Biology Question Bank for 10+2 MR Students (English)

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Unit-1 Reproduction
Chapter-1: Reproduction in Organisms

O ctive Type- 2 marks

I. Fill in the blanks:

1. Gametes are ---------- . (haploid/diploid)
2. Zygote is ----------. (haploid/diploid)
3. Chromosome number in human being is ----------. (46, 23)
4. During embryogenesis, the zygote undergoes----------. (Mitosis/Meiosis)
5. Two gametes, similar in appearance are called ----------. (homogametes/heterogametes)
6. The process of fusion of gemetes is called---------- . (Fertilisation/embryogenesis)

Answers:

1-haploid **4-Mitosis**
2-diploid **5-homogametes**
3-46 **6-Fertilisation**

II. Match the column

Column I Organism	Column II App. Life Span
i. Butterfly	(a) 60 years
ii. Crow	(b) 140 years
iii. Parrot	(c) 100-150 years
iv. Elephant	(d) 15 years
v. Tortoise	(e) 1-2 week

Answer: i(e), ii(d), iii(b), iv(a), v(c)

III. Multiple Choice Questions

1. In which of the following organisms, asexual reproduction occurs by buds?

a) Chlamydomonas b) Sponge

c) Penicillium d) Hydra

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2. Stem cuttings are commonly used for the propagation of:
   a) Banana b) Rose
   c) Mango d) Cotton

3. Binary fission is a form of:
   a) asexual reproduction b) division of amoeba
   c) fusion of chromosomes d) both (a) and (b)

4. In bryophyllum, vegetative reproduction is by:
   a) roots b) stem
   c) Leaves d) branch

5. Sponges reproduce asexually by:
   a) Conidia b) Rhizome
   c) Gemmules d) None of these

Answers: 1-d, 2-b, 3-d, 4-c, 5-c

IV. True/False

1. In frog, external fertilisation takes place.
2. Internal fertilisation takes place outside the body.
3. The period from birth to natural death of an organism is termed as life span.
4. Transfer of pollen grains from anther to the stigma is called Pollination.
5. Reproduction is the process in which an organism gives rise to young ones similar to itself.

Answers:

1-True, 4-True
2-False, 5-True
3-True, ,

V. Very Short (3 marks)Questions

1. Differentiate between binary and multiple fission.
2. What is external fertilisation? Mention its disadvantage.
3. What are different modes of natural vegetative propagation in plants?
4. What are different modes of artificial vegetative propagation in plants.
5. Name the events in sexual reproduction.
6. What is pericarp? What is its function?
7. What is clone?

VI. Short Questions (4 Marks)

1. What is Reproduction? Describe its two types.

2. Describe binary fission in Amoeba.
3. What are seasonal breeders? Give two examples.
4. What are hermaphrodite or bisexual organism? Give two examples.
5. What are oviparous and viviparous animals? Give examples.
6. What is embryogenesis? Explain the processes which occur during embryogenesis.
7. How the birds are exploited commercially for human welfare?

Chapter-2 Sexual Reproduction in flowering Plant.

(Objective Type questions) : 2 Marks each

I. Fill in the Blanks:

1. The removal of stamens in the flower during hybridization is called ---------- . (Emasculation, Bagging)
2. Pollination by birds is called ---------- . (Zoophily, Ornithophily)
3. Cleistogamy favours ----------.(self pollination/cross pollinations)
4. ----------is pollination by bats. (Chiropterophilly, Entomophily)
5. Pollination by animals is called ----------. (Hydrophily/Zoophily)
6. Chasmogamous flowers never ----------. (open/close)

Answers

1-Emasculation, 4-Chiropterophilly

2-Ornithophily, 5-Zoophily

3-self pollination, 6-close

II. Match the Column:

Column I	Column II
i. Testa and tagmen are present in	(a) Embryo sac
ii. Largest cell of ovule is	(b) Seed coat
iii. Female gamete is	(c) Generative Cell
iv. Male gametes are formed from	(d) Micropylar end
v. Egg apparatus is present at	(e) Central Cell

Answers: i- (b), ii-(e), iii-(a), iv-(c), v-(d)

III. Multiple Choice Questions:

1. Development of a fruit from the ovary without fertilization is called:
   (a) Parthenocarpy (b) Apogamy
   (c) Apospory (d) tissue culture
2. Endosperm is consumed by developing embryo in the seeds of:
   (a) pea (b) maize
   (c) coconut (d) castor
3. Banana is seedless because it is developed by:
   (a) sexual reproduction (b) Polyembryony
   (c) Asexual reproduction (d) unfertilised ovules
4. The type of pollination, involving transfer of pollen grains from anther to the stigma of the same flower is known as:
   (a) Geitonogamy (b) Xenogamy
   (c) Autogamy (d) Apogamy
5. When pollen is transferred from anther of a flower to the stigma of another flower of the same plant, is known as:
   (a) Allogamy (b) Xenogamy
   (c) Autogamy (d) Geitonogamy

