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CONTENTS

Chapter 1

Asexual and Sexual Reproduction in Plants

Chapter Snapshot

EVALUATION

1. Choose the correct statements 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.

[Ans. (d) Yeast reproduce by budding]

2. An eminent Indian embryologist is

(a) S. R. Kasyap (b) P. Maheshwari
(c) M. S. Swaminathan (d) K. C. Mehta

[Ans. (b) P. Maheshwari]

3. Identify the correctly matched pair

(a) Tuber – *Allium Cepa*
(b) Sucker – *Pistia*
(c) Rhizome – *Musa*
(d) Stolon – *Zingiber*

[Ans. (c) *Rhizome - Musa*]

4. Pollen tube was discovered by

(a) J. G. Kolreuter (b) G. B. Amici
(c) E. Strasburger (d) E. Hanning

[Ans. (b) G. B. Amici]

5. Size of pollen grains in *Myosotis*

[Govt.MQP-2019]

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

[Ans. (a) 10 micrometer]

6. First cell of male gametophyte in angiosperm is

(a) Microspore
(b) Megapore
(c) Nucleus
(d) Primary Endosperm Nucleus

[Ans. (a) Microspore]

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

[Ans. (b) I – iii, II – iv, III – i, 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.

[Ans. (d) Tapetum, middle layer, 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

[Ans. (c) Nucellus – Nutritive tissue for developing embryo]

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

[Ans. (d) Both assertion and reason are true]

Unit Test

[Time : 1 hr] [Marks: 25]

I. Choose the Correct Answer. 10 × 1 = 10

1. Choose the correct statements 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. Identify the incorrect pair.

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(c) Nucellus – Nutritive tissue for developing embryo.
(d) Obturator – Directs the pollen tube into micropyle

3. Choose the correct statement(s)

(I) An example for root cutting is *Hibiscus*.
(II) *Scilla* is bulbous plant and grows in rocky soils.
(III) *Solanum tuberosum* is an example of corm
(IV) Adventitious roots store food in *Ipomea batatus*.

(a) I, II correct II, IV wrong
(b) I, II wrong III, IV correct
(c) I, II,III correct IV wrong
(d) IV only

4. Assertion (A) : Ruminate endosperm has irregular surface.

Reason (R) : The best example of this is *Areca Catechu*.

(a) Both Assertion and Reason are true and 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; Reason is false.
(d) Both Assertion and Reason are false.

5. Which of the following represents megagametophyte?

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

6. Identify the correctly matched pair

(a) Tuber – *Allium Cepa*
(b) Sucker – *Pistia*
(c) Rhizome – *Musa*
(d) Stolon – *Zingiber*

7. Sexual reproduction of higher plants include _____ stages.

(a) 2 (b) 4
(c) 3 (d) 5

8. Match the following.

A	Tristyly	(i)	*Primula*
B	Distyly	(ii)	*Vallisneria*
C	Anemophily	(iii)	*Lythrum*
D	Hydrophily	(iv)	*Eichhornia bamboo*

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

9. An eminent Indian embryologist _____.

(a) S. R. Kasyap
(b) P. Maheshwari
(c) M. S. Swaminathan
(d) K. C. Mehta

10. Find the odd man out and given reason.

(a) Integuments
(b) Funiculus
(c) Hilum
(d) Exine

Chapter 2

CLASSICAL GENETICS

Chapter Snapshot

MUST KNOW DEFINITIONS

Alleles : Alternative forms of a gene.

Back Cross : Crosses between F_1 off-springs with either of the two parents (hybrid) are known as back cross.

F_1 / First Filial Generation : The second stage of Mendel's experiment is called F_1 generation.

Gene : The determinant of a characteristic of an organism (Mendelian factor).

Genetic Code : The set of 64 triplets of bases (codons) corresponding to the twenty amino acids in proteins and the signals for initiation and termination of polypeptide synthesis.

Genotype : The types of alleles in a single individual is called genotype.

Genome : The total complement of genes contained in a cell.

Heterozygous : Diploid organisms that have two different allels at a specific gene locus are said to be heterozygous.

Homozygous : A diploid organism in which both alleles are the same at a given gene locus is said to be homozygous.

Hybrid Vigour or Heterosis : The superiority of hybrid over either of its parents in one or more traits.

Locus : The site or position of a particular gene on a chromosome.

Phenotype : The physical expression of an individuals gene. The physical observable characteristics of an organism.

Punnett Square / Checkerboard : A sort of cross-multiplication matrix used in the prediction of the outcome of a genetic cross, in which male and female gametes and their frequencies are arranged along the edges.

Lethal genes : An allele which has the potential to cause the death of an organism.

Extra nuclear inheritance : Traits are governed either by the chloroplast or mitochondrial genes.

Pleiotropy : A single gene affecting multiple traits and thus alters the phenotype of an organism.

Codominance : A type of intragenic interaction in which simultaneous expression of both alleles occurs in the heterozygote.

Incomplete dominance : One allele is not completely dominant over another alleles and the phenotype is a blend of expression of both alleles. Also called blending inheritance.

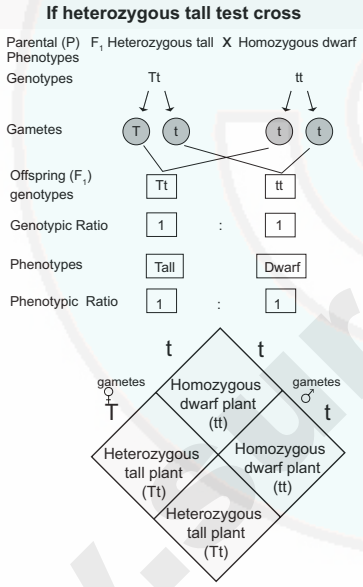
Gene interaction : A single phenotype is controlled by more than one set of genes, each of which has two or more alleles. This phenomenon is called gene interaction.

(ii) Peas with purple flowers, brown seeds and dark spot on the axils of the leaves were crossed with a variety of peas having white flowers, light coloured seeds and no spot on the axils of the leaves, the three traits for flower colour, seed colour and a leaf axil spot all were inherited together as a single unit.

(iii) This is due to the pattern of inheritance where the three traits were controlled by a single gene with dominant and recessive alleles. Example: sickle cell anemia.

4. Draw the flow chart for heterozygous tall x homozygous dwarf *Pisum sativum* plants. *[PTA-3]*

Ans.



5. Codominance is an example of intragenic gene interaction. How? *[PTA-6]*

Ans. *(i)* Interactions take place between the alleles of the same gene i.e., alleles at the same locus is called intragenic or intralocus gene interaction.

(ii) Red and white flowers of Camellia, inheritance of sickle cell haemoglobin, ABO blood group system in humanbeings.

(iii) In humanbeings, I^A and I^B alleles of I gene are codominant which follows Mendels law of segregation.

(iv) The codominance was demonstrated in plants with the help of electrophoresis or chromatography for protein or flavonoid substance.

GOVERNMENT EXAM QUESTIONS

Bio-Botany (Short version)

VERY SHORT ANSWERS — 2 MARKS

1. What do you know about pleiotropy? *[QY-2019]*

Ans. *(i)* The single gene affects multiple traits and alter the phenotype of an organism.

(ii) The pleiotropic gene influences number of characters simultaneously and such genes are called pleiotropic gene. **Eg:** sickle cell anaemia.

2. Define Atavism. *[HY-2019]*

Ans. It is a modification of biological structure where by an ancestral trait reappears after having been lost though evolutionary changes in the previous generation. **Eg:** Reemergence of sexual reproduction in the flowering plant *Hieracium pilosella*.

SHORT ANSWERS — 3 MARKS

1. Why Mendel has chosen *pisum sativum* for his experiment? *[HY-2019]*

Ans. He chose pea plant because,

(i) It is an annual plant and has clear contrasting characters that are controlled by a single gene separately.

(ii) Self-fertilization occurred under normal conditions in garden pea plants. Mendel used both self-fertilization and cross-fertilization.

(iii) The flowers are large hence emasculation and pollination are very easy for hybridization.

Chapter 3

Chromosomal Basis Of Inheritance

Chapter Snapshot

Botany Long Version Questions (for pure science Group)

Long Version Evaluation

Q.No. 1 to 12 Refer Evaluation.

13. Which one of the following pairs of codons is correctly matched with their function or the signal for the particular amino acid?
(a) UUA, UCA - Leucine
(b) GUU, GCU - Alanine
(c) UAG, UGA - Stop
(d) AUG, ACG – Start / Methionine
[*Ans.* (c) UAG, UGA - Stop]

14. Removal of introns and joining of exons in a defined order during transcription is called
(a) Splicing (b) Looping
(c) Inducing (d) Slicing
[*Ans.* (a) Splicing]

15. If one strand of DNA has the nitrogenous base sequence as ATCTS, what would be the complementary RNA strand sequence?
(a) ATCGU (b) TTAGU
(c) UAGAC (d) AACTG
[*Ans.* (a) UAGAC]

16. Removal of RNA polymerase III nucleoplasm will affect the synthesis of
(a) rRNA (b) tRNA
(c) hnRNA (d) mRNA
[*Ans.* (b) tRNA]

17. DNA dependent RNA polymerase catalyzes transcription on one strand of the DNA which is called the
(a) Alpha strand (b) Anti strand
(c) Template strand (d) Coding strand
[*Ans.* (c) Template strand]

18. Which of the following correctly represents the flow of genetic information?
a) DNA → RNA → Protein
b) RNA → DNA → Protein
c) RNA → Protein → DNA
d) Protein → RNA → DNA
[*Ans.* (a) DNA → RNA → Protein]

19. Initiation codon is
(a) UUU (b) UGA
(c) AUG (d) UAG
[*Ans.* (c) AUG]

20. A eukaryotic gene contains two kinds of base sequences which of these plays an important role in protein synthesis?
(a) Introns (b) Exons
(c) Both a and b (d) None of the above
[*Ans.* (b) Exons]

21. Codon – anticodon interactions occur by
(a) Covalent bond
(b) Electrostatic interactions
(c) Hydrogen bonds
(d) Hydrophobic interaction
[*Ans.* (c) Hydrogen bonds]

22. Which of the following RNA polymerases is responsible for the transcription of protein coding genes in eukaryotes?
(a) RNA Pol I (b) RNA Poly II
(c) RNA Pol III (d) RNA Pol IV
[*Ans.* (b) RNA Poly II]

23. How are RNA molecules transported out of the nucleus
(a) Passive diffusion through the membrane
(b) Through membrane pores in an energy independent process
(c) Through membrane pores in an energy dependent process
(d) Through a channel in the membrane that leads to the endoplastic reticulation
[*Ans.* (c) Through membrane pores in an energy dependent process]

24. During translation the codon in mRNA is actually "read" by
(a) The A site in the ribosomes
(b) The P site in the ribosomes
(c) The anticodon in at RNA
(d) The anticodon is an amino acid
[*Ans.* (c) The anticodon in at RNA]

ADDITIONAL QUESTIONS AND ANSWERS

CHOOSE THE CORRECT ANSWERS 1 MARK

I. CHOOSE THE CORRECT ANSWER

1. _____ was the first to suggest occurrence of distinct pairs of chromosomes.
(a) Sutton (b) Boveri
(c) Montgomery (d) Morgan
[**Ans.** (c) Montgomery]

2. The number of chromosomes in a diploid cell of *Drosophila* is _____.
(a) 6 (b) 8
(c) 10 (d) 12 [**Ans.** (b) 8]

3. The number of chromosomes in a diploid cell of *ophioglossum* is _____.
(a) 8 (b) 34 (c) 1262 (d) 48
[**Ans.** (c) 1262]

4. ___ discovered that crossing over is completely absent in some species of male *drosophila.*
(a) Morgan (b) Bridges
(c) Bateson (d) Reginald
[**Ans.** (b) Bridges]

5. Incomplete linkage was reported in _____.
(a) *Drosophila* (b) *Neurospora*
(c) Maize (d) Paddy
[**Ans.** (c) Maize]

6. The term crossing over was coined by
(a) Flemming (b) Morgan
(c) Reginald (d) De Vries
[**Ans.** (b) Morgan]

7. The number of chromosomes in a diploid cell of papaya is _____.
(a) 26 (b) 36
(c) 40 (d) 38 [**Ans.** (b) 36]

8. Chemical mutagenesis was first reported by __.
(a) H. J. Muller (b) C. Auerbach
(c) Stadler (d) Morgan
[**Ans.** (b) C. Auerbach]

9. Trisomy was first reported by _____.
(a) Morgan (b) Blackeslee
(c) Stadler (d) De Vries
[**Ans.** (b) Blackeslee]

10. *Cynodon Dactylon* (doob grass) is a natural _____.
(a) Allopolyploid (b) Autotetraploid
(c) Autotriploid (d) Hexaploid
[**Ans.** (c) Autotriploid]

11. *Sharbati Sonora* is a mutant wheat variety got by using _____
(a) Nitrous acid (b) X-ray
(c) gamma ray (d) MMS
[**Ans.** (c) gamma ray]

12. Castor Aruna is a mutant variety of castor developed for _____
(a) Pest resistance (b) high yield
(c) Disease resistance (d) early maturity
[**Ans.** (d) early maturity]

13. AUG codon is for the amino acid _____.
(a) Cysteine (b) Methionine
(c) Valine (d) Leucine
[**Ans.** (b) Methionine]

14. The enzyme _____ breaks the covalent bonds in DNA and removes positive supercoiling during replication.
(a) Ligase
(b) Topoisomerase
(c) Polymerase
(d) Resriction endonuclease
[**Ans.** (b) Topoisomerae]

15. _____ is required for transcription
(a) TATA box
(b) DNA Polymerase
(c) Okazaki fragments
(d) All the above [**Ans.** (a) TATA box]

16. Jumping genes was reported in _____
(a) *Neurospora* (b) *Drosophila*
(c) Polymerase (d) Maize
[**Ans.** (d) Maize]

17. _____ has been used in space research.
(a) Maize (b) *Arabidopsis*
(c) *Drosophila* (d) Pea
[**Ans.** (b) *Arabidopsis*]

Chapter 4

PRINCIPLES AND PROCESSES OF BIOTECHNOLOGY

Chapter Snapshot

Short Answers 3 Marks

1. What are vectors?

Ans. A vector is a small DNA molecule capable of self-replication and is used as a carrier and transporter of DNA fragment which is inserted into it for cloning experiments. Vector is also called cloning vehicle or cloning DNA.

2. Write a short note on conventional biotechnology.

Ans. *(i)* This is the kitchen technology developed by our ancestors, it is as old as human civilization.

(ii) This technology uses bacteria and other microbes in the daily usage for preparation of dairy products like curd, ghee, cheese and in preparation of foods like idli, dosa, nan, bread and pizza.

(iii) It also used for the preparation of alcoholic beverages like beer, wine, etc.

3. Define biopiracy. Give its examples.

Ans. Biopiracy can be defined as the manipulation of intellectual property rights laws by corporations to gain exclusive control over national genetic resources, without giving adequate recognition or remuneration to the original possessors of those resources.

Eg: Recent patents granted by the U.S. Patent and Trademarks Office to American companies on turmeric, 'neem' and, most notably, 'basmati' rice. All three products are indigenous to the Indo-Pak subcontinent.

4. Define Biopharming. Give its uses.

Ans. *(i)* Biopharming also known as molecular pharming.

(ii) It is the production and use of transgenic plants genetically engineered to produce pharmaceutical substances for use of human beings. This is also called **"molecular farming or pharming".**

Uses: These plants are different from medicinal plants which are naturally available.

Many pharmaceutical substances can be produced using transgenic plants.

Example: Golden rice.

5. Write a note on bioprospecting.

Ans. *(i)* Bioprospecting is the process of discovery and commercialization of new products obtained from biological resources.

(ii) Bioprospecting may involve biopiracy, in which indigenous knowledge of nature, originating with indigenous people, is used by others for profit, without authorization or compensation to the indigenous people themselves.

6. How can biotechnology used in plants for virus resistance?

Ans. *(i)* Biotechnological intervention is used to introduce viral resistant genes into the host plant so that they can resist the attack by virus.

(ii) This is by introducing genes that produce resistant enzymes which can deactivate viral DNA.

7. How will you transfer the genes into the plant cell with the help of electricity?

Ans. Electroporation is a method of direct gene transfer. A pulse of high voltage is applied to protoplasts, cell or tissues which makes transient pores in the plasma membrane through which uptake of foreign DNA occurs.

8. Write notes on FlavrSavr tomato.

Ans. *(i)* *Agrobacterium* mediated genetic engineering technique was followed to produce **FlavrSavr tomato, i.e.,** retaining the natural colour and flavor of tomato.

(ii) The tomato was made more resistant to rotting by *Agrobacterium* mediated gene transfer mechanism of introducing an antisense gene which interferes with the production of the enzyme polygalacturonase, which help in delaying the ripening process of tomato during long storage and transportation.

9. Give an account of limitations of Bioremediation.

Ans. *(i)* Only biodegradable contaminants can be transformed using bioremediation process.

(ii) Bioremediation processes must be specifically made in accordance to the conditions at the contaminated site.

(iii) Small scale test on a pilot scale must be performed before carrying out the procedure at the contaminated site.

Chapter 5

PLANT TISSUE CULTURE

Chapter Snapshot

MUST KNOW DEFINITIONS

Aseptic condition : Preparation of materials free from microbes *in vitro* cultures.

Cell Culture : Growing of cells *in vitro*, including the culture of single cells or small aggregates of cells in a liquid medium.

Chemically defined medium : A nutritive medium used for culturing cells or tissue; each chemical of this medium is known and defined.

Cybrid : Cytoplasmic hybrid obtained by the fusion of cytoplasm of cells of different parental sources; a term applied to the fusion of cytoplasms of two different protoplasts.

Organogenesis : The process of initiation and development of shoot or root though *in vitro* culture particularly from callus.

Patents : It is a special right to the discoverer/inventor that has been granted by the government through legislation for trading new articles.

Claim : Claim specifically defines the scope of the invention to be protected by the patent which the others may not practice.

Embryogenesis : Process of tissue culture in which the callus cells undergoes differentiation and produces somatic embryos, known as Embryoids.

Cybrid : The fusion product of protoplasts without nucleus of different cells is called a cybrid.

Artificial seeds : Somatic embryoids are coated with inert materials like agarose and sodium alginate to obtain artificial seeds.

