, iiid, ivc.

19. Differentiate primary introduction from secondary introduction.

20. How are microbial innoculants used to increase the soil fertility?

21. What are the different types of hybridization?

22. Explain the best suited type followed by plant breeders at present?

23. Write a note on heterosis.

24. List out the new breeding techniques involved in developing new traits in plant breeding.

ECONOMICALLY USEFUL PLANTS AND ENTREPRENEURIAL BOTANY

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.

a) Statement I is correct b) Statement II is correct

c) Both statements are correct

d) Both statements are wrong

11. Observe the following statements and pick out the right option from the following:

Statement I: The drug sources of Siddha include plants, animal parts, ores and minerals.

Statement II: Minerals are used for preparing drugs with long shelf-life.

a) Statement I is correct

b) Statement II is correct

c) Both statements are correct

d) Both statements are wrong

12. The active principle trans-tetra hydro canabial is present in a) Opium b) Curcuma c) Marijuana d) Andrographis

13. Which one of the following matches is correct?

a) Palmyra - Native of Brazil

b) Saccharun - Abundant in Kanyakumari

c) Steveocide - Natural sweetener

d) Palmyra sap - Fermented to give ethanol

14. The only cereal that has originated and domesticated from the New world.

a) Oryza sativa b)Triticum asetumn

c) Triticum duram d) Zea mays

15. Write the cosmetic uses of Aloe.

16. What is pseudo cereal? Give an example.

17. Discuss which wood is better for making furniture.

18. A person got irritation while applying chemical dye. What would be your suggestion for alternative?

19. Name the humors that are responsible for the health of human beings.

20. Give definitions for organic farming?

21. Which is called as the "King of Bitters"? Mention their medicinal importance.

22. Differentiate bio-medicines and botanical medicines.

23. Write the origin and area of cultivation of green gram and red gram.

24. What are millets? What are its types? Give example for each type.

25. If a person drinks a cup of coffee daily it will help him for his health. Is this correct? If it is correct, list out the benefits.

26. Enumerate the uses of turmeric.

27. What is TSM? How does it classified and what does it focuses on?

28. Write the uses of nuts you have studied.

29. Give an account on the role of Jasminum in perfuming.

30. Give an account of active principle and medicinal values of any two plants you have studied.

31. Write the economic importance of rice.

32. Which TSM is widely practiced and culturally accepted in Tamil Nadu? - explain.

33. What are psychoactive drugs? Add a note Marijuana and Opium

34. What are the King and Queen of spices? Explain about them and their uses.

35. How will you prepare an organic pesticide for your home garden with the vegetables available from your kitchen?