Answers 1(a), 2(a), 3(c), 4(c), 5(d)

IV. rue /False:

1. Embryo sac is found in ovule.
2. A Cleistogamous flower remains closed to help self pollination.
3. In angiosperms, endosperm develops after double fertilisation.
4. The female gametophyte of a typical dicot at the time of fertilisation is 8 celled.
5. Removal of anther from bud is called Emasculation.

Answers:

1-True **4-False**

2-True **5-True**

3-True

V. Very Short Questions (3 Marks)

1. Define double fertilisation.
2. What are characters of flowers pollinated by insects?
3. Why are date palm plants called dioecious?
4. Name the parts of an angiospermic flower in which development of male and female gametophytes takes place?
5. Why are pollen grains formed in large amounts in maize?
6. Why are cucurbits called monoecious?
7. Why is apple called a false fruit?

VI. Short Questions (4 Marks)

1. What is triple fusion? Where and how does it take place.?Name the nuclei involved in triple fusion.
2. What is apomixes? Write its importance.
3. List important features of wind pollinated plants.
4. What is Apocarpous and Syncarpous ovary?
5. What is pollination? Name different types of pollination.
6. Write difference between self and cross pollination.
7. Define Parthenocarpy. What is its significance?

Chapter-3 Human Reproduction
Objective Type 2 Marks Questions

I. Fill in the blanks :

1. Humans reproduce ----------. (asexually/Sexually)
2. Fertilisation is ---------- in humans. (external/internal)
3. Zygote is ----------. (diploid/haploid)
4. Humans are ----------. (oviparous/viviparous/ovo-viviparous)
5. Male and female gametes----------. (diploid/haploid)
6. Fertilisation takes place in ----------. (Ovary/Oviducts)

Answers:

1. **Sexually**
2. **Internal**
3. **Diploid**
4. **viviparous**
5. **haploid**
6. **Oviducts**

II. Match the Column:

Column I	Column II
i. In human female, the first menstruation is called	(a) 50 years
ii. Human female reaches menopause around the age of	(b) Spermiogenesis
iii. The seminal plasma along with sperms constitute	(c) Progesterone
iv. Corpus luteum secretes	(d) Semen
v. The process of transformation of spermatids into sperms	(e) Menarche

Answers: i-(e), ii- (a), iii-(d), iv-(c), v-(b)

III. Multiple choice Questions:

1. In 28-days human ovarian cycle, ovulation occurs on
   (a) Day 1 (b) day 5
   (c) day 14 (d) day 28
2. In man, the sperms are produced in:
   (a) Seminiferous tubules (b) Vasa efferentia
   (c) Rete testis (d) Vas deferens
3. The part of fallopian tube closer to ovary is:
   (a) Isthmus (b) In fundibulum
   (c) Cervix (d) Ampulla
4. The internal cavity formed by cell division prior to gastrula is
   (a) Antrum (b) Enteron
   (c) Archenteron (d) Blastocoel
5. Middle piece of mamalian sperm possesses:
   (a) Mitochondria and Centrioles (b) Mitochondria only
   (c) Centrioles (d) Nucleus and mitochondria.

Answers: 1(c), 2(a), 3(b), 4(d), 5(b)

IV. True/False:

1. Androgens are produced by sertoli cells.

2. Menstrual cycle ceases during pregnancy.
3. Leydig cells are found in ovary.
4. Leydig cells synthesis androgens.
5. Oogenesis takes place in corpus luteum.

Answers :

1-True **4-True**

2-True **5-False**

3-False

V. Very Short Questions (3 Marks)

1. Write three phases of Gametogenesis.
2. Name the three phases of menstrual cycle in human female.
3. What is the function of Scrotal sacs?
4. Name three parts of Epididymis.
5. Name the hormones involved in parturition.
6. Name the three germ layers which give rise to all the tissues and organs.
7. Name the three parts of an oviduct.

VI. Short Questions (4 Marks)

1. Give a schematic view of spermatogenesis in humans.
2. Briefly describe the process of oogenesis.
3. What is Menstrual cycle? Which hormones regulate it?
4. Give a brief account of puberty in a human male.
5. Give a brief account of male reproductive system.
6. Give a brief account of female reproductive system.
7. Give a brief account of puberty in human female.