Totipotency : The property of live plant cells to give rise to complete individual plant.

ABBREVIATIONS AND EXPANSION

GEAC	:	Genetic Engineering Appraisal committee
GMO	:	Genetically Modified Organisms
ELSI	:	Ethical, Legal and Social Implications
HGP	:	Human Genome Project
BRL	:	Biosafety Research Level
RCGM	:	The Review committee on Genetic manipulation
IBSC	:	The Institutional Bio-Safety Committee

IPR	:	Intellectual Property Rights
PEG	:	Poly Ethylene glycol
MS medium	:	Murashige and skoog medium
LAFC	:	Laminar Air Flow Chamber
HEPA	:	High Efficiency Particulate Air
KNOPS	:	Solution – Nutrient used in plant tissue culture.

Unit Test

[Time : 1 hr] [Marks: 25]

I. Choose the Correct Answer. 10 × 1 = 10

1. 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.

2. 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 to develop 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

3. Select the incorrect statement from given statement

(a) A tonic used for cardiac arrest is obtained from *Digitalis purpurea*.
(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*.

4. 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.

5. Dimethyl sulphoxide is added during cryopreservation because it

(a) reduces the temperature.
(b) helps in enzymatic activities.
(c) protects tissues from stress of freezing.
(d) maintains tissues in dormant condition.

6. Name the phenomenon of the reversion of mature cells to the meristematic state.

(a) Redifferentiation (b) Dedifferentiation
(c) Totipotency (d) Differentiation

7. Explant of _____ sterile segment selected from leaf for tissue culture.

(a) 1 - 3 cm (b) 1 - 2 cm
(c) 1 - 1.5 cm (d) 1 - 4 cm

8. Choose the incorrect pair.

(a) Roots - Rhizogenesis
(b) Shoots - Caulogenesis
(c) Artificial seed - Strawberry
(d) Micropropagation - Banana

9. Answer in a one word

Growing of plant tissue in artificial media _____

10. A complex mucilaginous polysaccharide is obtained from _____.

(a) sea weeds (b) bacteria
(c) *bacillus* (d) *micrococcus*

II. Very Short Answer 2 × 2 = 4

1. What is hardening?
2. What are artificial seeds?

III. Short Answer 2 × 3 = 6

1. What is patent?
2. Write the application of somatic embryo genesis?

IV. Long Answer 1 × 5 = 5

1. Write a note on Applications of plant tissue culture.

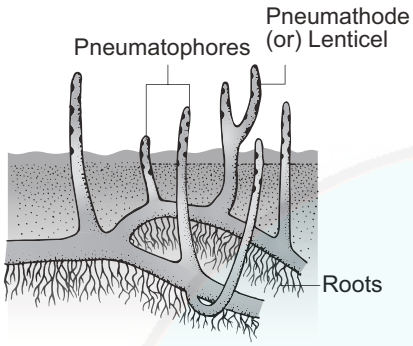
Chapter 6

PRINCIPLES OF ECOLOGY

Chapter Snapshot

(v) Leaves are thick, entire, succulent and glossy. Some species are **aphyllous** (without leaves).

(vi) Vivipary mode of seed germination is found in halophytes.



Pneumatophores of mangrove plant

55. What are the advantages of seed dispersal?

Ans. **Advantages of seed dispersal:**

(i) Seeds escape from mortality near the parent plants due to predation by animals or getting diseases and also avoiding competition.

(ii) Dispersal also gives a chance to occupy favourable sites for growth.

(iii) It is an important process in the movement of plant genes. Particularly this is the only method available for self-fertilized flowers and maternally transmitted genes in out crossing plants.

(iv) Seed dispersal by animals help in conservation of many species even in human altered ecosystems.

(v) Understanding of fruits and seed dispersal acts as a key for proper functioning and establishment of many ecosystems from deserts to evergreen forests and also for the maintenance of biodiversity conservation and restoration of ecosystems.

56. Describe dispersal of fruit and seeds by animals.

Ans. Dispersal of fruits of fruits and seeds by animals is called zoochory.

They have the following devices:

(i) **Hooked fruit :** The surface of the fruit or seeds have hooks, (*Xanthium*), barbs (*Andropogon*), spines (*Aristida*) by means of which they adhere to the body of animals or clothes of human beings and get dispersed.

(ii) **Sticky fruits and seeds :**

(a) Some fruits have sticky glandular hairs by which they adhere to the fur of grazing animals.

Example : *Boerhaavia and Cleome.*

(b) Fruits with viscid layer adhere to the beak of the bird which eat them and they rub them on to the branch of the tree, they disperse and germinate.

Example : *Cordia* and *Alangium*

PTA Question & Answers

Choose the Correct Answers — 1 mark

1. Match the following and find the correct answer. *[PTA-3]*

(i)	Free floating hydrophyte	(A)	Utricularia
(ii)	Rooted floating hydrophyte	(B)	Pistia
(iii)	Submerged floating hydrophyte	(C)	Hydrilla
(iv)	Rooted -submerged hydrophyte	(D)	Nymphaea

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

[***Ans.*** **(c) (i) C (ii) D (iii) A (iv) B]**

3. Assertion (A) : Hypolimniotic layer of water is always cold.

Reason (R) : The water holds the temperature of soil at the bottom of pond. *[PTA-4]*

(a) (A) correct; (R) wrong
(b) Both (A) and (R) are correct; but (R) is not the correct explanation of (A)
(c) Both (A) and (R) are correct; (R) is the correct explanation of (A)
(d) Both (A) and (R) are wrong

[***Ans.*** **(a) (A) correct; (R) wrong]**

Chapter 7

ECOSYSTEM

Chapter Snapshot

EVALUATION

I Choose the most suitable answer from the given four alternatives and write the option code and the corresponding answer.

1. Which of the following is not a abiotic component of the ecosystem?
(a) Bacteria
(b) Humus
(c) Organic compounds
(d) Inorganic compounds [*Ans.* (a) Bacteria]

2. Which of the following is / are not a natural ecosystem?
(a) Forest ecosystem (b) Rice field
(c) Grassland ecosystem (d) Desert ecosystem
[*Ans.* (b) Rice field]

3. Pond is a type of
(a) forest ecosystem
(b) grassland ecosystem
(c) marine ecosystem
(d) fresh water ecosystem
[*Ans.* (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
[*Ans.* (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
[*Ans.* (b) no effective light penetration]

6. Solar energy used by green plants for photosynthesis is only
(a) 2 – 8% (b) 2 – 10%
(c) 3 – 10% (d) 2 – 9%
[*Ans.* (b) 2 – 10%]

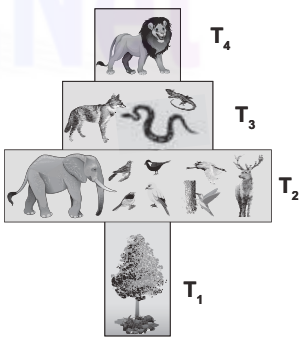
7. Which of the following ecosystem has the highest primary productivity?
(a) Pond ecosystem (b) Lake ecosystem
(c) Grassland ecosystem (d) Forest ecosystem
[*Ans.* (d) Forest ecosystem]

8. Ecosystem consists of
(a) decomposers (b) producers
(c) consumers (d) all of the above
[*Ans.* (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
[*Ans.* (c) Tertiary consumers → Secondary consumer → Primary consumers → Producers]

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 [*Ans.* (d) b and c]

11. The following diagram represents



1. **Primary productivity :**
The chemical energy or organic matter generated by autotrophs during the process of photosynthesis and chemosynthesis is called **primary productivity**. It is the source of energy for all organisms, from bacteria to human.

   a. **Gross Primary Productivity (GPP):**
   The total amount of food energy or organic matter or biomass produced in an ecosystem by autotrophs through the **process of photosynthesis** is called gross primary productivity.

   b. **Net Primary Productivity (NPP) :**
   The proportion of energy which **remains after respiration loss in the plant** is called net primary productivity. It is also called as apparent photosynthesis. Thus the difference between GPP and respiration is known as NPP.
   NPP = GPP – Respiration

2. **Secondary productivity :**
The amount of energy stored in the tissues of **heterotrophs** or **consumers** is called secondary productivity.

   a. **Gross secondary productivity :**
   It is equivalent to the total amount of plant material is ingested by the herbivores minus the materials lost as faeces.

   b. **Net secondary productivity :**
   Storage of energy or biomass by consumers per unit area per unit time, **after respiratory loss** is called net secondary productivity.

3. **Community productivity :**
The rate of net synthesis of organic matter (biomass) by a group of plants per unit area per unit time is known as **community productivity**.

GOVERNMENT EXAM QUESTIONS

Bio-Botany (Short version)

CHOOSE THE CORRECT ANSWERS — 1 MARK

1. Photosynthetically active radiation wave length between the range of *[Govt.MQP-2019]*

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

[***Ans.*** **(c) 400-700nm**]

2. Water purification belongs to which of the following Ecosystem Services? *[HY-2019]*

(a) Regulating services
(b) Supporting services
(c) Cultural services
(d) Provisioning services

[***Ans.*** **(a) Regulating services**]

SHORT ANSWERS — 3 MARKS

1. Draw a pyramid from following details and explain. The quantities of organisms are given: Hawks 25 and plants - 500 rabbit and mouse- 125 + 125 snake and lizard - 50 + 25 respectively. *[Govt.MQP-2019]*

Ans. This is a pyramid of number and is based on grassland ecosystem.

(i) The number of producers is maximum. (500)

(ii) This is followed by primary consumers. (250)

(iii) This is followed by secondary consumers. (75)

(iv) The tertiary consumers are lesser than secondary consumers. (25)

Chapter 8

ENVIRONMENTAL ISSUES

Chapter Snapshot

Methane :

Methane is 20 times as effective as CO_2 at trapping heat in the atomosphere. Its sources are attributed paddy cultivation, cattle rearing, bacteria in water bodies, fossil fuel production, ocean, non-wetland soils and forest / wild fires.

N_2O (Nitrous oxide):

It is naturally produced in Oceans from biological sources of soil and water due to microbial actions and rainforests. Man-made sources include nylon and nitric acid production, use of fertilizers in agriculture, manures cars with catalytic converter and burning of organic matter.

VERY SHORT ANSWERS 2 MARKS

1. Mention the year of Launching and application of Satellite CARTOSAT-2. *[HY-2019]*

Ans.

Name of the Satellites	Year of Launch	Application
CARTOSAT – 2	Jan. 2018	Earth observation
CARTOSAT – 2 (100th Satellite)	Jan. 2018	To watch border surveillance

GOVERNMENT EXAM QUESTIONS

Bio-Botany (Short version)

CHOOSE THE CORRECT ANSWERS 1 MARK

1. Loss of biodiversity in worldwide is caused by the plant: *[HY-2019]*

(a) *Prosopis juliflora*
(b) *Elchhornia crassipes*
(c) *Gliricidia sepium*
(d) *Sesbania grandiflora*

[Ans. (b) *Elchhornia crassipes*]

ADDITIONAL QUESTIONS AND ANSWERS

CHOOSE THE CORRECT ANSWERS 1 MARK

I. CHOOSE THE CORRECT ANSWERS:

1. The gases that capture heat are called green house gases which include.

(a) only CO_2 (b) Methane
(c) N_2O and CFC (d) All of these

[Ans. (d) All of these]

2. The International treaty called the Montreal protocol was held in _____.

(a) America (b) Italy
(c) Canada (d) England

[Ans. (c) Canada]

3. Aforestation means _____.

(a) Planting of trees
(b) Removal of Treas and Plants
(c) Conversion of forest area into non forest area
(d) Supplying of seedlings

[Ans. (a) Planting of trees]

4. Environmental impact assessment is an _____.

(a) Environment management tool
(b) Trees and plants management tool
(c) Rain harvesting management tool
(d) Supporting tool for biodiversity

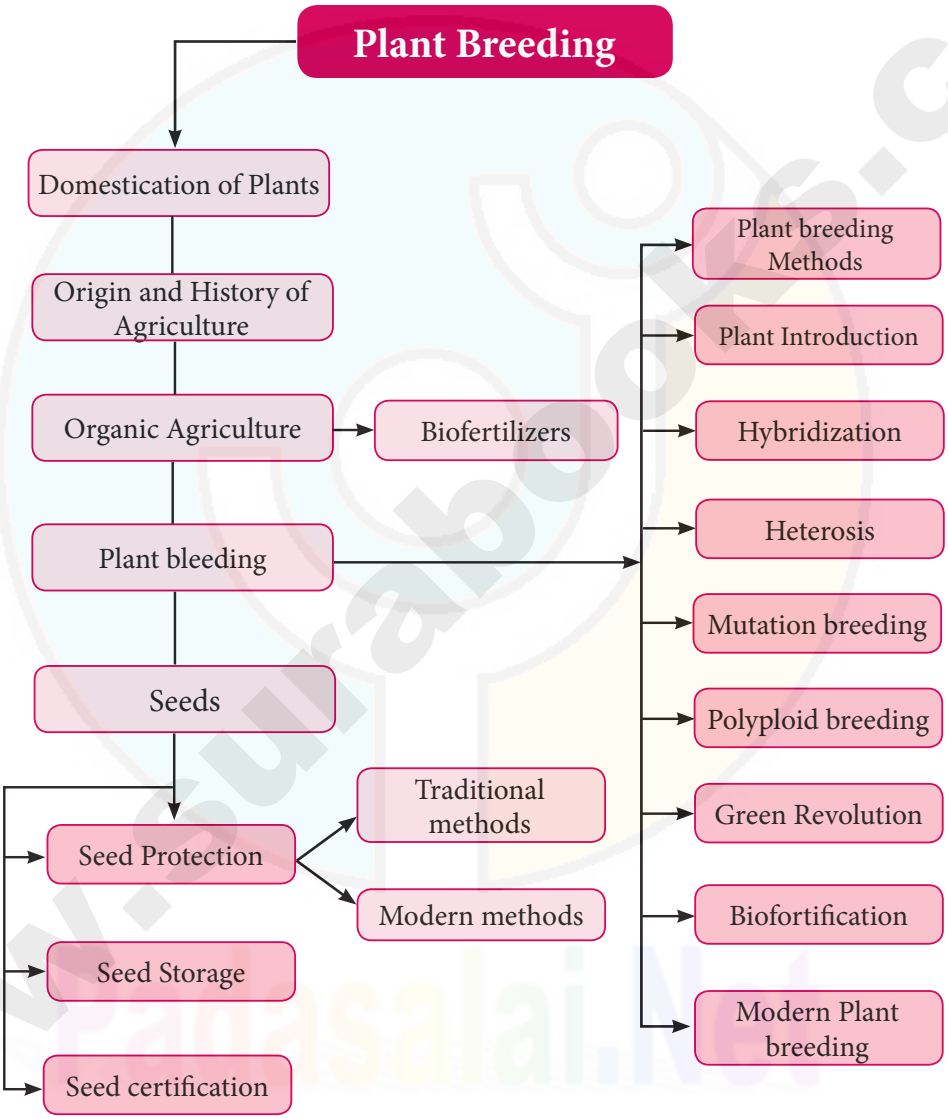
[Ans. (a) Environment management tool]

Chapter 9

PLANT BREEDING

Chapter Snapshot

Concept Map



BOTANY LONG VERSION QUESTIONS (FOR PURE SCIENCE GROUP)

LONG VERSION EVALUATION

Q.No. 1 to 18 Refer Evaluation.

19. List the ways by which seeds can be stored for longer duration.

Ans.

SEED STORAGE
Roberts (1973) classified seeds based on physiological behaviour during storing

ORTHODOX SEED	RECALCITRANT SEED
Seeds dried to low moisture of 5% (wet basis) and stored at low or Sub-freezing temperature for long period. Example:Cereals, pulses and oil seeds.	Seeds dried to high moisture of 20 - 50% (wet basis) and which cannot be successfully stored for long period. Example: Mango, Jack fruit, Coconut etc

SEED STORAGE
Ewart (1908) classified seeds into 3 categories based on life span or longitivity

Micro biotic:
Seed life span not exceeding 3 years.
Mesobiotic:
Seed life span not exceeding from 3 to 15 years.
Macrobiotic:
Seed life span not exceeding from 15 years to over 1000 years.

Also there are other methods of seed storage. They are:

(i) Conventional Methods of Seed Storage.
(ii) Modern Methods of Seed Storage.
- *(a)* Seed storage in cryopreservation .
- *(b)* Seed storage in gene bank.
- *(c)* Svalbard seed bank.

20. Refer Evaluation Q.No. 19

21. Refer Evaluation Q.No. 20

22. Discuss the importance of neem in seed storage.

Ans. Seeds are coated with Neem leaf powder and stored for short duration as a traditional way of seed protection.

23. Refer Evaluation Q.No. 21

21. Refer Evaluation Q.No. 22

25. Refer Evaluation Q.No. 23

26. Refer Evaluation Q.No. 24

PTA Question & Answers

CHOOSE THE CORRECT ANSWERS 1 MARK

1. **Assertion (A) :** A veriety formed by pure line selection method shows more homozygosity with respect to all genes.
Reason (R) : The pure line plants are produced by asexual method or Vegetative propagation method. *[PTA-1]*
(a) (A) is correct; (R) is wrong
(b) (A) is wrong; (R) is correct
(c) (A) is correct; (R) does not explain (A)
(d) (A) is correct; (R) explain (A)
[***Ans.*** **(a) (A) is correct; (R) is wrong]**

Chapter 10

Economically Useful Plants and Entrepreneurial Botany

Chapter Snapshot

ABBREVIATION

IRRI	:	International Rice Research Institute
SFA	:	Saturated Fatty Acid
UFA	:	Unsaturated Fatty Acid
MUFA	:	Mono Unsaturated Fatty Acid
PUFA	:	Poly Unsaturated Fatty Acid
TSM	:	Traditional Systems of Medicine
USPTO	:	United States Patent and Trade mark Office
TK	:	Traditional Knowledge
THC	:	trans-tetrahydrocanabinal
SCP	:	Single Cell Protein
NCB	:	Narcotics Control Bureau
NMPB	:	National Medicinal Plants Board
CIMAP	:	Central Institute of Medicinal and Aromatic Plants
HDL	:	High Density Lipids
GI	:	Geographical Indication

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
[***Ans.*** **(b) Both (i) and (ii) are correct]**

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.
[***Ans.*** **(a) Assertion is correct, Reason is wrong]**

3. Groundnut is native of _____
(a) Philippines
(b) India
(c) North America
(d) Brazil [***Ans.*** **(d) Brazil]**

2. Write the medicinal uses of Holy basil. *[PTA-3]*

Ans. **Medicinal Uses for Holy basil:**

(i) The leaves are stimulant, antiseptic, anti-hypertensive and anti-bacterial and expectorant used in bronchitis.

(ii) Decoction of roots is given as a diaphoretic in malarial fever.

3. Write any two uses of THC. *[PTA-5]*

Ans. *(i)* THC is used in treating Glaucoma a condition in which pressure develops in the eyes.

(ii) THC is also used in reducing nausea of cancer patients undergoing radiation and chemotherapy.

(iii) THC provides relief to bronchial disorders, especially asthma as it dilates bronchial vessels.

SHORT ANSWERS 3 MARKS

1. TN Govt suggest Nilavembu as a medicine for Dengue. Write its medicinal importance. *[PTA-1]*

Ans. *(i)* Medicinal importance : Andrographis is a potent hepatoprotective and is widely used to treat liver disorders.

(ii) Concoction of *Andrographis paniculata* and eight other herbs (Nilavembu Kudineer) is effectively used to treat malaria and dengue.

GOVERNMENT EXAM QUESTIONS

Bio-Botany (Short version)

SHORT ANSWERS 3 MARKS

1. What aroma would you like to add to your tea? Write its uses. *[HY-2019]*

Ans. Cardomom aroma is one of my favourite aroma and that gives pleasing aroma and pungent taste to my tea.

Uses of Cardamom:

(i) Seeds have a pleasing aroma and characteristic warm, slightly pungent taste.

(ii) It is used for flavouring confectionaries, bakery products and beverages.

(iii) The seeds are used in the preparation of curry powder, pickles and cakes.

(iv) Medicinally, it is employed as a stimulant and carminative. It is also chewed as a mouth freshener.

ADDITIONAL QUESTIONS AND ANSWERS

CHOOSE THE CORRECT ANSWER 1 MARK

I. CHOOSE THE CORRECT ANSWER:

1. All cereals are members of family _____.

(a) Lamiaceae (b) Poaceae
(c) Verbenaceae (d) Musaceae

[Ans. (b) Poaceae]

2. _____ is the only cereal which has originated and domesticated from the new world.

(a) Paddy (b) Wheat
(c) Millet (d) Maize

[Ans. (d) Maize]

3. _____ is used in manufacture of infant foods.

(a) Rice bran oil (b) Corn syrup
(c) Pearl millet (d) Quinoa

[Ans. (b) Corn syrup]

4. _____ is an example of a pseudocereal.

(a) Cinchona (b) quinao
(c) Rauwolfia (d) Little Millet

[Ans. (b) quinoa]

5. Finger millet refers to _____.

(a) Little Millet (b) Kodo Millet
(c) Ragi (d) Foxtail Millet

[Ans. (c) Ragi]

Unit Test

[Time : 1 hr] [Marks: 25]

I. Choose the Correct Answer. 10 × 1 = 10

1. **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.

2. **Find out the correctly matched pair.**
(a) Rubber - *Shorea robusta*
(b) Dye - *Indigofera annecta*
(c) Timber - *Cyperus papyrus*
(d) Pulp - *Hevea brasiliensis*

3. **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

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

5. **Match the following**

A	Geraniol	(i)	Terrarium
B	Seaweed	(ii)	Fertilizer
C	Begonia	(iii)	Pesticide
D	Neem	(iv)	Lemon grass

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

6. **Answer in one word**
A major constituent got from *Gloriosa superba* _____.

7. **Choose the incorrect statement(s).**
(a) Foxtail millet supports in strengthening of heart and improves eye sight.
(b) Thinai improves lactating mother.
(c) Kodo millet is originated from West Africa.
(d) Pulses are the edible seeds that are harvested from the fruits of malvaceae.

8. **Choose the correct pair.**
(a) Red gram - Pigeon pea
(b) Black gram - Chick pea
(c) Vigna mungo - Bengal gram
(d) Green gram - Cajanus cajan

9. **Find out the odd man out**
(a) Maize (b) Rice
(c) Almond (d) Wheat

10. ***Tectona grandis* belongs to the family**
(a) Lamiaceae (b) Fabaceae
(c) Dipterocaipaceae (d) Ebenaceae

II. Very Short Answer 2 × 2 = 4

1. Mention one difference between essential oil and vegetable oil.

2. What is a pseudo cereal? Give an example.

III. Short Answer 2 × 3 = 6

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

2. Why do popcorn pops?

IV. Long Answer 1 × 5 = 5

1. Write a note on Turmeric and its uses.

NEET BASED QUESTIONS

1. **The plant of Cycas, which belongs to sporophytic generation, is differentiated into :**
(A) Root, stem and leaves
(B) Male and female cones
(C) Leaves only
(D) Sometimes leaves and sometimes modified stems

2. **Which of the following cell organelles produces lysosomes?**
(A) ER
(B) Peroxisomes
(C) Golgi apparatus
(D) None of the above

3. **Epidermis and Epibelema are produced from :**
(A) Phellogen (B) Protoderm
(C) Procambium (D) Calyptrogen

4. **Which of the following is the characteristic of water storage tissue in xerophytes?**
(A) Presence of large sized cells
(B) Presence of thin cell walls
(C) Presence of mucilage
(D) Presence of vacuole

5. **What happens when loctose is present?**
(A) The repressor becomes able to bind to the operator
(B) Transcription of lac-y, lac-Z, and lac-a genes occurs
(C) The repressor becomes unable to bind to the operator
(D) Both (B) and (C)

6. **Which of the following organelles is usually absent in chloroplast of algae?**
(A) Lamellae
(B) Grana
(C) Pigments
(D) Quantasomes

7. **Abiogenesis theory states that :**
(A) Life originated due to spontaneous generation
(B) Origin of life is due to preexisting organisms
(C) Origin of life occurred from blue-green algae like microorganisms
(D) Origin of life is due to organic evolution owing to chemical reactions in presence of light

8. **Which of the process(es) is/are referred to as translation?**
(A) Decoding of the triplet codons of mRNA by tRNA
(B) Decoding of amino acids to proteins
(C) Decoding of the triplet codons by tRNA to mRNA
(D) All of the above

9. **Leafless stem of onion which is produced to bear flowers is called :**
(A) Scape (B) Torus
(C) Thalamus (D) Pedicel

10. **Feathery stigma and versatile anthers are found in :**
(A) Compositae (B) Graminae
(C) Leguminosae (D) All of the above

11. **Genotoxicity refers to the detection of agents that will damage :**
(A) Vitamins (B) Enzymes
(C) DNAs (D) Proteins

12. **Which one of the following families is commonly known as night-shade-family?**
(A) Compositae (B) Malvaceae
(C) Both (A) and (B) (D) Solanaceae

13. **The phosphlipids are broken down to their residues by the action of enzymes called :**
(A) Triose phosphate isomerase
(B) Cytochrome oxidase
(C) Peroxidase
(D) Malic dehydrogenase

14. ***E. coli* have the full complement of enzymes for the glyoxylate and citric acid cycles in the :**
(A) Mesosomes
(B) Mitochondira
(C) Cytosol
(D) Polysomes

15. **At what phase of meiosis are there two cells, each with separated sister chromatids that have been moved to opposite spindle poles?**
(A) Anaphase-I (B) Anaphase-II
(C) Metaphase-I (D) Metaphase-II

16. **Plants that retain their evergreen foliage throughout the year are called :**
(A) Draught escaping plants
(B) Evergreen plants
(C) Xerophytic plants
(D) All of the above

17. **The term 'allelomorphic' means :**
(A) Sex-linked characters
(B) Sex determining chromosomes
(C) A pair of contrasting characters
(D) Representatives of the same gene locus

ANSWERS

1. (A)	2. (C)	3. (B)	4. (B)	5. (D)	6. (B)	7. (A)	8. (A)	9. (A)	10. (B)
11. (C)	12. (D)	13. (A)	14. (C)	15. (B)	16. (B)	17. (C)	18. (D)	19. (B)	20. (D)
21. (A)	22. (C)	23. (D)	24. (B)	25. (B)	26. (A)	27. (A)	28. (D)	29. (D)	30. (B)
31. (C)	32. (A)	33. (B)	34. (D)	35. (A)	36. (A)	37. (A)	38. (A)	39. (D)	40. (C)
41. (C)	42. (D)	43. (C)	44. (A)	45. (D)	46. (D)	47. (A)	48. (B)	49. (A)	50. (B)
51. (C)	52. (A)	53. (A)	54. (B)	55. (B)	56. (D)	57. (D)	58. (B)	59. (C)	60. (A)
61. (C)	62. (A)	63. (D)	64. (C)	65. (C)	66. (C)	67. (C)	68. (A)	69. (A)	70. (C)
71. (A)	72. (D)	73. (C)	74. (C)	75. (D)	76. (D)	77. (B)	78. (B)	79. (A)	80. (A)

Explanatory Notes

2. Lysosomes are membrane-bound vesicles produced by a Golgi apparatus that contain hydrolytic digestive enzymes.

3. The outermost meristematic layer of the young growing region is known as protoderm, which develops into epidermis and epiblema

4. In xerophytes mostly water storage tissues possess thin-walled cell having a few inter-culluar spaces, Eg : *Opuntia*, Euphorbia etc.

6. In the algal plastids (chloroplasts) the thylakoids are only of one kind and restricted to the stack itself. They are not closely packed or fused as in the grana of higher plants.

7. Abiogenesis theory of origin of life stated that different types of organisms are formed automatically due to chemical reactions in presence of high energy. The spontaneous generation or abiogenesis of life was visualized as beginning with either inorganic materials or with putrefying organic matter.

14. Some bacteria, including *E. coli*, have the full complement of enzymes for the glyoxylate and citric acid cycles in the cytosol. *E. coli* can, therefore, grow with acetate as its sole source of carbon and energy.

15. During anaphase-II of meiosis-II, The centromeres divide and the daughter chromosomes move towards the spindle poles.

16. Plants bearing evergreen foliage throughout the year are called evergreen plants. Popularly, needle-leaved tree (Pine, Juniper, etc.) are called ever-green plants.

20. Symbiosis is also established by *mycorrhiza*, but in this case symbiosis is always established between fungus and the roots of higher plants.

22. In certain classes of fungi such as Ascomycetes and Basi-diomycetes, as a result of plasmogamy (fusion of the protoplasm of two compatible gametes) the nuclei of the opposite strains get themselves arranged in pairs but do not fuse. This phase in life cycle is termed as dikaryophase and the process is called dikaryotization.

24. Apricot *(Prunus persica)* is a kind of drupe fruit.

25. C_4 plants are more efficient at photosynthesis than C_3 plants in hot, dry conditions.

28. In prokaryotic protein synthesis, the initation of polypeptide chain is always brought about by an amino acid, methionine, which is coded by the codon AUG.

30. POP is an abbreviation of 'Persistent organic pollutants'. The WHO estimates an annual death toll of around 20000 due to poisoning from POPs and other pesticides.

32. Haploid plants possess only one set of chromosomes. Haploid produced from microspores or pollen grains (anthers) are called androgenic haploids. Maheshwari and Guha (1964, 65) successfully reported anther cultured plants from *Datura innoxia*.

35. Rhynia, which belongs to division Psilophyta, was discovered in 1917 by Kidston and Lang from Rhynie chert bed of Middle Devonian.

36. Exothermic refers to the release of heat (DH is negative). Exothermic reactions are generally, but not always, exergonic.

40. Lateral meristems are present along the lateral sides of stem and roots. Interstelar cambium ring formed by intrafascicular and interfascicular cambium and cork cambium are examples of lateral meristem.

41. Chromatin (Chromosome) has a special region called nucleous where ribosomal RNA (r-RNA) is produced.

44. CAM plants use PEPCase to fix CO_2 at night, forming a C_4 molecule, which is stored in large vacuoles in their mesophyll cells until the next day.

45. The process of formation of m-RNA from DNA is called transcription, which involves promotors (P), binding to the promotors site, RNA chain initiation and elongation, and RNA chain termination.

NEET BASED QUESTIONS

12th STD.

Register Number

GOVT. MODEL QUESTION PAPER - 2019-20

BIOLOGY

TIME ALLOWED : 2.30 hrs MAXIMUM MARKS : 70

Instructions:

i. Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

ii. Use **Blue** or **Black** ink to write and underline and **pencil** to draw diagrams:

PART-1 (BIO-BOTANY)

(35 MARKS)

SECTION – I

Note : (i) Answer **all** the questions: **(8 × 1 = 8)**

(ii) Choose the most suitable answer from the given **four** alternatives and write the option code with the corresponding answer.

1. Size of pollen grain in Myosotis is _____ micrometer.

(a) 10 (b) 20

(c) 200 (d) 2000

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

(a) Three (b) Four (c) Nine (d) two

3. EcoRI cleaves DNA at

(a) AGGGTT (b) GTATAC

(c) GAATTC (d) TATAGC

4. Choose the correct match from the following

	Column-I		Column - II
1.	Totipotency	A	Reversion of mature cells into meristem.
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

5. Photosynthetically active radiation wave length between the range of

(a) 200-700nm (b) 300-700nm

(c) 400-700nm (d) 500-700nm

6. For the given statements with respect to *Eichhornia* select the suitable answer.

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

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

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

(b) Both the statement A and B are correct.

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

(d) Both the statement A and B are wrong.

7. Which of the following is incorrectly paired?

(a) Wheat - Himgiri

(b) Milch breed - Sahiwal

(c) Rice - Ratna

(d) Pusa komal - Brassica

12th STD.

Register Number

QUARTERLY COMMON EXAMINATION - 2019-20

BIOLOGY

TIME : 2.30 Hours MAXIMUM MARKS : 70

Instructions:

i. Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

ii. Use **Blue** or **Black** ink to write and underline and **pencil** to draw diagrams.

Note : (i) Answer **all** the questions. **(8 × 1 = 8)**

(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

PART-I (BIO-BOTANY)

SECTION – I

1. 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

2. "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

3. Match the following

	Column-A		Column - B
i	Syngenesions	A	pollen grain
ii	Androecium	B	anther wall
iii	Male gametophyte	C	Asteraceae
iv	Primary Parietal Layer	D	Stamens

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

4. Match the following

	Column-A		Column - B
i	Exonuclease	A	Add or remove phosphate
ii	Endonuclease	B	binding the DNA fragment
iii	Alkaline Phosphatase	C	cut the DNA at terminus
iv	Ligase	D	cut the DNA at middle

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

5. Which of the following sentences are correct?

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

2) The linked gene exhibit some crossing over in complete linkage.

3) The separation of the 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)

6. 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

12th STD.

Register Number | | | | | | |

SURA MODEL QUESTION PAPER

BIOLOGY

TIME ALLOWED : 15Min + 3.00 Hours MAXIMUM MARKS : 70

BIO-BOTANY

(35 MARKS)

Instructions:

i. Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

ii. Use **Blue** or **Black** ink to write and underline and **pencil** to draw diagrams:

PART – I

Note : (i) Answer **all** the questions: **(8 × 1 = 8)**

(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

1. Identify the correctly matched pair

(a) Tuber – *Allium Cepa*
(b) Sucker – *Pistia*
(c) Rhizome – *Musa*
(d) Stolon – *Zingiber*

2. Select the period for Mendel's hybridization experiments

(a) 1856-1863 (b) 1850-1870
(c) 1857-1869 (d) 1870-1877

3. 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 class of enzymes called nucleases.

Choose the correct option regarding above statements.

(a) I & II (b) I & III
(c) II & III (d) I,II & III

4. 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.

5. Match the following

A	Carbon cycle	(i)	Sedimentary cycle
B	Phosphorous cycle	(ii)	Gaseous cycle
C	Biogeochemical cycle	(iii)	Micro consumers
D	Decomposers	(iv)	Nutrient cycle

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

6. 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

SURA'S

BIO-ZOOLOGY & ZOOLOGY

(Short version and Long version)

12th Standard

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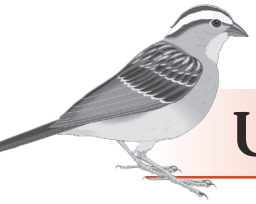
- Public Examination March 2020 Question Paper with Answers are given.

SURA PUBLICATIONS
Chennai

CONTENTS

ZOOLOGY LONG VERSION
(FOR PURE SCIENCE GROUP)



UNIT I

Chapter 1

REPRODUCTION IN ORGANISMS

CHAPTER SNAPSHOT

MUST KNOW DEFINITIONS

Asexual reproduction	:	Reproduction by single parent involving amitotic or mitotic divisions only.
Sexual reproduction	:	Participation of two individuals and involves formation of male and female gamete.
Fission	:	Division of parent body into two or more identical Daughter individuals.
Binary fission	:	Parent organism divides into two daughter cells.
Multiple fission	:	Parent body divides into many similar daughter cells.
Strobilation	:	A special type of transverse fission giving rise to number of individuals.
Budding	:	Parent body produces one or more buds which separate from the parent and lead an independent life
Gemmule	:	Internal buds formed is sponge which can tolerate adverse conditions and are a means of asexual reproduction.
Apolysis	:	Separation of gravid proglottids from the body of a tape worm.
Regeneration	:	Regrowth in the injured region.
External fertilization	:	Fusion of male & female gametes takes place outside the body of the female organism.
Internal fertilization	:	Fusion of male and female gametes takes place within the body of the female organism.
Fertilization	:	Fusion of male & female gametes.
Conjugation	:	Type of sexual reproduction between two individuals, where certain amount of nuclear material exchange takes place after which they separate.
Parthenogenesis	:	Development of an egg into a complete individual without fertilization.
Oviparous condition	:	Young ones hatch from eggs laid outside the mother's body.
Viviparous condition	:	Animals give birth to young ones.
Ovoviviparous conditions	:	Embryo develops inside the eggs and remains in the mother's body until they are ready to hatch.