Chapter-4
Reproductive Health

Objective type Questions: 2Marks each

I. Fill in the blanks:

1. The number of individuals inhabiting per unit area ----------.
(Population density/Population Frequency)
2. The branch of science that deals with the trends in human population ----.
(Demography/Geography)

3. The actual birth rate that occurs under the existing conditions ----------. (Natality rate/Mortality Rate)

4. The actual number of deaths in the existing conditions ----------. (Mortality rate/Natality rate)

5. The total number of individuals of a species found in particular area, continent or whole earth ----------. (Population/ecosystem)

Answers:

1-Population density **4-Mortality Rate**
2-Demography **5-Population**
3-Natality rate

II. Match the Column:

Column 1	Column II
i. Semen collected from husband or donor is artificially introduced either into the vagina or into the uterus.	(a) IVF
ii. Transfer of embryos with more than 8 blastomeres into the fallopian tube	(b) ZIFT
iii. Sperm directly injected into the ovum.	(c) GIFT
iv. Transfer of embryos with upto 8 blastomeres into the fallopian tube	(d) ICSI
v. Fertilisation outside the body in almost similar conditions as that in the body.	(e) IUI

Answers: i-e, ii-c, iii-d, iv-b, v-a

III. Multiple choice Questions

1. A method of birth control is:
   (a) GIFT (b) ZIFT
   (c) IVF-ET (d) IUD's
2. Copper-T prevents:
   (a) Ovulation (b) Fertilisation of egg
   (c) Implantation of embryo (d) Both (b) and (c)
3. The prenatal technique to determine the genetic disorder in a foetus is called:
   (a) Laproscopy (b) Amniocentesis
   (c) Abstinence (d) Coitus interruptus
4. Which is related to males?
   (a) Oral pill (b) Tubectomy

(c) Vasectomy (d) None of these

5. The main factor for the growth of human population in India is:
   (a) High birth rate (b) less death rate
   (c) lack of education (d) All the above

Answers : 1(d), 2(d), 3(b), 4(c), 5(d)

IV. True/False

1. Cu-T is used as birth control device by women.
2. Progesterone in the contraceptive pill inhibits estrogen.
3. Vasectomy is related to men.
4. Tubectomy is related to women.
5. GIFT is a method of birth control.
6. Complete lactation could help as a natural method of contraception.

Answers:1-True, 2-False, 3-True, 4-True, 5-False, 6-True

V. Very Short Questions (3 marks)

1. Write the full form of ZIFT, GIFT, ICSI.
2. Name any two copper releasing intrauterine devices. List two reasons that make them effective contraceptives.
3. What is contraception ? Name two types.
4. What is the role played by oral pills?
5. What is amniocentesis?
6. What is the aim of 'Reproductive and Child health care' programme run by govt. of India?
7. Define Reproductive health according to WHO.

VI. Short Questions (4 marks)

1. What are the measures one has to take to prevent from STD's?
2. Write four probable reasons of population explosion in India.
3. (a) Expand IUD.
   (b) Why hormone releasing IUD considered a good contaceptive to space children?
4. What is artificial insemination? Write its significance.
5. Discuss briefly natural methods of contraception.
6. Suggest any two methods to assist infertile couples to have children.
7. List main methods of birth control.

Chapter 5. Principles of inheritance and variations

Part 1 (Objective Questions)

I Fill in the Blanks

1. Mendel studied ---------- characters in Pea plant.(7,14)
2. Haemophilia is a ---------- linked recessive disorder.(X,Y)
3. Point of crossing over is called ----------.(Chiasmata, Centromere)
4. Crossing over occurs at ---------- stranded stage. (Two, four)
5. Linkage and crossing over are ----------related. (Directly, Inversely)
6. Human females are Homogametic and males are ----------.
7. Turner's Syndrome individuals have---------- chromosome combinations. (XO, XXY)
8. ---------- is segment of DNA. (gene, chromosome)
9. Bateson and Punnet discovered ---------- linkage. (complete, incomplete)
10. When F1 Hybrid is crossed with its recessive parent it is called------- cross. (back, test)

Answers:

1-7	**6-Heterogametic**
2-X	**7-XO**
3-chiasmata	**8-Gene**
4-four	**9-Incomplete**
5-inversely	**10-Test**

II Match the column

1.

Column I	Column II
(i) Morgan	a) Linkage
(ii) Mendel	b) Sex Linkage
(iii) Bateson and punnet	c) laws of Heredity

2.