PTA Question & Answers

Choose the Correct Answer — 1 Mark

1. Human beings are unisexual animals, the type of syngamy in human beings is *[PTA-3]*

(a) autogamy (b) exogamy
(c) hologamy (d) paedogamy

[*Ans.* (a) autogamy]

2. In hydra, the buds develop from *[PTA-4]*

(a) ectoderm layer only
(b) ectoderm and endoderm layers
(c) ectoderm, mesoderm and endoderm layers
(d) ectoderm and mesoderm layers

[*Ans.* (b) ectoderm and endoderm layers]

3. The primary and secondary hosts of Tape worm are respectively. *[PTA-5]*

(a) Mosquito and man
(b) Man and housefly
(c) Cattle and man
(d) Man and pig **[*Ans.* (d) Man and pig]**

Very Short Answers — 2 Marks

1. Zygote is not formed during the conjugation of *Paramecia*, but we call it as sexual reproduction why? *[PTA-2]*

Ans. ***(i)*** *Paramecium* reproduces both sexually and asexually.

(ii) In *Paramecium*, conjugation is a form of sexual reproduction. It is a temporary union of two individuals of same species for mutual exchanges of genetic materials.

(iii) If can also multiply during nuclear organizations.

Various process of *Paramecium* reproduction listed below:

(i) Binary fission - Asexual reproduction.

(ii) Conjugation - Sexual reproduction by cross fertiliztion.

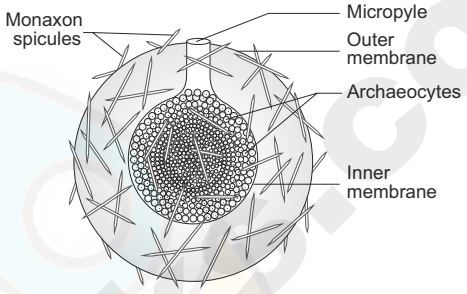
2. Why do we call parthenogenesis as a special type of sexual reproduction in animals? *[PTA-4]*

Ans. ***(i)*** Development of an egg into a complete individual without fertilization is known as parthenogenesis.

(ii) Parthenogenesis is the special type of sexual reproduction seen in animals. It is of two main types namely natural parthenogenesis and artificial parthenogenesis.

3. Draw the diagram of a gemmule and label the parts. *[PTA-3]*

Ans.



Gemmule in sponges

Short Answers — 3 Marks

1. Meiosis cell division does not take place during the gametes formation of drone bees. Give reason. *[PTA-2]*

Ans. ***(i)*** Drones are produced by parthenogenesis, unfertilized eggs develop into drone bees (males).

(ii) Males have the half the number of chromosomes (haploid). Thus meiosis cell division does not take place during the gametes formation of drone bees.

2. Write the differences between multiple fission and sporulation in *Amoeba*. *[PTA-6]*

Ans.

	Multiple fission	Sporulation
1.	The parent body divides into many similar daughter cells simultaneously.	During unfavourable conditions *Amoeba* multiplies by sporulation without encystment.
2.	Nucleus divides repeatedly without the division of the cytoplasm, later the cytoplasm divides into many parts as that of nuclei.	Nucleus breaks into several small fragments or chromatin blocks.

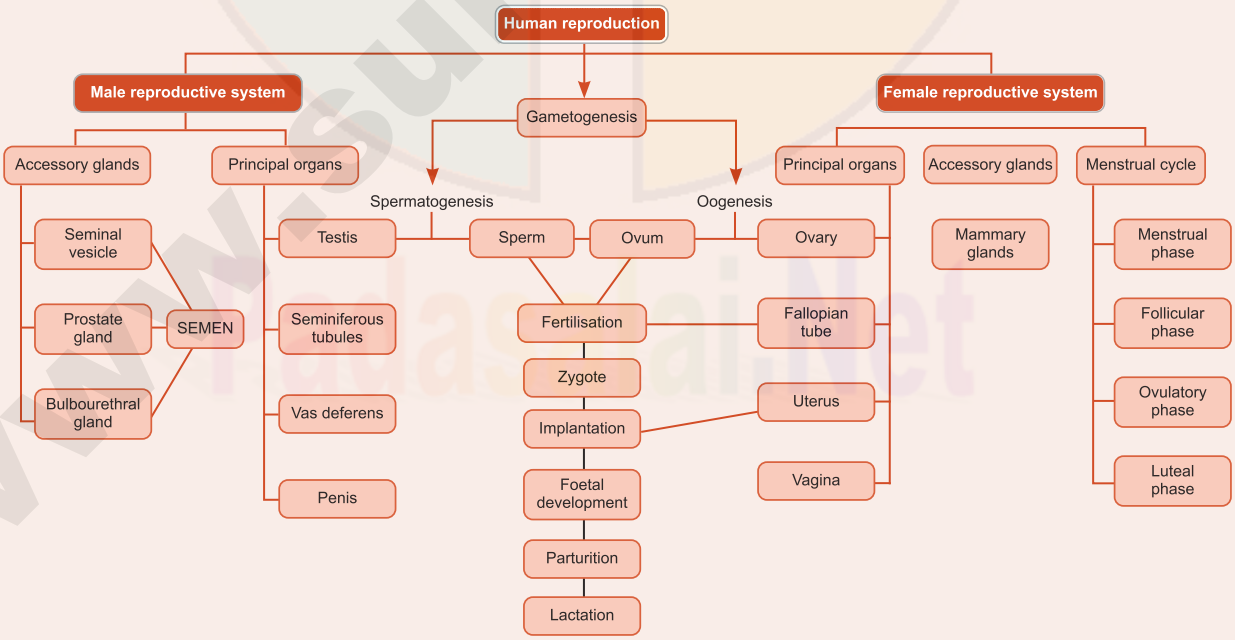
UNIT I

Chapter 2

HUMAN REPRODUCTION

CHAPTER SNAPSHOT

Concept Map



Evaluation

1. The mature sperms are stored in the
(a) Seminiferous tubules (b) Vas deferens
(c) Epididymis (d) Seminal vesicle
[*Ans.* (c) Epididymis]

2. The male sex hormone testosterone is secreted from
(a) Sertoli cells (b) Leydig cell
(c) Epididymis (d) Prostate gland
[*Ans.* (b) Leydig cell]

3. The glandular accessory organ which produces the largest proportion of semen is
(a) Seminal vesicle
(b) Bulbourethral gland
(c) Prostate gland
(d) Mucous gland [*Ans.* (a) Seminal vesicle]

4. The male homologue of the female clitoris is
(a) Scrotum (b) Penis
(c) Urethra (d) Testis
[*Ans.* (b) Penis]

5. The site of embryo implantation is the
(a) Uterus (b) Peritoneal cavity
(c) Vagina (d) Fallopian tube
[*Ans.* (a) Uterus]

6. The foetal membrane that forms the basis of the umbilical cord is
(a) Allantois (b) Amnion
(c) Chorion (d) Yolk sac
[*Ans.* (a) Allantois]

7. The most important hormone in intiating and maintaining lactation after birth is
(a) Oestrogen (b) FSH
(c) Prolactin (d) Oxytocin
[*Ans.* (c) Prolactin]

8. Mammalian egg is
(a) Mesolecithal and non-cleidoic
(b) Microlecithal and non-cleidoic
(c) Alecithal and non-cleidoic
(d) Alecithal and cleidoic
[*Ans.* (c) Alecithal and non-cleidoic]

9. The process which the sperm undergoes before penetrating the ovum is
(a) Spermiation (b) Cortical reaction
(c) Spermiogenesis (d) Capacitation
[*Ans.* (d) Capacitation]

10. The milk secreted by the mammary glands soon after child birth is called
(a) Mucous (b) Colostrum
(c) Lactose (d) Sucrose
[*Ans.* (b) Colostrum]

11. Colostrum is rich in
(a) Ig E (b) Ig A
(c) Ig D (d) Ig M
[*Ans.* (b) Ig A]

12. The Androgen Binding Protein (ABP) is produced by
(a) Leydig cells (b) Hypothalamus
(c) Sertoli cells (d) Pituitary gland
[*Ans.* (c) Sertoli cells]

13. Find the wrongly matched pair
(a) Bleeding phase - Fall in oestrogen and progesterone
(b) Follicular phase - Rise in oestrogen
(c) Luteal phase - Rise in FSH level
(d) Ovulatory phase - LH surge
[*Ans.* (c) Luteal phase - Rise in FSH level]

Answer the following type of questions Assertion (A) and Reason (R)

(a) A and R are true, R is the correct explanation of A
(b) A and R are true, R is not the correct explanation of A
(c) A is true, R is false
(d) Both A and R are false

14. A – In human male, testes are extra abdominal and lie in scrotal sacs.
R – Scrotum acts as thermoregulator and keeps temperature lower by 2°C for normal sperm production .
[*Ans.* (a) A and R are true, R is the correct explanation of A]

15. A – Ovulation is the release of ovum from the Graafian follicle.
R – It occurs during the follicular phase of the menstrual cycle.
[*Ans.* (c) A is true, R is false]

16. A – Head of the sperm consists of acrosome and mitochondria.
R – Acrosome contains spiral rows of mitochondria.
[*Ans.* (d) Both A and R are false]

Additional Questions

Choose the Correct Answer — 1 Mark

I. Choose the correct options for the below Questions

1. _____ are endocrine cells.
(a) Inhibitin (b) Leydig cells
(c) Oogonia (d) Sertoli cells
[*Ans.* (b) Leydig cells]

2. Testosterone is secreted by _____
(a) spermatocytes (b) sperm
(c) polar bodies (d) leydig cells
[*Ans.* (d) leydig cells]

3. _____ is not a part of female reproductive system in human.
(a) Cervix (b) Infundibulum
(c) Isthmus (d) Prostate gland
[*Ans.* (d) Prostrate gland]

4. The _____ glands in human female are homologous to the bulbouretural glands
(a) Bartholin's glands (b) Skene's glands
(c) mammary glands (d) Cowper's gland
[*Ans.* (a) Bartholin's glands]

5. The _____ glands in human female are homologous to the prostate gland in male.
(a) Bartholin's glands (b) Skene's glands
(c) Mammary glands (d) Cowper's gland
[*Ans.* (b) Skene's glands]

6. _____ is popularly known as sperm lysin.
(a) Inhibitin (b) Hyaluronidase
(c) Androgen (d) Acrosome
[*Ans.* (b) Hyaluronidase]

7. The whole process of spermatogenesis takes about _____ days
(a) 25 (b) 42 (c) 64 (d) 72
[*Ans.* (c) 64]

8. The _____ is the smallest human cell.
(a) sperm (b) neuron
(c) nephron (d) alveoli
[*Ans.* (a) sperm]

9. The corpus luteum secretes large amount of _____
(a) testosterone (b) relaxin
(c) oestrogen (d) progesterone
[*Ans.* (d) progesterone]

10. _____ is not linked to polymenorrhoea.
(a) Shorter cycle (b) Gland activity
(c) Malnutrition (d) Pain
[*Ans.* (d) Pain]

11. _____ may be due to cancer of the ovary.
(a) Amenorrhoea (b) Dysmenorrhoea
(c) Menorrhagia
(d) Oligomenorrhoea [*Ans.* (c) Menorrhagia]

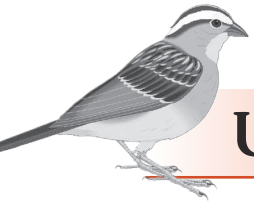
12. _____ is a berry shaped cluster of cells
(a) Blastula (b) Gastrula
(c) Morula (d) Zygote
[*Ans.* (c) Morula]

13. The term after birth refers to _____
(a) Parturition (b) Lactation
(c) Remains of placenta
(d) Corpus albicans
[*Ans.* (c) Remains of placenta]

14. 'Let Down' reflex for lactation is caused by ___
(a) Prolactin (b) Oxytocin
(c) Lactogenic hormone (d) Progesterone
[*Ans.* (b) Oxytocin]

15. Among the extra embryonic membranes, the _____ is the outer most membrane
(a) amnion (b) chorion
(c) allantois
(d) vitelline membrane [*Ans.* (b) chorion]

16. The dividing embryo takes _____ days to move to the uterus from the fallopian tube
(a) 10 (b) 15 (c) 4-5 (d) 2
[*Ans.* (c) 4-5]



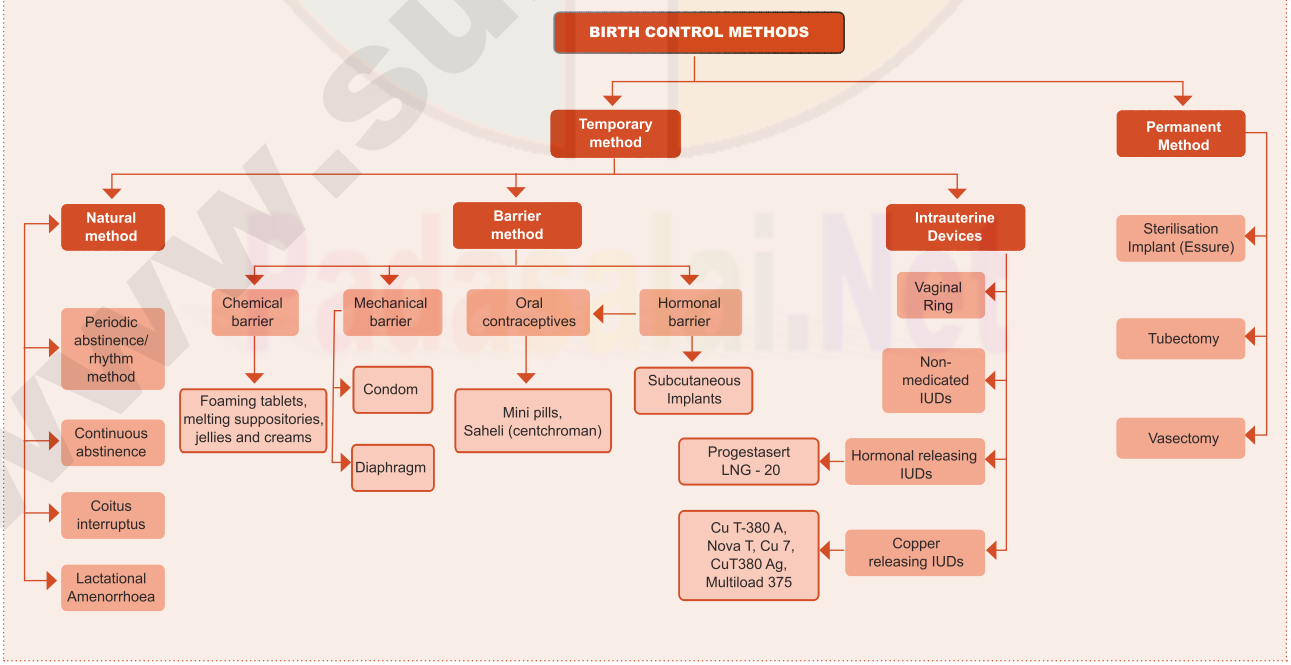
UNIT I

Chapter 3

REPRODUCTIVE HEALTH

CHAPTER SNAPSHOT

Concept Map



MUST KNOW DEFINITIONS

Female foeticide	:	Aborting the female in the mother's womb.
Female infanticide	:	Female infanticide is 'killing the female child after her birth.
PCPNDT Act	:	Preconception and prenatal diagnostic technique act.
POCSO Act	:	Prevention of children from sexual offences.
Birth control	:	Voluntary use of Contraceptive procedures to prevent fertilization.
Lactational amenorrhea	:	Delay in ovarian cycles due to lactation.
Barrier method of contraception	:	Ovum and sperm are prevented from meeting to prevent fertilization
Tubectomy	:	Surgical Sterilisation in women
Vasectomy	:	Surgical Sterilisation in men
Azoospermia	:	Absence of spermatozoa in the ejaculate semen.
Infertility		Inability to conceive or produce children even after the unprotected sexual cohabitation
Ultrasonography	:	Scanning technique which helps to detect fluid disorders during early pregnancy.
Amniocentesis	:	Taking a small sample of amniotic fluid to diagnose for chromosomal abnormalities.
Foetoscope	:	An instrument used to monitor the foetal heart rate.

ACRONYMS

IUD	:	Intra Uterine Devices Devices inserted by medical experts in the uterus as a Contraceptive measure.
MTP	:	Medical termination of pregnancy (voluntary or intentional termination of pregnancy in a Non-surgical way)
STD	:	Sexually transmitted diseases.
AIDS	:	Acquired immunodeficiency syndrome.
HIV	:	Human immunodeficiency virus.
HPV	:	Human papilloma virus
HBV	:	Hepatitis B Virus
IUI	:	Intra Uterine Insemination
IVF	:	*In Vitro* Fertilization
ZIFT	:	Zygote intra-fallopian transfer
GIFT	:	Gamete Intra-fallopian Transfer
ICSI	:	Intra-cytoplasmic sperm injection
CVS	:	Chorionic Villus Sampling

2. Mention the type of IUDs with example.

Ans. *(i)* Copper releasing IUD - Multiload 375 CuT 380.
(ii) Hormone – releasing IUD - LNG-20.
(iii) Non-medicated IUD - Lippes loop.

3. Mention any 3 causes for infertility.

Ans. *(i)* Low body fat or anorexia in women. i.e. a psychiatric eating disorder characterised by the fear of gaining weight.
(ii) Under developed ovaries or testes.
(iii) Female may develop antibodies against her partner's sperm.

4. What is ZIFT?

Ans. *(i)* ZIFT - Zygote Intra-Fallopian Transfer.
(ii) The zygote upto 8 blastomere stage is transferred to the fallopian tube by laparoscopy. The zygote continues its natural divisions and migrates towards the uterus where it gets implanted.

5. What is Cryopreservation?

Ans. *(i)* Cryopreservation (or freezing) of embryos is often used when there are more embryos than needed for a single IVF transfer.
(ii) Embryo cryopreservation can provide an additional opportunity for pregnancy, through a Frozen embryo transfer (FET), without undergoing another ovarian stimulation and retrieval.

6. What is GIFT?

Ans. GIFT - Gamete Intra-Fallopian Transfer
(i) Transfer of an ovum collected from a donor into the fallopian tube. In this, the eggs are collected from the ovaries and placed with the sperms in one of the fallopian tubes.
(ii) The zygote travels toward the uterus and gets implanted in the inner lining of the uterus.

7. What is embryo transfer technique?

Ans. The transfer of an embryo with more than 8 blastomeres stage into uterus is called embryo transfer technique.

8. What is micro-testicular sperm extraction (TESE)?

Ans. Microsurgical sperm retrieval from the testicle involves a dilation of the microscope, the seminiferous tubules under the microscope and small amount of testicular tissue in areas of active sperm production are removed. This is improved for sperm yield compared to traditional biopsy techniques.