Column I	Column II
(i) Skin colour in Man	a) Monohybrid cross
(ii) ABO blood group	b) dihybrid cross
(iii) Laws of segregation	c) Multiple alleles
(iv) Law of independent assortment	d) Polygenic inheritance

3.

Column I	Column II
(i) Down's syndrome	a) X-Linked Recessive disorder
(ii) Kline felter's syndrome	b) Trisomy of 21^{st} chromosome
(iii) Haemophilia	c) XXY type

4.

Column I	Column II
(i) Monohybrid cross	a) 9:7
(ii) Dihybrid cross	b) 3:1
(iii) Complementary gene	c) 9:3:3:1

5.

Column I	Column II
(i) First filial generation	a) DNA
(ii) Gene	b) Colour blindness
(iii) Sex- linked trait	c) Hybrid

6.

Column I	Column II
(i) Linkage group in Human	a) 4
(ii) Linkage group in garden pea	b) 23
(iii) Linkage group in Drosophila	c) 7

Answer :

1-	**i-b,**	**ii- c**	**iii-a**	
2-	**i-d,**	**ii-c**	**iii-a**	**iv-b**
3-	**i-b**	**ii-c**	**iii-a**	
4-	**i-b**	**ii-c**	**iii-a**	
5-	**i-c**	**ii-a**	**iii-b**	
6.	**i-b,**	**ii-c,**	**iii-a**	

III Multiple choice questions.

1. Father of genetics is
   a. Darwin
   b. Hugo de Vries
   c. Mendel
   d. Morgan
2. Which blood group is a universal donor?
   a. A blood group
   b. O blood group
   c. AB blood group
   d. B blood group
3. Down's Syndrome occurs due to trisomy of
   a. 21^{st} chromosome
   b. 14^{th} chromosome
   c. 3^{rd} chromosome
   d. 15^{th} chromosome
4. In XX-XY type of Sex-determination found in case of human beings which one is Heterogametic
   a. XX
   b. XY
   c. Both
   d. None of the above
5. Phenotypic and Genotypic ratio is same in case of
   a. Incomplete dominance
   b. Multiple alleles
   c. Co-dominance

d. Polygenic inheritance

6. Sudden inheritable change produced in an individual is called
   a. crossing over
   b. Recombination
   c. Mutation
   d. Linkage
7. When F1 Hybrid is crossed with its recessive parent it is called
   a. back cross
   b. Reciprocal cross
   c. Multiple cross
   d. Test cross
8. Mendel's dihybrid phenotypic ratio is
   a. 12:3:1
   b. 9:3:4
   c. 3:1
   d. 9:3:3:1
9. Mendel's experimental plant was
   a. Pisum sativum
   b. Lathyrus odratus
   c. Drosophila melanogaster
   d. Aspergillus niger
10. No of Linkage groups found in Man is
   a. 23
   b. 7
   c. 14
   d. 46

Answers 1-10

1-a	**6-c**
2-b	**7-d**
3-a	**8-d**
4-b	**9-a**
5-a	**10-a**

IV True/False

1. Human blood groups are determined by multiple alleles.
2. A cross between F_1 hybrid and dominant parent is called test cross.
3. In a monohybrid cross, test cross gives the expected ratio of 3:1.
4. Mendel studied total 9 characters of garden pea.
5. Human skin colour is a polygenic trait.
6. Crossing over occurs at two stranded stage.
7. Turner's syndrome in caused by XXY genotype.
8. Crossing over introduces variations.
9. Frequency of crossing over is directly proportional to distance between genes.

Answers:

1-True **6-False**
2-False **7-False**
3-False **8-True**
4-False **9-True**
5-True

V Very Short Questions (3 marks)

1. What is Mendel's Monohybrid ratio?
2. Name the two kinds of linkage.
3. Write down Mendel's dihybrid phenotypic ratio.
4. Define allele.
5. What are complementary genes?
6. Define Mutation.
7. Which disorder is caused in man by the presence of one extra sex chromosome?
8. Who proposed chromosomal theory of inheritance?
9. Give one example of Multiple alleles.
10. X-Linked recessive disorder express more often in Males or females?

VI Short Questions (4 marks)

1. Differentiate between co-dominance and incomplete dominance.
2. Write down differences between monohybrid & dihybrid cross.
3. Write down two dissimilarities between Turner's syndrome & kline felter's Syndrome.
4. Differentiate between Homozygous & Heterozygous.

5. Differentiate between dominant trait & recessive trait.
6. Give an example of Pleiotropic gene.
7. Give one example of multiple alleles to illustrate its meaning.
8. Give two example of genetic disorders.
9. Give an example of polygenic inheritance.

Chapter-6
Molecular Basis of inheritance
Multiple choice Questions

I Fill in the blanks

1. DNA molecule takes a complete turn after very ----------base pairs. (10,14)
2. A nucleoside consists of a ---------- and a nitrogen base. (Pentose Sugar, Phosphate)
3. The unidirectional flow of information from DNA→RNA→Protein is called ----------. (Central dogma, Replication)
4. ---------- in RNA replaces Thymine in DNA. (Uracil, Adenine)
5. A sequence of 3 nitrogenous bases that codes for an amino acid is called ----------. (codon, anticodon)
6. ----------has the shape of clover leaf. (t-RNA, m-RNA)
7. The protein coat of viruses is called----------. (capsid, capsule)
8. Lagging strand is formed of ----------fragments. (Okazaki, Ligase)
9. ----------are enzymes used for cutting the DNA molecule into fragments. (EcoRI, Helicase)

Answers

1.-10
2-Pentose sugar
3-Central dogma
4-Uracil
5-t-RNA
6-Capsid
7-Okazaki
8-EcoRI

II Match the Column

1.

Column I	Column II
(i) DNA	a) Ribose sugar
(ii) RNA	b) Dexyribose Sugar
(iii) Ribosome	c) Protein Factory

2.

Column I	Column II
(i) Watson and crick	a)DNA fingerprinting
(ii) Taylor	b)Double Helical Model of DNA
(iii) Sir Alec Jeffreys	c) Semi-Conservative DNA Replication

3.

Column I	Column II
(i) AUG, GUG	a) codon
(ii) UAA, UAG, UGA	b) Start codons
(iii) Triplet nature	c) Stop codons

4.

Column I	Column II
(i) Inducible operon	a) Unidirectional
(ii)Repressible operon	b) Lac-operon
(iii) Central dogma	c) Tryptophan-operon

Answer : 1 (i)-b

(ii)-a

(iii)-c

2 (i)-b
(ii)-c
(iii)-a

3 (i)-b
(ii)-c
(iii)-a

4. (i)-b
(ii)-c
(iii)-a

III Multiple Choice Questions

1. Which of the following is the genetic material?

a. Protein
b. Carbohydrate
c. Fats
d. DNA

2. Which of the following is not a component of deoxyribonucleotide?
   a. Deoxyribose sugar
   b. Ribose sugar
   c. Phosphate
   d. Nitrogenous Base
3. Which Nitrogen Base is absent in DNA
   a. A-Adenine
   b. U-Uracil
   c. T-Thymine
   d. C-cytocine
4. Human Genome Project was started in year
   a. 1990
   b. 1985
   c. 2000
   d. 1998
5. DNA fingerprinting was invented by
   a. Sanger
   b. Sir Alec Jeffrey's
   c. Taylor
   d. Griffith
6. Which cell organelle is known as Protein Factories
   a. Mitochondria
   b. ER
   c. Golgi Bodies
   d. Ribosome
7. The flow of genetic information from DNA to RNA is known as
   a. Replication
   b. Transcription
   c. Translation
   d. Termination
8. Replication of DNA occurs during
   a. S Phase
   b. G_2 Phase
   (c) G_1 Phase
   (d) Interphase

9. Which of following element or ion is required for association of two ribosome sub units?
   a. Na^{+}
   b. Ca^{+2}
   c. K^{+}
   d. Mg^{+2}
10. Which of the following RNA is known as informational RNA?
   a. r-RNA
   b. t-RNA
   c. m-RNA
   d. None of these
11. Semi-conservation Replication occurs for
   a. DNA
   b. m-RNA
   c. T-RNA
   d. r-RNA
12. Semi-conservative Replication of DNA was discovered by
   a. Hugo de vries
   b. Taylor
   c. Karl correns
   d. Griffith
13. First Experimental evidence to prove DNA as genetic material was discovered by
   a. Griffith
   b. Mendel
   c. Hershey & chase
   d. Darwin

Answers: 1-d, 2-b, 3-b, 4-a, 5-b, 6-d, 7-b, 8-a, 9-d, 10-c, 11-a, 12-b, 13-a

IV. True/False

1. AUG and GUG are start codon.
2. Leading strand is a replicated strand of DNA which grow continuosly without any gap in 5'– 3' direction.
3. DNA consists of Ribose sugar.
4. Lac-operon is an inducible operon.
5. The ratio of $\frac{A+T}{G+C}$ = constant for species.