9. How will you detect the foetal disorders, during the early stages of pregnancy?

Ans. The techniques used to detect the foetal disorders during the early stages of pregnancy are:
(i) Ultrasound scanning
(ii) Amniocentesis
(iii) Chorionic villus sampling (CVS)
(iv) Foetoscope

Long Answers — 5 Marks

1. Explain about Breast Self Examination and Early diagnosis of Cancer.

Ans. Breast self examination and early diagnosis of cancer
(i) Breast is divided into 4 quadrants and the center (Nipple) which is the 5th quadrant.
(ii) Each quadrant of the breast is felt for lumps using the palm of the opposite hand.
(iii) The examination is done in both lying down and standing positions, monthly once after the 1st week of menstrual cycle.

This way if there are lumps or any deviation of the nipple to one side or any blood discharge from the nipple we can identify cancer at an early stage. Mammograms are done for women above the age of 40 years and for young girls and women below 40 years. Ultrasound of the breast aids in early diagnosis.

2. Write a note on Cervial Cancer.

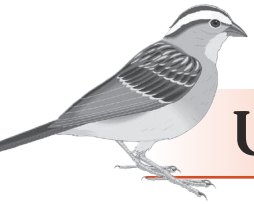
Ans. *(i)* Cervical cancer is caused by a sexually transmitted virus called Human Papilloma virus (HPV).
(ii) HPV may cause abnormal growth of cervical cells or cervical dysplasia.

Symptoms and signs: Pelvic pain, increased vaginal discharge and abnormal vaginal bleeding.

Risk factors for cervical cancer:
(i) Having multiple sexual partners
(ii) Prolonged use of contraceptive pills

Diagnosis:
(i) Papanicolaou smear (PAP smear) combined with an HPV test.
(ii) X-Ray, CT scan, MRI and a PET scan may also be used to determine the stage of cancer.

Treatment: Radiation therapy, surgery and chemotherapy.



UNIT II

Chapter 4

PRINCIPLES OF INHERITANCE AND VARIATION

CHAPTER SNAPSHOT

PTA Question & Answers

Choose the Correct Answer — 1 Mark

1. A haemophilia man marries a homozygons normal woman. What would be the possible condition to their children? *[PTA-1]*

(a) Sons would be normal but daughters would be sufferer.
(b) Sons would be sufferer but daughters would be normal.
(c) Both sons and daughters would be normal.
(d) Both sons and daughters would be normal but daughters would be carrier.

[*Ans.* (b) Sons would be sufferer but daughters would be normal]

2. *Plasmotomy* means *[PTA-2]*

(a) Mononucleated parent divides into two mononucleated individuals.
(b) Multinucleated parent divides into two mononucleated invividuals.
(c) Multinucleated parent divides into many mononucleated individuals.
(d) Multinucleated parent divides into many multinucleated daughter individuals.

[*Ans.* (d) Multinucleated parent divides into many multinucleated daughter individuals]

3. What is the sex of *Drosophila*, which contains 12 autosomes and 3 'X' Chromosomes? *[PTA-4]*

(a) Male (b) Female
(c) Gynandromorphs (d) Super male

[*Ans.* (c) Gynandromorphs]

4. Which one of the following is true statement regarding sex chromosomes of Mammals? *[PTA-4]*

(a) Both males and females have only one functional X chromosome per cell.
(b) Males have one functional X chromosome whereas females have two functional X chromosomes.
(c) Males have two functional X chromosomes whereas females have only one functional X chromosomes.
(d) Females have two functional X chromosomes whereas males have no functional X chromosomes.

[*Ans.* (a) Both males and females have only one functional X chromosome per cell]

5. Four children of a couple have blood groups A, B AB and O. What could be the Genotype of the parents? *[PTA-6]*

(a) $I^AI^A \times I^BI^B$ (b) $I^AI^\circ \times I^BI^A$
(c) $I^AI^\circ \times I^BI^\circ$ (d) $I^\circ I^\circ \times I^AI^B$

[*Ans.* (c) $I^AI^\circ \times I^BI^\circ$]

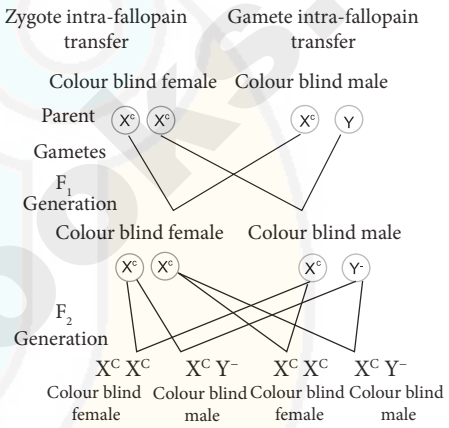
Very Short Answers — 2 Marks

1. Draw the F_1 & F_2 generations flow chart for

X^CX^C	X	X^CY
	Colour blind	

[PTA-2]

Ans.



2. Y-linked genes are non-homologous. Why? *[PTA-6]*

Ans. ***(i)*** The genes present in the non-homologous region of the Y chromosome are called **Y - linked genes** or Holandric genes.
(ii) The Y - linked genes have no corresponding allele in X - chromosome.
(iii) These genes are transmitted directly from father to son, because males inherit the Y chromosome from the father.
(iv) **Eg.** Gene for Hypertrichosis (excessive development of hairs on pinna of the ear).

Short Answers — 3 Marks

1. A thalassemia baby is born to a normal non thalassemic parents. Explain the possible causes for the occurrence of thalassemia.

Ans. **Thalassemia:** *[PTA-1]*

(i) Thalassemia is an autosomal recessive disorder. It is caused by gene mutation resulting in excessive destruction of RBC's due to the formation of abnormal haemoglobin molecules.

Unit Test

[Time : 1 hr] [Marks: 25]

I. Choose the Correct Answer. 10 × 1 = 10

1. ZW – ZZ system of sex determination occurs in _____.
(a) Fishes (b) Reptiles
(c) Birds (d) All of these

2. Which of the following phenotypes are possible in offspring from the parental combination A X O?
(a) A and B (b) O only
(c) A only (d) A and O

3. Klinefelters syndrome is characterized by
(a) XYY (b) XO
(c) XXY (d) XXX

4. In gypsy moth, we find _____ type of sex determination.
(a)ZW - ZZ (b) ZO - ZZ
(c) XX - XY (d) XX - XO

5. Y – Chromosome was discovered by _____.
(a) Stevens (b) Henking
(c) Bertram (d) Sonneborn

6. Red – green colour blindness is also called _____.
(a) daltonism (b) glucoma
(c) myopia (d) presbyopia

7.

1.	Karyotyping	A.	Metaphase
2.	XO females	B.	Barr body
3.	3n female	C.	Aneuploidy
4.	Lyon	D.	Bridges

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

8. Mark the correct answer as
Assertion (A): The Kappa in *Paramecium* appears to be a bacterium.
Reason (R): Kappa particles are not dependent on the chromosomal genes.
(a) A and R are true, R is the correct explanation of A
(b) A and R are true, R is not the correct explanation of A
(c) A is true, R is false
(d) Both A and R are false

9. Choose the mismatched pair:
(i) SRY - X Chromosome
(ii) Heterogametic female - XX–XO
(iii) Barr body - Sex Chromatin
(iv) Rh factor - Landsteiner
(a) i and iv (b) ii and iii and iv
(c) ii only (d) i and ii

10. Choose the correct statement:
(i) Y linked genes are transmitted from mother to son.
(ii) People with $I^A I^O$ gene type have O blood group.
(iii) Human Y chromosome is shorter than X chromosome.
(iv) Fertilized eggs develop into Drones.
(a) i,iv (b) ii,iii,iv
(c) i and iii (d) iii only

II. Very Short Answer 2×2 = 4

11. Define Eugenics.

12. What is criss cross inheritance?

III. Short Answer 2×3 = 6

13. List any three applications of karyotype

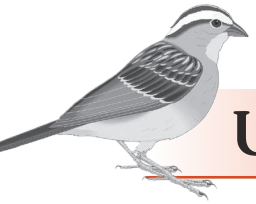
14. What is trisomy 21?

IV. Long Answer 1×5 = 5

15. Write a note on genetic control of ABO Blood groups.

(OR)

Write a note on Thalassemia.



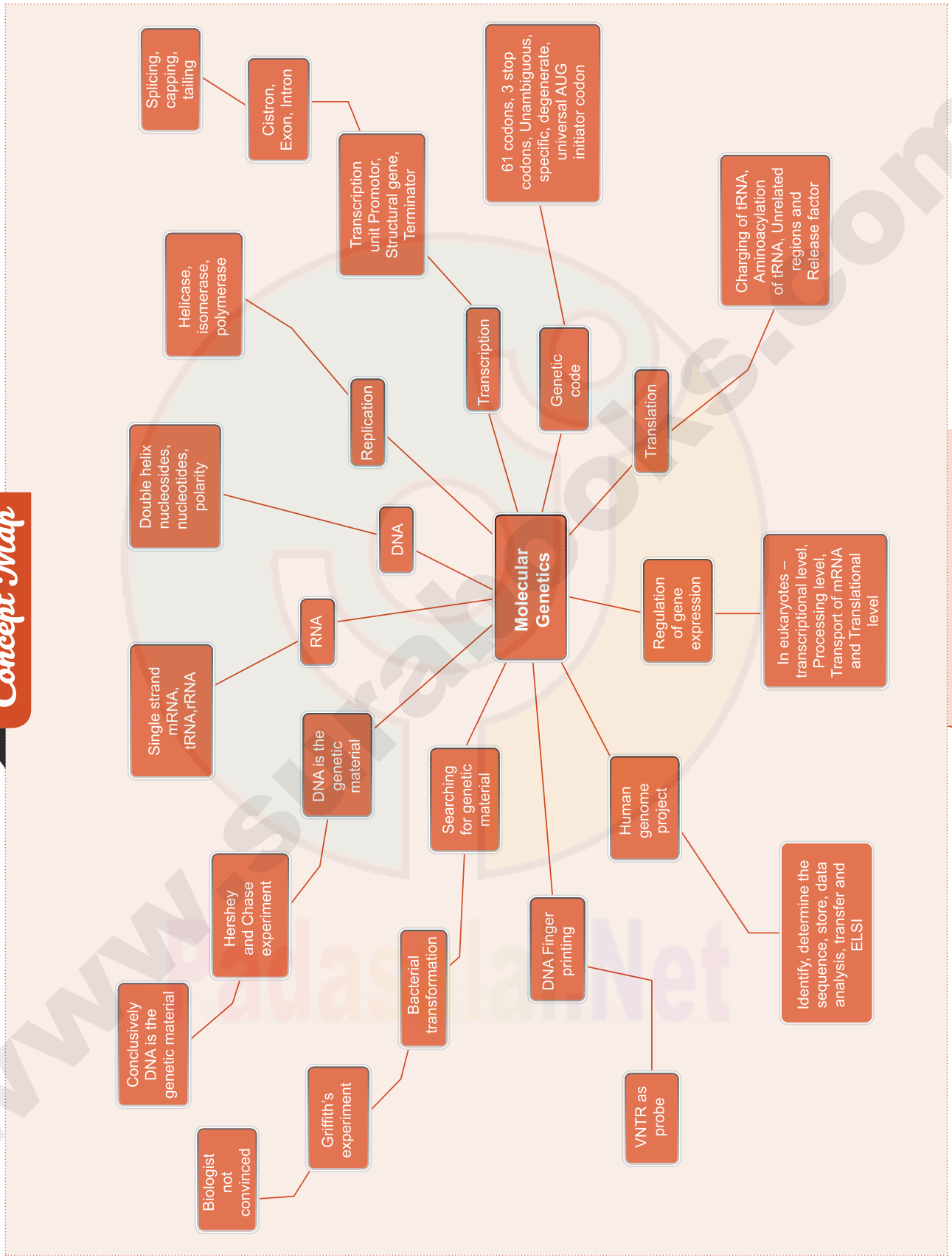
UNIT II

Chapter 5

MOLECULAR GENETICS

CHAPTER SNAPSHOT

Concept Map



Very Short Answers — 2 Marks

1. Mention any four salient features of Human Genome Project. *[Govt.MQP-2019]*

Ans. *(i)* Although human genome contains 3 billion nucleotide bases, the DNA sequences that encode proteins make up only about 5% of the genome.

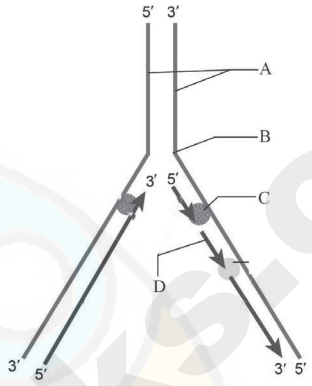
(ii) An average gene consists of 3000 bases, the largest known human gene being dystrophin with 2.4 million bases.

(iii) The function of 50% of the genome is derived from transposable elements such as LINE and ALU sequence.

(iv) Genes are distributed over 24 chromosomes. Chromosome 19 has the highest gene density. Chromosome 13 and Y chromosome have lowest gene densities.

Short Answers — 3 Marks

1. Name the process which the picture shows. Write the labelled parts of the picture. *[HY-2019]*



Ans. A - Template strands
B - Replication fork
C - DNA polymerase
D - Okazaki fragments

Additional Questions

Choose the Correct Answer — 1 Mark

I. Choose the correct options for the below Questions

1. The term gene was coined by _____
(a) Mendel (b) Lyon
(c) Johannsen (d) Hershey
[Ans. (c) Johannsen]

2. The classical concept of a gene was given by _____
(a) Mendel (b) Sutton
(c) Johannsen (d) Hofmeister
[Ans. (b) Sutton]

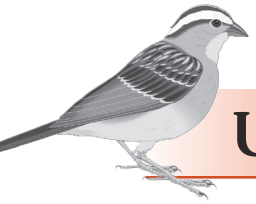
3. One gene one enzyme hypothesis was proposed by Beadle and Tatum based on _____
(a) *Yeast* (b) *Drosophila*
(c) *E. coli* (d) *Neurospora*
[Ans. (d) *Neurospora*]

4. Chromosomes were first observed by _____
(a) Miescher (b) Hofmeister
(c) Avery (d) Griffith
[Ans. (b) Hofmeister]

5. The term nucleic acid was coined by _____
(a) Miescher (b) Hofmeister
(c) Altman (d) Mcleod
[Ans. (c) Altman]

6. Griffith's experiments proved that _____
(a) RNA is involved in protein synthesis
(b) Bacteria undergoes asexual reproduction
(c) DNA is the genetic material
(d) DNA is made of two strands
[Ans. (c) DNA is the genetic material]

7. The experiment conducted by Griffith was based on _____
(a) Transduction (b) Replication
(c) Transformation (d) Conjucation
[Ans. (c) Transformation]



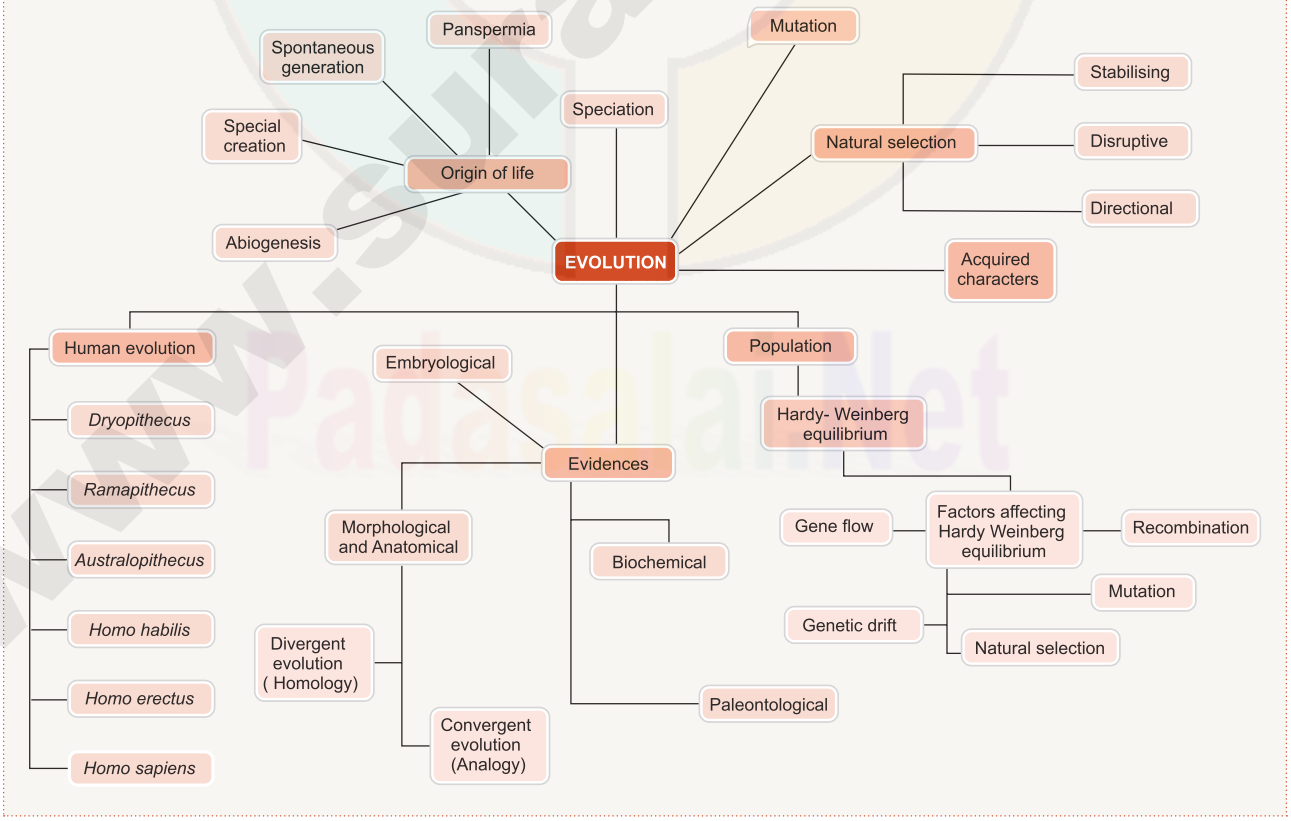
UNIT II

Chapter 6

EVOLUTION

CHAPTER SNAPSHOT

Concept Map



2. Match the following and find the correct answer. *[PTA-5]*

(i)	Tertiary period	(A)	Age of fishes
(ii)	Jurassic period	(B)	Dominance of invertebrates
(iii)	Devonian period	(C)	Mammals and birds
(iv)	Ordovician period	(D)	Golden age of Reptiles

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

[*Ans.* (d) (i) C (ii) D (iii) A (iv) B]

3. Which is the correct order of human evolution? *[PTA-6]*

(a) Hominid → Homo habilis → Homo erectus → Homo sapiens
(b) Homo habilis → Homo erectus → Hominids → Homo sapiens
(c) Homo erectus → Homo habilis → Hominids → Homo sapiens
(d) Homo habilis → Hominids → Homo exctus → Homo sapiens

[*Ans.* (a) Hominid → Homo habilis → Homo erectus → Homo sapiens]

Very Short Answers — 2 Marks

1. State the theory of chemical evolution. *[PTA-2]*

Ans. According to the theory of chemical evolution primitive organisms in the primordial environment of the Earth evolved spontaneously from inorganic substances and physical forces such, as lightning, UV radiations, volcanic activities, etc.