6. Histones are acidic proteins.

Answer: 1-True, 2-True, 3-False, 4-True, 5-True, 6-False,

V Very short Questions (3 marks)

1. What are Nucleosome?
2. Define Lagging strand.
3. Name the technique used for separating DNA fragments.
4. Name one amino acid, which is coded by only one codon.
5. Expand VNTR.
6. Define transcription.
7. Name 3 terminator **codon**.
8. What do you mean by semi-conservative Replication of DNA.
9. Why lac operon is called inducible operon?
10. What is an anticodon?
11. Who proposed the operon model?

VI Short Questions (4 marks)

1. Write down two applications of DNA fingerprinting.
2. Differentiate between Prokaryotic DNA & Eukaryotic DNA.
3. Write down differences between DNA & RNA.
4. Differentiate between Replication & Transcription.
5. Differentiate between Lac operon and Tryptophan operon.
6. Differentiate between leading & lagging strand.
7. Differntiate between m-RNA & t-RNA

Chapter-7
Evolution

I. Fill in the blanks

1. Primitive atmosphere was ----------. (Reducing/oxidising)
2. Miller & Urey took CH_4, NH_3 & ---------- in the 2:2:1 for their experiment. (H_2, Co_2)
3. Redi, spallanzani & Louis Pasteur disapproved theory of ----------. (Abiogenesis/Special creation)
4. Process of continuous change is called ----------. (Evolution, Mutation)
5. Organs having same origin but different functions are called ---------- organs. (Homologous/Analogous)

6. ----------is the connecting link between fishes and amphibians. (Lung fish/frog)
7. Ontogeny repeats ----------. (Evolution/Phylogeny)
8. Birbal sahni institute of Paleontology is located in ----------. (Calcutta/Lucknow)
9. ----------is the missing link between reptiles & Birds. (Peripatus, Archaeopteryx)

Answers:

1-Reducing, **6-Lung fish**
2-H_2 **7-Phylogeny**
3-Abiogenesis **8-Lucknow**
4-Evolution **9-Archaeopteryx**
5-Homologous

II. Match the Column

1.

Column I	Column II
(i) Darwin's theory	a) Inheritance of acquired characters
(ii) Lamark's theory	b) Theory of Natural selection
(iii) Oparin & Haldane theory	c) Chemical theory

2.

Column I	Column II
(i) Connecting Link	a) Archaeopteryx
(ii) Missing Link	b) Peripatus

3.

Column I	Column II
(i) Homologous organs	a) Insect & Bird wing
(ii) Analogous organs	b) Short tail in new born babies.
(iii) Atavism	c) Vertebrate forelimbs

4.

Column I	Column II
(i) Industrial melanism	a) Wisdom tooth
(ii) Vestigial organ	b) Peppered moth
	c) Mutation

5.

Column I	Column II
(i) Analogous organs	a) Convergent evolution
(ii) Homologous organs	b) Divergent evolution

6.

Column I	Column II
(i) Fossils	a) Atavism
(ii) Hind limbs of python	b) Vestigial organs
	c) Paleontology

Answer: 1. (i) b, (ii)-a, (iii)-c

2. (i) b, (ii)-a
3. (i)-c, (ii)-a, (iii)-b
4. (i)-b, (ii)-a
5. (i)-a, (ii)-b
6. (i)-c, (ii)-b

III Multiple Choice Questions

1. Who gave theory of spontaneous generation?
   a. F. Redi
   b. Spallanzani
   c. Pasteur
   d. Van Helmont
2. Darwin's theory of evolution is also called
   a. Theory of Natural selection
   b. Theory of special Creation
   c. Inheritance of Acquired characters
   d. None of the above

3. The wings of Butterfly & Bird are
   a. Homologous
   b. Analogous organ
   c. Vestigial organ
   d. None of above
4. A baby has been born with a small tail. It is a case exhibiting
   a. Retrogressive evolution
   b. Mutation
   c. Atavism
   d. Metamorphosis
5. Evolutionary History of an organism is known as
   a. Ontogeny
   b. Phylogeny
   c. Ancestry
   d. Paleontology
6. Which of the following provides most evident proof of evolution
   a. Fossils
   b. Morphology
   c. Embryo
   d. Vestigial organ
7. According to abiogenesis, life originated from
   a. Non living matter
   b. Pre-existing life
   c. Chemicals
   d. Extra-terrestrial matter
8. Archaeopteryx is a connecting link between
   a. Reptiles & Birds
   b. Birds & mammals
   c. Amphibians & reptiles
   d. None of these
9. Industrial Melanism is an example of
   a. Neo-Lamarckism
   b. Neo Darwinism
   c. Natural selection
   d. Mutation
10. Fossils are generally found in
   a. Sedimentary rocks
   b. Igneous rocks
   c. Metamorphic rocks
   d. Any type of rock

Answers :

1-d	**6-a**
2-a	**7-a**
3-b	**8-a**
4-c	**9-c**
5-b	**10-a**

IV True/False

1. Fossils are found in sedimentary rocks.
2. Evolution is a discontinuous process.
3. Potato & carrot are analogous organs.
4. Latimeria is a living fossil.
5. Neanderthal man had the largest sized cranial cavity.
6. Mimicry & protective coloration favours Darwin's theory.
7. Wing of a bat & wing of a bird are homologous organs.
8. There was plenty of oxygen present in atmosphere of primitive earth.

Answers :

1-True	**5-True**
2-False	**6-True**
3-True	**7-False**
4-True	**8-False**

V (Very Short Questions 3 marks)

1. Give a 3-word definition of 'Organic evolution'?
2. Give one example of homologous organs in plants.
3. What are sympatric species?
4. What is a Coacervate?
5. Define genetic drift.
6. What is divergent evolution.
7. Define Atavism.
8. Define Industrial melanism.
9. Who wrote the book "Origin of Species"

10. Name the phenomenon which prevents individuals of two different species from interbreeding to produce fertile off-springs.
11. Name a living fossil.
12. Which period was dominated by dinosaurs.
13. Who proposed the Biogenetic law.

VI Short Questions (4 marks)

1. Write down two examples of Homologous organs.
2. Write down two examples of Analogous organs.
3. Give two examples of connecting links.
4. Give two examples of Directional selection.
5. Write down differences between primitive atmosphere & modern atmosphere of Earth.
6. Write down differences between Darwinism & Neo Darwinism.
7. Differentiate between Artificial selection & Natural selection.
8. Differentiate between Homologous & Analogous organs.
9. Differentiate between connecting link & missing link.
10. Differentiate between Atavism & vestigial organs.

Unit III Biology and Human Welfare
Lesson 8-Human Health and diseases

I Fill in the blanks

1 ---------- diseases can be transmitted from an infected person to a healthy person. (Communicable/Non Communicable)

2 The most abundant immunoglobulin in Man is ----------. (Igm/IgG)

3 ----------lymphocytes form the cell mediated Immune system. (T-lymphocytes/B-lymphocytes)

4 Primary lymphoid organs are ---------- and ----------. (Bone Marrow, thymus, spleen, tonsils)

5 ----------tumor remains confined to the affected organ. (Benign/Malignant)

6 AIDS can be diagnosed by ----------test. (Widal/ELISA)

7 The most dangerous hallucinogen is ----------. (LSD/Opium)

Answers:

1-Communicable

2- IgG

3-T-lymphocytes

4- Bone Marrow Thymus,

5- Benign

6- ELISA

7- LSD

II Match the Column

1.

Column I	Column II
(i) Typhoid	(a) Rhinoviruses
(ii) Pneumonia	(b) Salmonella typhi
(iii) Common cold	(c) Entamoeba histolytica
(iv) Amoebiasis	(d) Streptococcus pneumoniae

2.Match the following disease with the names of their causative agents-

Column I Name of disease	Column II Causative Agents
(i) Malaria	(a) Ascaris lumbricoides
(ii) Filariasis	(b) Microsporum
(iii) Ascariasis	(c) Plasmodium
(iv) Ringworm	(d) Wuchereria bancrofti

3.Match the following drugs with the source from which they are obtained-

Column I Name of Drug	Column II Source
(i) Opium	(a) Coffee
(ii) Cocaine	(b) Cannabis sativa
(iii) Caffeine	(c) Erythroxylem coca
(iv) Bhang	(d) Papaver somniferum

4. Match the terms in column A with suitable terms in column B

Column I	Column II
Cancer causing genes	(a) Malaria Vector
Western Blot test	(b) Typhoid
Widal Test	(c) Oncogenes
Female Anopheles Mosquito	(d) AIDS

5. Match the terms in column A with suitable terms in column B

Column I	Column II
(i) Nicotine	(a) Psychedelicdrugs
(ii) Hallucinogens	(b) Tobacco
(iii) Liver Cirrhosis	(c) Caffeine
(iv) Stimulant	(d) Alcohol

6. Match the terms in coloumn A with suitable contents in column B

Column I	Column II
(i) Rheumatoid arthritis	(a) Antibodies IgA
(ii) Mites in dust	(b) Antihistamine
(iii) Colostrum	(c) Autoimmune disease
(iv) Allergy	(d) Allergens

Answers: **1. i-b, ii-d, iii-a, iv-c**

2. i-c, ii-d, iii-a, iv-b
3. i-d, ii-c, iii-a, iv-b
4. i-c, ii-d, iii-b, iv-a
5. i-b, ii-a, iii-d, iv-c
6. i-c, ii-d, iii-a, iv-b

III Multiple Choice questions.