2. Differentiate Relative dating from Absolute dating. *[PTA-3]*

Ans.

Relative dating	Absolute dating
Relative dating is used to determine a fossil by comparing it to similar rocks and fossils of known age.	Absolute dating is used to determine the precise age of a fossil by using radiometric dating to measure the decay of isotopes.

Short Answers — 3 Marks

1. What is the evolutionary significance of Archaeopteryx? *[PTA-2]*

Ans. ***(i)*** Archaeopteryx is considered as the common ancestors of all birds.
(ii) This organism about 150 million years ago and its fossils are the proof that birds have originated from replies.
(iii) If forms an important link between two classes in the phylum chordata.

2. What is the role of connecting links in evolution? *[PTA-3]*

Ans. The organisms which possess the characters of two different groups (transitional stage) are called connecting links.

Example: *Peripatus* (connecting link between Annelida and Arthropoda), *Archeopteryx* (connecting link between Reptiles and Aves).

3. Gene flow can be a strong agent of evolution Explain how? *[PTA-5]*

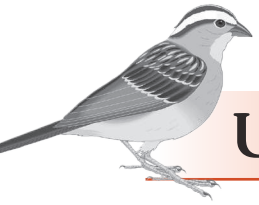
Ans. ***(i)*** Movement of genes through gametes or movement of individuals in (immigration) and out (emigration) of a population is referred to as gene flow.
(ii) Organisms and gametes that enter the population may have new alleles or may bring in existing alleles but in different proportions than those already in the population. Gene flow can be a strong agent of evolution.

Long Answers — 5 Marks

1. Explain the modern synthetic theory of natural selection. *[PTA-6]*

Ans. **Modern synthetic theory:**

According to this theory gene mutations, chromosomal mutations, genetic recombinations, natural selection and reproductive isolation are the five basic factors involved in the process of organic evolution.



UNIT III

Chapter 7

HUMAN HEALTH AND DISEASES

CHAPTER SNAPSHOT

MUST KNOW DEFINITIONS

Communicable diseases	:	Diseases which are transmitted from one person to another are called infectious diseases or **communicable diseases.**
Non infectious diseases	:	Diseases are not transmitted from infected to a healthy person.
Vector	:	An insect (organism which carries the pathogen from infected person/things to a healthy person.
Pandemic	:	A disease which has spread worldwide.
Digenic parasite	:	An organism which requires two hosts to complete its life cycle
Hygiene	:	Set of practices performed to conserve good health
Drug abuse	:	The intake of drugs in an amount and frequency that impairs one's physical, Physiological and Psychological functions.
Euphoria	:	A state characterised by mental and emotional preoccupation with the drug by the person.
Alcoholism	:	Initially to control drinking due to physical and emotional dependence on alcohol
Addiction	:	Physical or Psychological need to do or take or use certain substance to the point that it can be harmful to the individual.
Korsakoff syndrome	:	Chronic memory disorder caused by alcohol misuse.
Zoonotic	:	An organism transmitted from animals to humans

5. **Why dendritic cells are called so?** *[PTA-5]*

(a) Because they look like teeth of animals
(b) Because they cause dent in the host body
(c) Because they look like dentrites of nerve cells
(d) Because they function like nerve cells.

[*Ans.* (c) Because they look like dentrites of nerve cells]

6. **Which one of the following is not a correct pair?** *[PTA-6]*

(a)	African sleeping sickness	-	Tsetse fly
(b)	Amoebiasis	-	House fly
(c)	Kala azar	-	Sand fly
(d)	Malaria	-	Aedes mosquitoes

[*Ans.* (d) Malaria - Aedes mosquitoes]

Very Short Answers — 2 Marks

1. **Differentiate Merozoites from Sporozoites.**

Ans. *[PTA-1]*

	Merozoites	Sporozoites
1.	Sporozoites enters into the liver, they undergo multiple asexual fission and produce merozoites.	The oocyte undergoes meiosis by a process sporogony to form sporozoites.
2.	If penetrates the RBC's.	Sporozoites migrate to the salivary glands of the *Anopheles* mosquito and is injected into the human mosquito.

2. **Write the symptoms of Hepatitis–B.** *[PTA-1]*

Ans. Liver damage, jaundice, nausea, yellowish eyes, fever and pain in the abdomen.

3. **A 10 year old child is suffering from chicken pox. Is this infection good or bad? Give reason for your answer.** *[PTA-4]*

Ans. *(i)* Chickenpox is an infection caused by the *Varicella zoster* virus.
(ii) Most commonly, children get chickenpox before the age of 10.
(iii) The immune system makes proteins called antibodies during the infection.
(iv) It's better to get chickenpox as a child than as an adult.

4. **Mention the four types malaria and their causative agents.** *[PTA-5]*

Ans. *(i)* Tertian, benign tertian or vivax malaria - *P. vivax*
(ii) Quartan malaria - *P. malariae*
(iii) Mild tertian malaria - *P. ovale*
(iv) Malignant tertian or quotidian malaria - *P. falciparum*

5. **Define metastasis.** *[PTA-5]*

Ans. *(i)* A tumour or neoplasm is a group of cells whose growth has gone unchecked.
(ii) When a tumour continues to grow and invades healthy tissue, it is called cancer.
(iii) They spread to other parts of the body from the tumour and give rise to secondary tumour. This is known as metastasis.

Short Answers — 3 Marks

1. **Why is typhoid called as enteric fever?** *[PTA-4]*

Ans. Typhoid is also known as enteric fever, because is a common worldwide bacterial disease caused by the ingestion of contaminated food and water which contain the bacterium *Salmonella enterica.*

Long Answers — 5 Marks

1. **Explain the role of immunity in prevention of cancer.** *[PTA-1]*

Ans. *(i)* When a cell undergoes malignant transformation, it acquires new surface antigen and may also lose some normal antigens.
(ii) These antigens are present on the membranes of malignant cells and they induce an immune response.
(iii) Both humoral and cellular responses can be observed in malignancy.
(iv) Cancer cells can avoid immune detection as they are not foreign bodies but are abnormally functioning body cells. This makes them difficult to treat.

2. List any five bacterial diseases causative agents, mode of transmission of syndrome.

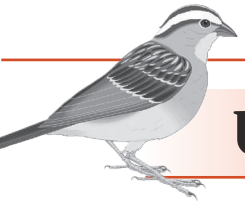
Ans.

No	Diseases	Causative agent	Site of infection	Mode of transmission	Symptoms
1	Shigellosis (Bacillary dysentery)	*Shigella sp.*	Intestine	Food and water contaminated by faeces / faecal oral route	Abdominal pain, dehydration, blood and mucus in the stools
2	Bubonic plague (Black death)	*Yersinia pestis*	Lymph nodes	Rat flea vector-Xenopsylla cheopis	Fever, headache, and swollen lymph nodes
3	Diphtheria	*Corynebacterium diphtheriae*	Larynx, skin, nasal and genital passage	Droplet infection	Fever, sore throat, hoarseness and difficulty in breathing
4	Cholera	*Vibrio cholerae*	Intestine	Contaminated food and water/ faecal oral route	Severe diarrhoea and dehydration
5	Tetanus (Lock jaw)	*Clostridium tetani*	Spasm of muscles	Through wound infection	Rigidity of jaw muscle, increased heart beat rate and spasm of the muscles of the jaw and face

3. List any five viral diseases, their casuative agents, site of infection, mode of transmission and symptoms.

Ans.

S. No	Diseases	Causative agent	Site of infection	Mode of transmission	Symptoms
1	Common cold	*Rhino viruses*	Respiratory tract	Droplet infection	Nasal congestion and discharge, sore throat, cough and headache
2	Mumps	*Mumps virus (RNA virus) Paramyxo virus*	Salivary glands	Saliva and droplet infection	Enlargement of the parotid glands
3	Measles	*Rubella virus (RNA virus), Paramyxo virus*	Skin and respiratory tract	Droplet infection	Sore throat, running nose, cough and fever. reddish rashes on the skin, neck and ears
4	Viral hepatitis	*Hepatitis - B virus*	Liver	Parenteral route, blood transfusion	Liver damage, jaundice, nausea, yellowish eyes, fever and pain in the abdomen
5	Chicken pox	*Varicella -Zoster virus (DNA Virus)*	Respiratory tract, skin and nervous system	Droplet infection and direct contact	Mild fever with itchy skin, rash and blisters



UNIT III

Chapter 8

MICROBES IN HUMAN WELFARE

CHAPTER SNAPSHOT

6. _____ got from fungi is used as an immune suppressant in organ transplantation.
(a) Statin (b) Cyclosporin A
(c) Insulin (d) Protease.
[Ans. (b) Cyclosporin A]

7. The first bioherbicide was got from _____.
(a) *Trichoderma*
(b) *Phytophthora* species
(c) *Bacillus* (d) *Aspergillus*
[Ans. (b) *Phytophthora* species]

8. _____ is not used as a biofertilizer.
(a) *Bacillus thuringiensis* (b) *Rhizobium*
(c) *Nostoc* (d) *Anabaena*
[Ans. (a) *Bacillus thuringiensis*]

9. _____ is used for recycling of PET plastics.
(a) *Dechloromonas aromatica*
(b) *Phanerochaete chrysosporium*
(c) *Ideonella sakaiensis*
(d) Nitrosomonas
[Ans. (c) *Ideonella sakaiensis*]

10. _____ is free living bacteria which acts as a biofertilizer.
(a) *Azospirillum* (b) *Nostoc*
(c) *Oscillatoria* (d) *Glomus*
[Ans. (a) *Azospirillum*]

II. Choose the Correct Options for the Below Fill in the Blanks

1. Mycorrhiza cannot contribute to this process.
(a) Resistance to pathogens
(b) Tolerance to salinity
(c) Help to fix nitrogen
(d) Enhance plant growth
[Ans. (c) Help to fix nitrogen]

2. _____ is not a part of MFC.
(a) Bacteria
(b) Semi permeable Membrane
(c) Cathode (d) Electric circuit
[Ans. (b) Semi permeable membrane]

3. The cry toxin affects _____ system of insect pests
(a) Nervous system
(b) Respiratory system
(c) Digestive system
(d) Reproductive system
[Ans. (c) Digestive system]

4. Biofertilizers are not involved in this process
(a) increase water holding capacity of soil
(b) Help to degrade pollutants
(c) Provide nutrients
(d) Improve soil texture
[Ans. (b) Help to degrade pollutants]

5. _____ is a prokaryotic organism helping to improve fertility of the soil.
(a) *Glomus* (b) Azolla
(c) legume (d) *Tolypothrix*
[Ans. (d) *Tolypothrix*]

6. Identify the free living nitrogen fixing bacteria.
(a) Azotobacter (b) *Rhizobium*
(c) *Glomus*
(d) *Ideonella sakaiensis* [Ans. (a) Azotobacter]

7. A free living fungi which is a biocontrol agent.
(a) *Phytophthora palmivora*
(b) *Trichoderma*
(c) Polyporus (d) Peziza
[Ans. (b) *Trichoderma*]

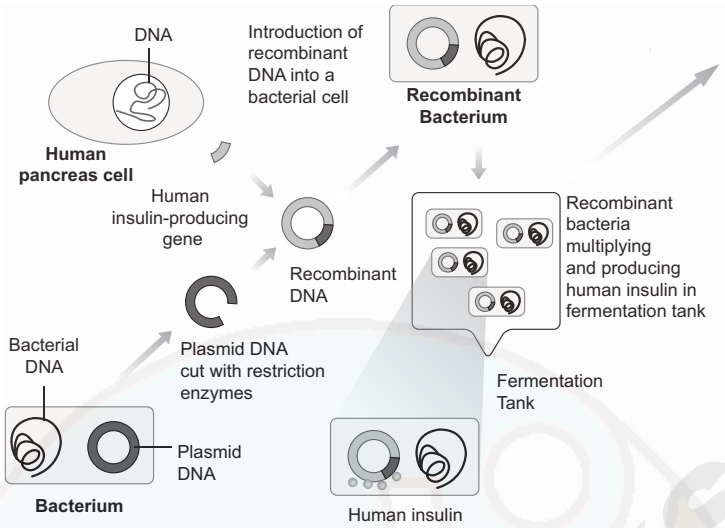
8. Plants used for bio-diesel production.
(a) *Anabaena* (b) Jatropha
(c) *Pongamia* (d) b and c
[Ans. (d) b and c]

9. _____ is not a biocontrol agent.
(a) *Trichoderma* (b) Dragonfly
(c) *Glomus* (d) Buculovirus
[Ans. (c) Glomus]

10. *Rhizopus oryzae* can produce _____.
(a) Fumaric acid (b) Malic acid
(c) Acetic acid (d) Citric acid
[Ans. (a) Fumaric acid]

III. Identify the Correct Statements

1. (i) The Yamuna action plan is a bilateral project.
(ii) Biogas plant works on a aerobic mode.
(iii) *Trichoderma* species occur in the root system.
(iv) Bioremediation is a artificial process
(a) i and iv (b) ii and iii
(c) ii, iii and iv (d) i and ii
[Ans. (d) i and iii]



Human Insulin Production

Zoology Long Version Questions (for pure science Group)

Q.No. 1 to 3 Refer Evaluation.

4. **GEAC stands for**

(a) Genome Engineering Action Committee
(b) Ground Environment Action Committee
(c) Genetic Engineering Approval Committee
(d) Genetic and Environment Approval Committee

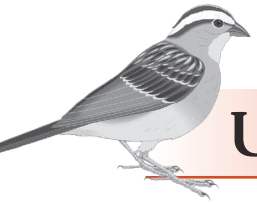
[*Ans.* (c) Genetic Engineering Approval Committee]

5. **Refer Evaluation Q.No.4**
6. **Refer Evaluation Q.No.5**
7. **Refer Evaluation Q.No.6**
8. **Refer Evaluation Q.No.7**
9. **Refer Evaluation Q.No.8**
10. **Refer Evaluation Q.No.9**
11. **Refer Evaluation Q.No.10**
12. **Refer Evaluation Q.No.11**
13. **Refer Evaluation Q.No.12**
14. **Refer Evaluation Q.No.13**
15. **Refer Evaluation Q.No.14**
16. **Refer Evaluation Q.No.15**
17. **Refer Evaluation Q.No.16**
18. **Refer Evaluation Q.No.17**
19. **Refer Evaluation Q.No.18**
20. **Refer Evaluation Q.No.19**
21. **Refer Evaluation Q.No.20**
22. **Refer Evaluation Q.No.21**
23. **Refer Evaluation Q.No.22**

24. **What are the possible risks of GMOs?**

Ans. GMOs stands for Genetically Modified Organisms. The possible risks of GMO's include:

Environmental	Health	Agricultural
Toxins in pest-resistant GMOs could negatively impact non-target organisms and harm ecosystems.	Proteins transcribed and translated from transferred genes could cause allergic reactions in humans or other animals – currently GM foods are not properly labelled.	GMOs with pest toxins could increase evolution of resistance in certain pest populations.



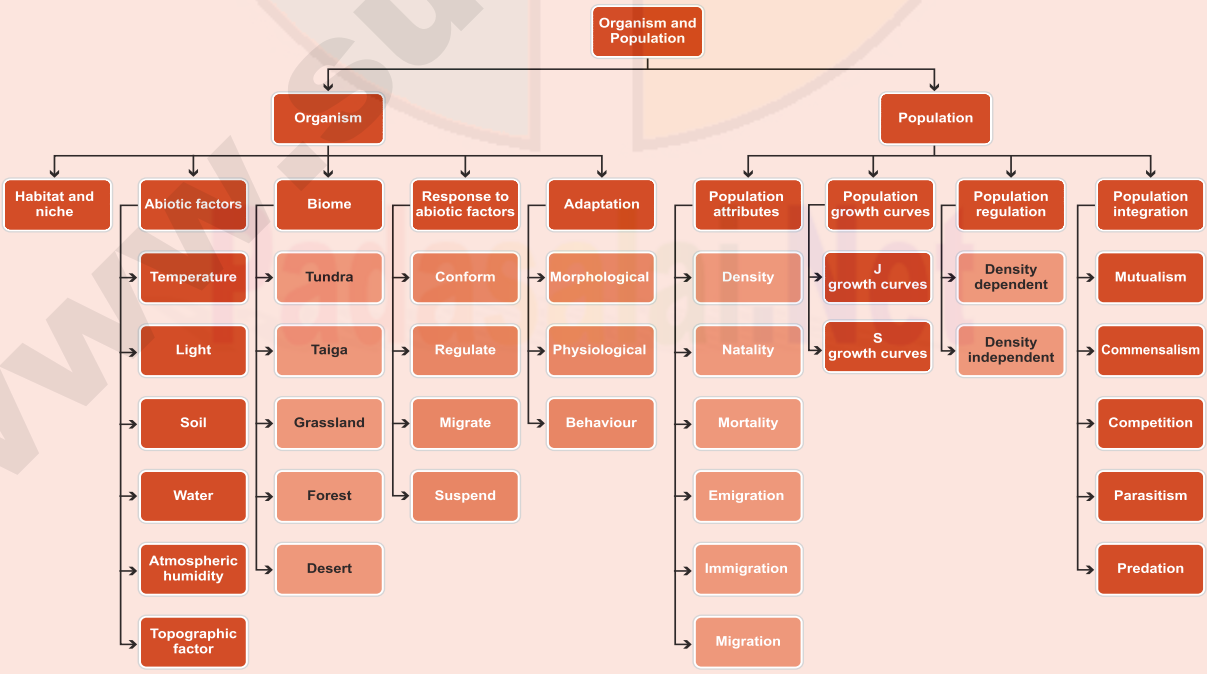
UNIT V

Chapter 10

ORGANISMS AND POPULATIONS

CHAPTER SNAPSHOT

Concept Map



(viii) Only animals which can tap available water or capable of storing sufficient water and withstand the heat can survive in the desert. The animals include small nocturnal (active at night) carnivores. The dominant animals are burrowers and have cursorial, fossorial and saltatorial adaptations.

(ix) The animals stay inactive in protected hideaways during the hot day and come out to forage at dusk, dawn or at night,when the desert is cooler.

(x) The dominant animals of warm deserts are reptiles and small mammals. The Indian Spiny-tailed lizard, the black buck, the white-footed fox are the common fauna of the Thar deserts. There are also insects, arachnids and birds.

Additional Questions and Answers

Choose the Correct Answer — 1 Mark

I. Choose the Correct options for the below Questions

1. The word 'Niche' was first used by _____.
a) Charles Elton b) Van't Hoff
c) Bergmann d) Jordon
[Ans. (a) Charles Elton]

2. Van't Hoff's rule describes the impact of _____ on the environment.
a) Light b) Temperature
c) Water d) Soil
[Ans. (b) Temperature]

3. "Birds and mammals attain greater body size in colder regions than warmer regions." – Choose the correct option.
a) Bergmann's rule b) Jordon's rule
c) Sewall wright effect d) Allen's rule
[Ans. (a) Bergmann's rule]

4. Which of the following is a behavioural adaptation?
a) Thick fur b) camouflage
c) Sharp canines d) Migration
[Ans. (d) Migration]

5. Identify the response under which 'Osmotic balance' can be classified.
a) Suspend b) Regulate
c) Migrate d) Conform
[Ans. (b) Regulate]

6. Type of response in hibernation and aestivation.
a) Suspend b) Regulate
c) Migrate d) Conform
[Ans. (a) Suspend]

II. Choose the Correct options for the below Fill in the blanks:

1. Animals destroyed at the feet of elephants is an example of _____
a) Mutualism b) Amensalism
c) Commensalism d) parasitism
[Ans. (b) Amensalism]

2. Birds sitting on cows to eat insects is an example of _____.
a) Competition b) Mutualism
c) Commensalism d) Amensalism
[Ans. (c) Commensalism]

3. Nuts are eaten by birds and squirrels. This is an example of an interaction called _____.
a) Commensalism b) Mutualism
c) Amensalism d) Competition
[Ans. (d) Competition]

4. 1000 fish in the volume of water in the pond indicates _____
a) Relative abundance
b) Ecological density
c) Crude density
d) Population density
[Ans. (b) Ecological density]

5. Diapause is a type of response classified under _____.
a) Suspend b) Migrate
c) Conform d) Regulate
[Ans. (a) Suspend]

Unit Test

Time : 1hr] [Marks: 25

I. Choose the Correct Answer 10×1 = 10

1. Which of the following is a behavioural adaptation?
   a) Thick fur b) Comouflauge
   c) Sharp canines d) Migration

2. Type of response in hibernation and aestivation.
   a) Suspend b) Regulate
   c) Migrate d) Conform

3. Birds sitting on cows to eat insects is an example of _____.
   a) Competition b) Mutualism
   c) Commensalism d) Amensalism

4. Competition between species leads to _____
   (a) Extinction (b) Mutation
   (c) Amensalism (d) Symbiosiss

5.

1. Egrets and cattle	a. Parasitism
2. Sea anemone and hermit crab	b. Predation
3. Jackal and deer	c. Commensalism
4. Pathogenic fungi	d. Mutualism

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

6. Identify the wrong statement from the below.
   i) Catla, Rohu and Mrigal occupy different ecological niches.
   ii) According to Jordon, in some aquatic environments, lower the temperature, more the vertebrae.
   iii) Euglena shows phototropism.
   iv) Grasslands are a major source for the logging industry.
   a) i and iv b) iii and iv
   c) ii and iii d) i only

7. **Assertion:** Rapidly growing population has larger proportion of young individuals.
   Reason: Natality is high in such a population.
   (a) A and R are true, R is the correct explanation of A
   (b) A and R are true, R is not the correct explanation of A
   (c) A is true, R is false
   (d) Both A and R are false

8. The word 'niche' was first used by _____.
   a) Charles Elton b) Van't Hoff
   c) Bergmann d) Jordon

9. The relationship between sucker fish and shark is _____.
   (a) Competition (b) Commensalism
   (c) Predation (d) Parasitism.

10. Which of the following is an r-species?
    (a) Human (b) Insects'
    (c) Rhinoceros (d) Whale

II. Very Short Answer 2×2 = 4

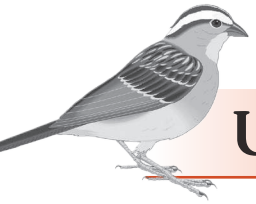
11. What is Migration?
12. Mention two adaptations seen in aquatic animals?

III. Short Answer 2×3 = 6

13. Eurythermy is advantageous to the animal. Justify.
14. Explain Commensalism with an example.

IV. Long Answer 1×5 = 5

15. Differentiate between Tundra and Taiga biome.



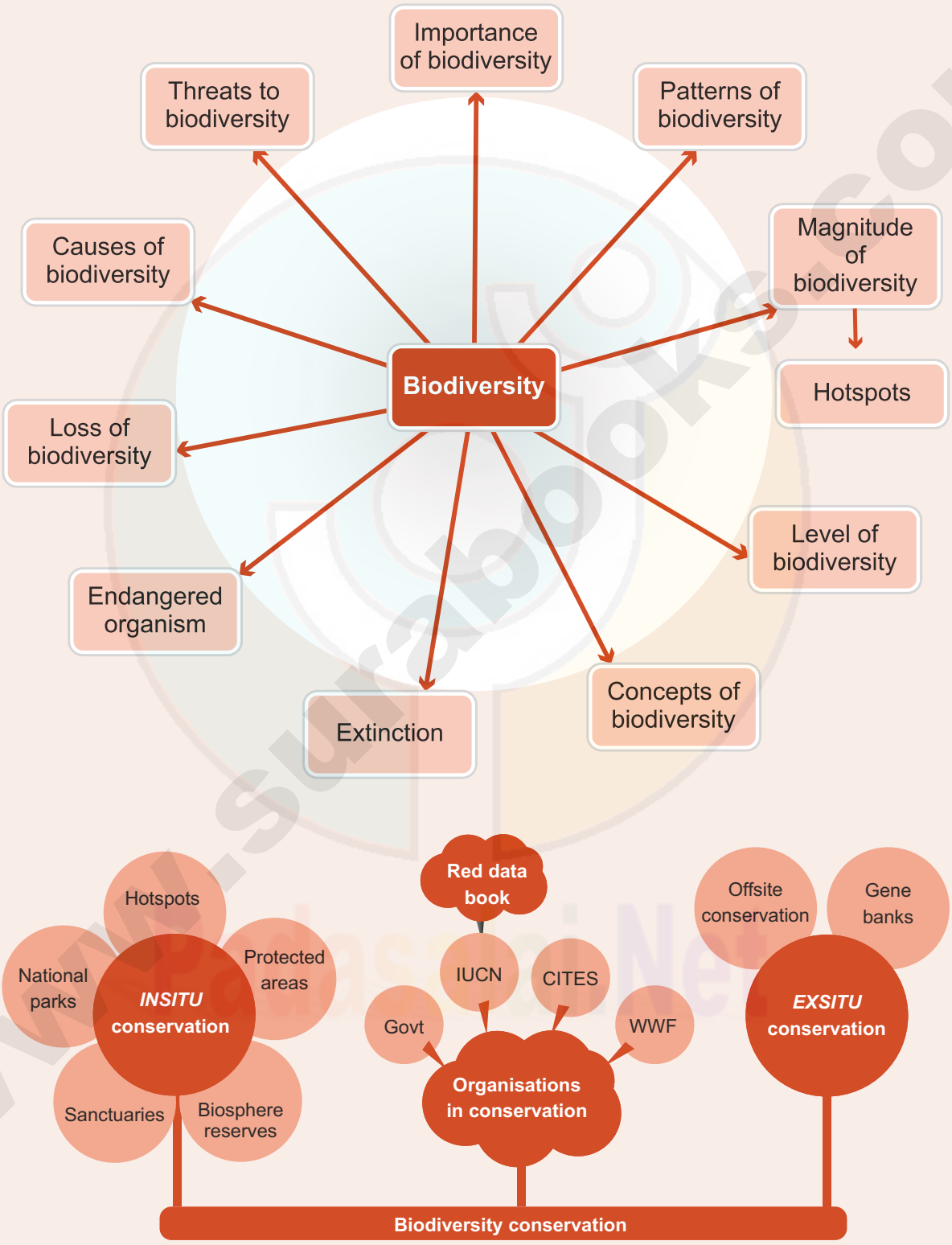
UNIT V

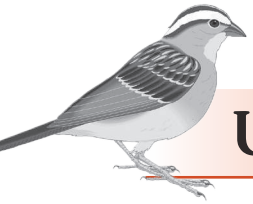
Chapter 11

BIODIVERSITY AND ITS CONSERVATION

CHAPTER SNAPSHOT

Concept Map





UNIT V

Chapter 12

ENVIRONMENTAL ISSUES

CHAPTER SNAPSHOT

ZOOLOGY LONG VERSION (FOR PURE SCIENCE GROUP)

UNIT III

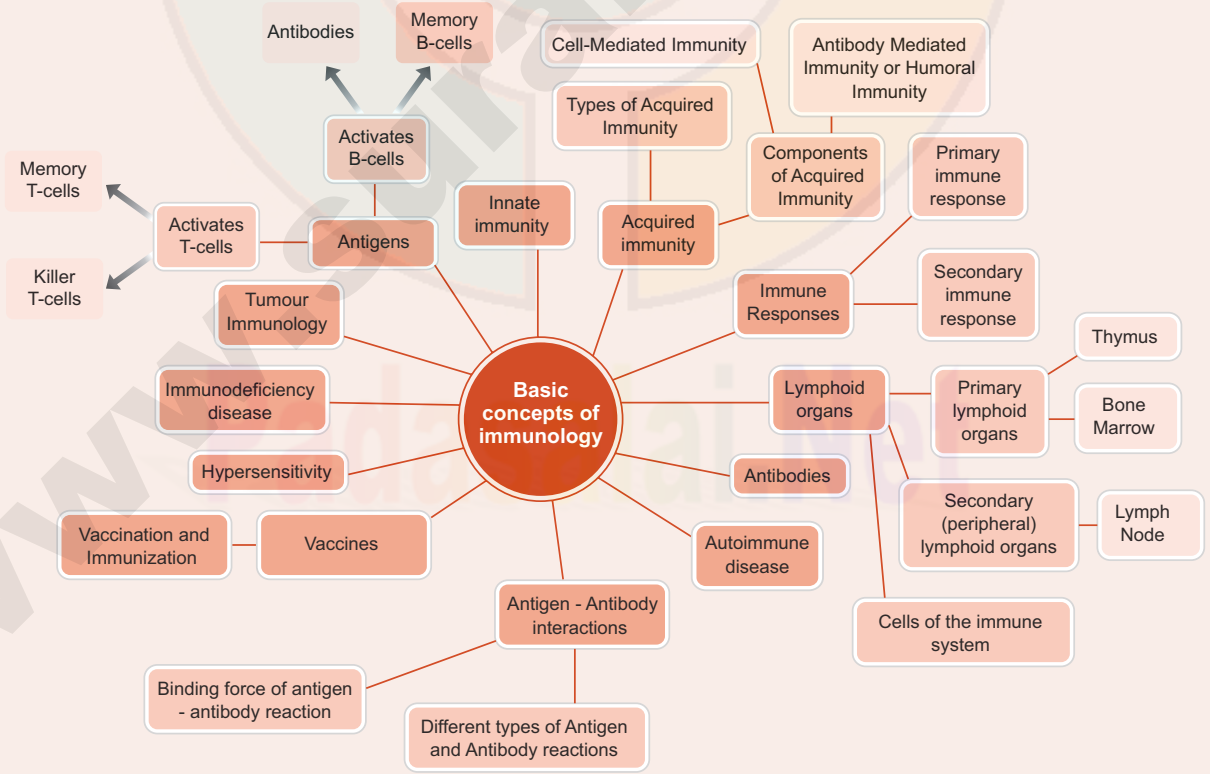
Chapter 8

IMMUNOLOGY

This Chapter is for only long version not for short version

CHAPTER SNAPSHOT

Concept Map



S. No	Primary lymphoid	Secondary lymphoid
1.	The primary Alymphoid organs provide appropriate environment for lymphocytic maturation.	The secondary lymphoid organs trap antigens and make it available for mature lymphocytes, which can effectively fight against these antigens.
2.	It is also called as central lymphoid organ. Eg: Thymus gland	It is also called as peripheral lymphoid organs. Eg: Spleen

2. What is Bursa of fabricius?

Ans. **(i)** Bursa of fabricius is a primary lymphoid organ of birds.

(ii) It is attached to the dorsal side of the cloaca.

(iii) B lymphocytes mature in the bursa and bring about humoral immunity.

3. Write a note on spleen as a lymphoid organ.

Ans. Spleen is a secondary lymphoid organ located in the upper part of the abdominal cavity close to the diaphragm.

(i) Spleen contains B and T cells.

(ii) It brings humoral and cell mediated immunity.

4. Distinguish Epitope and Paratope.

Ans.

S. No	Epitope	Paratope
1.	Epitope is an antigenic determinant	Paratope is the antigen – binding site
2.	It is the active part of an antigen.	It a part of an antibody which recognizes and binds to an antigen.

5. How are antigens classified?

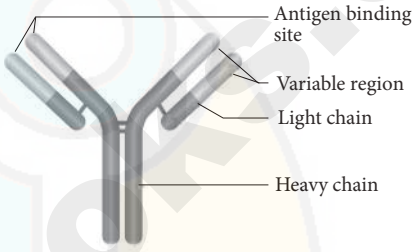
Ans. On the basis of origin, antigens are classified into **exogenous antigens** and **endogenous antigens**.

(i) **Exogenous antigen:** The antigens which enter the host from the outside in the form of microorganisms, pollens, drugs, or pollutants .

(ii) **Endogenous antigens:** The antigens which are formed within the individual are **Eg.** Blood group antigens.

6. Draw a immunoglobulin and label any 4 parts.

Ans.



Structure of immunoglobulin

7. What is Metastasis?

Ans. The tumor cells spread to other parts of the body from the tumour and give rise to secondary tumour. This is known as metastasis.

8. V regions of an antibody are different in different antibodies. Justify.

Ans. Antibodies responding to different antigens have very different (V) regions because the (V) regions of the heavy and light chains in each arm of the antibody structure combine to form the antigen binding site shaped to 'fit' a specific antigenic determinant.

9. What are the applications of antigen-antibody reactions?

Ans. **a)** Determine blood groups for transfusion.

b) Determine the characteristics of certain Immunodeficiency diseases.

c) Detect the presence or absence of protein in serum.

10. What is Agglutination?

Ans. **(i)** Whenever a particulate antigen interacts with its antibody, it would result in clumping or agglutination of the particulate antigen, which is called agglutination reaction.

(ii) The antibody involved in bringing about agglutination reaction is called agglutinin.

MCQs for Higher Studies

CHAPTER 1
REPRODUCTION IN ORGANISMS

1. **"Nothing lives forever, but life continues". What does it mean?** [AIPMT 1995]
a) Older dies but new ones are produced by reproduction
b) Nothing can produce without death
c) Death has nothing to do with the continuation of life
d) Parthenogenesis is must for sexual reproduction

2. **A few statements describing certain features of reproduction are given below. Select the options that are true for both sexual and asexual reproduction from the options given:**
i. Gametic fusion takes place
ii. Transfer of genetic material takes place
iii. Reduction division takes place
iv. Progeny have some resemblance with parents
a) i and ii b) ii and iii
c) ii and iv d) i and ii

3. **A few statements with regard to sexual reproduction are given below:**
i. Sexual reproduction does not always require two individuals
ii. Sexual reproduction generally involves gametic fusion
iii. Meiosis never occurs during sexual reproduction
iv. External fertilization is a rule during sexual reproduction
Choose the correct statements from the options below:
a) i and iv b) i and ii
c) ii and iii d) i and iv

4. **Given below are a few statements related to external fertilization. Choose the correct statements:**
i. The male and female gametes are formed and released simultaneously
ii. Only a few gametes are released into the medium
iii. Water is the medium in a majority of organism sexhibiting external fertilization
iv. Offspring formed as a result of external fertilization have better chance of survival than those formed inside the organism
a) iii and iv b) i and iii
c) ii and iv d) i and iv

5. **Which of the following statements, support the view that elaborate sexual reproductive process develops much later in the organic evolution?**
i) Lower groups of organisms have simpler body design
ii) Asexual reproduction is common in lower groups
iii) Asexual reproduction is common in higher groups of organisms
iv) The high incidence of sexual reproduction is in angiosperms and vertebrates.
a) i, ii and iii b) i, iii and iv
c) i, ii, and iv d) ii, iii and iv

CHAPTER 2
HUMAN REPRODUCTION

1. **Select the incorrect statement.** [NEET 2016, phase I]
a) LH and FSH trigger ovulation in ovary
b) LH and FSH decrease gradually during the follicular phase
c) LH triggers secretion of androgens from the Leydig cells.
d) FSH stimulates the sertoli cells which help in spermiogenesis

11. Which one of the following statements is correct with respect to immunity? [AIPMT MAINS 2012]

a) The antibodies against small pox pathogen are produced by T – lymphocytes
b) Antibodies are protein molecules each of which has four light chains.
c) Rejection of a kidney graft is the function of B – lymphocytes.
d) Preformed antibodies need to be injected to treat the bite by a viper snake.

12. Which one of the following is not a property of cancerous cells whereas the remaining three are? [AIPMT PRE 2012]

a) They compete with normal cells for vital nutrients
b) They do not remain confined in the area of formation
c) They divide in an uncontrolled manner
d) They show contact inhibition

13. At which stager HIV infection does one usually show symptoms of AIDS? [AIPMT 2014]

a) Within 15 days of sexual contact with an infected person
b) When the infected retro virus enters host cells
c) When HIV damages large number of helper T- Lymphocytes
d) When the viral DNA is produced by reverse transcriptase

14. Match each disease with its correct type of vaccine [AIPMT 2015]

a) Tuberculosis	i) harmless virus
b) Whooping cough	ii) inactivated toxin
c) Diphtheria	iii) killed bacteria
d) Polio	iv) harmless bacteria

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

15. Which of the following is correct regarding AIDS causative agent HIV? [NEET-II, 2016]

a) HIV is enveloped virus that contains two identical molecules of single-stranded RNA and two molecules of reverse transcriptase
b) HIV is unenveloped retrovirus
c) HIV does not escape but attacks the acquired immune response
d) HIV is enveloped virus containing one molecule of single – stranded RNA and one molecule of reverse transcriptase

CHAPTER 9
MICROBES IN HUMAN WELFARE

1. When domestic sewage mixes with river water [AIPMT MAINS 2010]

a) Small animals like rat will die after drinking river water
b) The increased microbial activity releases micro nutrients such as iron.
c) The increased microbial activity uses up dissolved oxygen.
d) The river water is still suitable for drinking as impurities are only about 0.1 per cent

2. Select the correct statement from the following. [AIPMT PRE 2010]

a) Biogas is produced by the activity of aerobic bacteria on animal waste.
b) Methanobacterium is an aerobic bacterium found in rumen of cattle.
c) Biogas, commonly called gober gas, is pure methane.
d) Activated sludge-sediment in settlement tank of sewage treatment plant is a right source of aerobic bacteria.

3. Read the following four statements (A to D): [AIPMT MAINS 2012]

a) Colostrums is recommended for the new born because it is rich in antigen.
b) Chikungunya is caused by a gram negative bacterium.
c) Tissue culture has proved useful in obtaining virus-free plants.
d) Beer is manufactured by distillation of fermented grape juice

How many of the above statements are wrong?

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

11. **A river with an inflow of domestic sewage rich in organic waste may result in:** [NEET-I, 2016]

a) Drying of the river very soon due to algal bloom
b) Increased population of aquatic food web organisms
c) An increased production of fish due to biodegradable nutrients
d) Death of fish due to lack of oxygen

12. **A lake which is rich in organic waste may result in** [NEET-II, 2016]

a) Drying of the lake due to algal bloom
b) Increased population of fish due to lots of nutrients
c) Mortality of fish due to lack of oxygen
d) Increases population of aquatic organisms due to minerals

13. **The highest DDT concentration in aquatic food chain shall occur in** [NEET-II, 2016]

a) Seagull b) Crab
c) Cell d) Phytoplankto

ANSWERS

Chapter 1	1. (a)	2. (c)	3. (d)	4. (b)	5. (c)					
Chapter 2	1. (b)	2. (a)	3. (b)	4. (b)	5. (d)	6. (d)	7. (b)	8. (b)		
Chapter 3	1. (b)	2. (b)	3. (d)	4. (d)						
Chapter 4	1. (d)	2. (c)	3. (c)	4. (a)	5. (a)	6. (b)	7. (b)	8. (c)	9. (c)	10. (d)
Chapter 5	1. (c)	2. (a)	3. (b)	4. (c)	5. (c)	6. (b)	7. (a)	8. (a)	9. (d)	10. (b)
Chapter 6	1. (c)	2. (c)	3. (b)	4. (c)	5. (d)	6. (b)				
Chapter 7 & 8	1. (b)	2. (d)	3. (b)	4. (c)	5. (d)	6. (a)	7. (c)	8. (a)	9. (d)	10. (a)
	11. (d)	12. (d)	13. (c)	14. (c)	15. (a)					
Chapter 9	1. (c)	2. (d)	3. (a)	4. (a)	5. (a)	6. (b)	7. (d)	8. (d)	9. (d)	
Chapter 10	1. (a)	2. (d)	3. (a)	4. (d)	5. (a)	6. (c)	7. (d)	8. (c)	9. (a)	10. (d)
	11. (c)	12. (d)	13. (d)							
Chapter 11	1. (c)	2. (d)	3. (d)	4. (a)	5. (a)	6. (d)	7. (a)	8. (c)	9. (a)	
Chapter 12	1. (b)	2. (a)	3. (a)	4. (c)	5. (a)	6. (b)	7. (b)	8. (c)		
Chapter 13	1. (b)	2. (c)	3. (d)	4. (b)	5. (a)	6. (a)	7. (b)	8. (a)	9. (d)	10. (d)
	11. (d)	12. (c)	13. (a)							

MCQ's

NEET BASED QUESTIONS

1. **Deiters' cells are supporting cells in :**
   (A) Organ of corti (B) Neuroglia cells
   (C) Both (A) and (B) (D) None of these

2. **Which layer of the uterine endometrium is shed during menstruation?**
   (A) Decidua basalis
   (B) Decidua capsularis
   (C) Decidua menstrualis
   (D) Decidua parietalis

3. **The statistical and quantitative study of human population is called :**
   (A) Demography (B) Kalology
   (C) Mastology (D) Nephilogy

4. **Break bone fever is also known as :**
   (A) Dengu (B) Sleeping sickness
   (C) Ague (D) Leishmaniasis

5. **Colles' fracture is associated with :**
   (A) Humerus (B) Radius
   (C) Ulna (D) Femur

6. **Gull's disease is associate with :**
   (A) Myxoedema (B) Bright's disease
   (C) Acromegaly (D) None of these

7. **Ecotone is characterised by :**
   (A) Terrestrial ecosystem
   (B) Transitional zone between two diverse communities
   (C) Zone of transition between water and land
   (D) Forest ecosystem

8. **Long chain molecules of fatty acids are formed by :**
   (A) Polymerisation of two carbon compunds
   (B) Decomposition of fats
   (C) Polymerisation of glycogen
   (D) None of these

9. **Process of urea formation in humans is also known as :**
   (A) Hans Kreb cycle (B) Nitrogen cycle
   (C) Transamination (D) All the above

10. **In some animals, allantois is also related with:**
    (A) Storage of nitrogenous wastes
    (B) Blood formation
    (C) Digestion
    (D) All the above

11. **Bedbug can survive long time starvation because :**
    (A) It stores glycogen
    (B) It converts uric acid to amino acid
    (C) Its life span is very long
    (D) It can minimise its requirements

12. **Oxygen toxicity is related with :**
    (A) Failure of ventilation of lungs
    (B) Collapse of alveolar walls
    (C) Its life span is very long
    (D) It can minimise its requirements

13. **During respiration, failure of ventilation leads to :**
    (A) Decreased oxygen tension
    (B) Decreased carbon dioxide tension
    (C) Carbonate tension
    (D) Dicarbonate tension

14. **Latissimus dorsi muscles in humans :**
    (A) Draws legs forward
    (B) Draws arms downward and backwards
    (C) Moves head
    (D) Moves ankles

15. **The association of Sea Anemone and Hermit crab is an example of :**
    (A) Mutualism (B) Commensalism
    (C) Parasitism (D) None of these

16. **Heparin is produced by :**
    (A) Nervous cells (B) Liver cells
    (C) Kidney cells (D) Spleen

17. **If the human blood pH changes below 7.0 or rises above 7.8, which of the following will not function properly?**
    (A) Heart (B) Nerves
    (C) Liver (D) All of these

18. **A disease in child showing characterised premature old age, is called :**
    (A) Hartnup disease (B) Progeria
    (C) Fabry's disease (D) Xanthinuria

19. **Which of these protects the changes in basal cell DNA from ultraviolet wavelengths of sun light to avoid skin cancer?**
    (A) Melanocytes (B) Keratinocytes
    (C) Both (A) and (B) (D) None of these

ANSWERS

1.	(C)	2.	(C)	3.	(A)	4.	(A)	5.	(B)	6.	(A)	7.	(B)	8.	(B)	9.	(A)	10.	(A)
11.	(B)	12.	(A)	13.	(A)	14.	(B)	15.	(A)	16.	(B)	17.	(B)	18.	(B)	19.	(A)	20.	(C)
21.	(B)	22.	(C)	23.	(B)	24.	(B)	25.	(C)	26.	(B)	27.	(C)	28.	(D)	29.	(C)	30.	(D)
31.	(B)	32.	(B)	33.	(C)	34.	(B)	35.	(B)	36.	(D)	37.	(C)	38.	(B)	39.	(B)	40.	(D)
41.	(A)	42.	(B)	43.	(D)	44.	(D)	45.	(C)	46.	(D)	47.	(A)	48.	(B)	49.	(A)	50.	(B)
51.	(B)	52.	(C)	53.	(B)	54.	(B)	55.	(A)	56.	(C)	57.	(A)	58.	(D)	59.	(A)	60.	(A)
61.	(A)	62.	(B)	63.	(D)	64.	(B)	65.	(D)	66.	(A)	67.	(B)	68.	(C)	69.	(B)	70.	(D)
71.	(A)	72.	(D)	73.	(A)	74.	(B)	75.	(C)	76.	(B)	77.	(A)	78.	(B)	79.	(C)	80.	(C)

Explanatory Notes

1. Deiters' cells are supporting cells in organ of corti and neuroglia cells.

3. Demography is the statistical and quantitative study of characteristics of human populations and size, growth, density, age and sex distribution and vital statistics are included in the data collected.

5. Colles fracture is the transverse fracture of the distal end of the radius (just above wrist) with displacement of hand backward and outward.

6. Gull's disease is atrophy of the thyroid gland, which causes myxoedema.

17. In the human body changes in the pH of fluids can be dangerous and life-threatening. For example if the pH of blood falls below 7.0 or rises above 7.8, nerves do not function properly and a coma or convulsions may occur.

19. Melanocytes are found in the epidermis. They are specialized to produce a dark pigment called melanin. Melanin protects the DNA of the dividing cells in the basal stratum from damage by ultraviolet wavelengths of sun light. Changes in basal cell DNA can lead to skin cancer.

24. The Acne vulgaris affects most teenagers and few adults, is an infection of the sebaceous glands by the bacterium proprioniobacterium acnes, a normal resident of the skin.

30. Cephalopodes have paired large eyes, efficient and bulge from the dorsolateral sides of head,. They bear striking resemblance to those of a vertebrate eye, in that a cornea, lens, iris, retina are present.

33. The spermatids cannot act directly as the male gamete, so that they have to undergo spermiogenesis. During spermiogenesis spermatids are metamorphosed into sperms.

40. Rennin is secreted only in mammals as an inactive proenzyme, called prerennun. HCI activates it into active rennin. It changes the soluble casein protein of milk into insoluble calcium paracaseinate.

41. Basal-cell carcinoma rarely metastasizes and is the most common and least dangerous form of skin cancer.

12th STD.

Register Number | | | | | | |

SURA MODEL QUESTION PAPER

TIME ALLOWED : 3.00 Hours **BIOLOGY** MAXIMUM MARKS : 70

BIO-ZOOLOGY

(35 MARKS) - PART – I

Note : (i) Answer **all** the questions: **(8 × 1 = 8)**

(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

1. Which one of the following menstrual irregularities is correctly matched?

(a) Menorrhagia - excessive menstruation

(b Amenorrhoea - absence of menstruation

(c) Dysmenorrhoea - irregularity of menstruation

(d) Oligomenorrhoea - painful menstruation

2. Answer the following type of questions Assertion (A) and Reason (R)

A – Ovulation is the release of ovum from the Graafian follicle.

R – It occurs during the follicular phase of the menstrual cycle.

(a) A and R are true, R is the correct explanation of A

(b) A and R are true, R is not the correct explanation of A

(c) A is true, R is false

(d) Both A and R are false

3. Who is the founder of Modern Eugenics movement?

(a) Mendel (b) Darwin

(c) Francis Galton (d) Karl pearson

4. Which of the following statements is not true about DNA replication in eukaryotes?

(a) Replication begins at a single origin of replication.

(b) Replication is bidirectional from the origins.

(c) Replication occurs at about 1 million base pairs per minute.

(d) There are numerous different bacterial chromosomes, with replication ocurring in each at the same time.

5. The most common substrate used in distilleries for the production of ethanol is_____

(a) Soyameal (b) Groundgram

(c) Molasses (d) Corn meal

6. Which of the following is correct for r-selected species?

(a) Large number of progeny with small size

(b) large number of progeny with large size

(c) small number of progeny with small size

(d) small number of progeny with large size

7. Identify the correct assertion and reason

Assertion : Ecoson helps to reduce waste water generation.

Reason : It works on the principle of dry composting

A. If both A and R are true and R is correct explanation for A

B. If both A and R are true but R is not the correct explanation for A

C. If A is true but R is false

D. If both A and R are false.

8. Conservation of biodiversity within their natural habitat is.

(a) *Insitu* conservation

(b) *Exsitu* conservation

(c) In vivo conservation

(d) In vitro conservation

12th STD.

Register Number | | | | | | |

PUBLIC EXAMINATION MARCH-2020

TIME : 3.00 Hours

PART - II - BIOLOGY (with answer)

MAXIMUM MARKS : 70

Instructions:

i. Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

ii. Use **Blue** or **Black** ink to write and underline and use **pencil** to draw diagrams:

Note : (i) Answer **all** the questions: **(8 × 1 = 8)**

(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

PART-II (BIO-ZOOLOGY)

SECTION – I

1. What Saccharomyces Cerevisiae is more suitable for production of recombinant interferons than *E.coli*?

(a) *E.coli* cannot be used in biofermentor.
(b) *E.coli* does not have suitable plasmid for the production of proteins.
(c) *E.coli* does not have the machinery for glycosylation of proteins.
(d) *E.coli* is not easily available for the production of proteins.

2. ELISA is mainly used for:

(a) Selecting plants having desired traits
(b) Detection of mutations
(c) Detection of pathogens
(d) Selecting animals having desired traits

3. **Assertion (A)** : Genetically engineered Bt-cotton is disease resistant type.
Reason (R) : Cry-toxin produced in the plant has specific activities against free living fungi.

(a) Both (A) and (R) are true, but (R) does not explain (A).
(b) (A) is wrong; (R) is correct
(c) Both (A) and (R) are wrong
(d) (A) is true but (R) is wrong

4. Which one of the following are at high risk of extinction due to habitat destruction?

(a) Echinoderms (b) Mammals
(c) Birds (d) Amphibians

5. Identical twins are produced when the following conditions is satisfied:

(a) Two sperms are fertilizing one eggs
(b) Two sperms are fertilizing two eggs
(c) One sperm is fertilizing two eggs
(d) One sperm is fertilizing one egg

6. The difference between DNA sugars and RNA sugars is:

(a) One oxygen atom excess in deoxyribose sugars
(b) One oxygen atom less in ribose sugars
(c) Two oxygen atoms less in ribose sugars
(d) One oxygen atom less in deoxyribose sugars

7. Which one of the following is true to gastrulation?

(a) Formation of multicellular structure from Zygote.
(b) Formation of specific organs from germ layers.
(c) Formation of three germ layer embryo from single layer embryo.
(d) Attachment of blastocyst to the uterine wall.

8. Match the following:

(1)	Copper releasing IUD	(i)	LNG - 20
(2)	Hormone releasing IUD	(ii)	Lippes loop IUD
(3)	Non-medicated IUD	(iii)	Saheli
(4)	Mini pills	(iv)	Multiload - 375

12th STD.

Register Number | | | | | | |

PUBLIC EXAMINATION MARCH - 2020

TIME ALLOWED : 3.00 Hours **PART - III - ZOOLOGY** (with answer) MAXIMUM MARKS : 70

Instructions:

i. Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

ii. Use **Blue** or **Black** ink to write and underline and **pencil** to draw diagrams:

Note : (i) Answer **all** the questions: **(15 × 1 = 15)**

(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

1. The first clinical gene therapy was done for the treatment of :

(a) SCID (b) AIDS
(c) Cancer (d) Cystic Fibrosis

2. _____ and _____ proposed the classical model of Lac operon to explain gene expression and regulation in *E.Coli*.

(a) Hershey, Chalse (b) Jacob, Monod
(c) Meselson, Stahl (d) Watson, Crick

3. If the childs blood group is 'O' and fathers blood group is 'A' and mother's blood group is 'B' the genotype of the parents will be :

(a) $I^A I^o$ and $I^B I^o$ (b) $I^A I^A$ and $I^B I^o$
(c) $I^o I^o$ and $I^B I^B$. (d) $I^A I^B$ and $I^o I^o$

4. **Assertion (A)** : XX-XO type of sex determination is seen in bedbugs, cockroaches and grasshoppers.

Reason (R) : The sex of the offspring depends upon the sperm that fertilizes the egg.

(a) Both **(A)** and **(R)** are true and **(R)** is not the correct explanation for (A)
(b) Both **(A)** and **(R)** are false.
(c) **(A)** is true and **(R)** is false.
(d) Both **(A)** and **(R)** are true and **(R)** is the correct explanation for **(A)**.

5. Find the true and false statements from the following :

(i) *Plasmodium vivax* is a digenic parasite.
(ii) The life cycle of Plasmodium involves 3 phases namenly, schizogony, polygony and sporogony.
(iii) The large schizont shows yellowish - brown pigmented granules called Schuffners granules.
(iv) *Plasmodium* infection leads to Lysis of white blood cells results in cycles of fever and other symptoms.

(a) (i)- True, (ii) -True, (iii) - False, (iv) - True
(b) (i)- True, (ii) -True, (iii) - False, (iv) - False
(c) (i)- True, (ii) -False, (iii) - True, (iv) - False
(d) (i)- False, (ii) -True, (iii) - False, (iv) - True

6. Which one of the following bacterium is not involved in ethanol production?

(a) *Sarcina ventriculi*
(b) *Saccharomyces cervisiae*
(c) *Ideonella sakaiensis*
(d) *Zymomonas mobilis*

7. Which of the following chromosome has the highest gene density?

(a) Chromosome 'Y'
(b) Chromosome 1
(c) Chromosome 19
(d) Chromosome 13

8. Which one of the following technique is used to monitor the foetal heart rate and other functions during late pregnancy and labour?

(a) Foetoscope (b) EEG
(c) Amniocentesis (c) CVS

9. B Cells that produce and release large amount of antibody is called :

(a) Killer Cells (b) Memory Cells
(c) Basophils (d) Plasma Cells

10. In the E-waste generated by the mobile phones, Which among the following metal is most abundant?