1. Appearancy of dry, scaly lesions on skin, scalp and nails is the main symptom of the disease ----------.

   (a) Typhoid (b) Malaria (c) Ringworm

2. ---------- act as mechanical carriers of amoebiasis.

   (a) Mosquitoes (b) Housflies (c) Pigs

3. Common pathogens of Man are ----------.

(a) Bacteria (b) Viruses

(c) Fungi (d) All of above

4. A common bacterial disease is ----------.

(a) Common cold (b) AIDS (c) Typhoid

5. Malarial parasite requires two hosts ---------- and ----------to complete its life cycle.

(a) Human and Mosquito (b) Human and Housefly

(c) Human and pig

6. The chronic use of alcohol causes ----------.

(a) Ringworm (b) Liver Cirrhosis (c) AIDS

7. ----------is a very effective sedative and painkiller.

(a) Morphine (b) LSD (c) Cocaine

Answers:

1-(c) Ringworm **5-(a) Human and Mosquito**

2-(b) Houseflies **6-(b) Liver Cirrhosis**

3-(d) All of the above **7-(a) Morphine**

4-(c) Typhoid

IV True/False

1. Active immunity is slow.
2. In case of snakebite, injection given to patients contains preformed antibodies against the snake venom.
3. Health is not affected by life style.
4. Malignant Malaria caused by Plasmodium falciparum is the most serious type of Malaria.
5. Acquired Immunity is present at the time of birth.
6. B-lymphocytes produce antibodies.
7. Hepatitis B vaccine is produced from bacteria.

8. The main lymphoid organ is Thymus.

Answers:

1-True	**5-False**
2-True	**6-True**
3-False	**7-False**
4-True	**8-False**

V Very Short Questions (3 marks)

1. What is health?
2. What are the symptoms of common cold?
3. What are the two classes of Lymphocytes?
4. Name the Primary and secondary lymphoid organs.
5. What is Metastasis?
6. What is the difference between Benign Tumor and Malignant Tumor?
7. List three preventive and control measures of use of alcohol or drugs.

VI Short Questions (4 marks)

1. Expand ELISA, AIDS, SCID and CMIS.
2. Differentiate between Infectious and Non Infectious diseases.
3. What is the difference between Innate Immunity and Acquired Immunity?
4. Differentiate between B-Cells and T-Cells.
5. Expand HIV, MALT, AMIS and GALT.
6. List the harmful effects of alcohol or drug abuse.
7. What are Hallucinogens?
8. What are Carcinogens?
9. Write a note on Vaccination.
10. Why is use of tobacco in any form injurious to health?
11. Name of the causative agent of filariasis. Write its symptoms and prophylaxis.

Lesson 9

Strategies for enhancement in Food Production

I Fill in the blanks with a suitable word-

1. ---------- is a newbreed of sheep developed in Punjab by crossing Bikaneri ewes and Marino rams. (Jersey/Hisardale)
2. ---------- is the maintenance of hives of honeybee for the production of honey. (Apiculture/Sericulture)
3. The most common species of honeybee used in apiculture is ----------. (Apis indica/ Apis dorsata)
4. ----------is a marine fish. (Rohu/Hilsa)
5. ----------is the purposeful manipulation of plant species in order to create desired plant types. (Animal breeding/Plant breeding)
6. ----------is high yielding and disease resistant variety of wheat. (Sonalika/Pusa komal)

Answers :

1-Hisardale	**4-Hilsa**
2-Apiculture	**5-Plant Breeding**
3-Apis indica	**6-Sonalika**

II Match the column

1.

Column I Name of crop	Column II Name of variety
(i) Wheat	(a) Pusa Komal
(ii) Brassica	(b) Kalyan Sona
(iii) Cauliflower	(c) Pusa swarnim
(iv) Cowpea	(d) Pusa Shubhra

2. Match the crop with its variety

Name of Crop	name of Variety
Okra (Bhindi)	(a) Pusa Sadabahar
Flat Bean	(b) Pusa Gaurav
Brassica	(c) Pusa Sawani
Chilli	(d) Pusa Sem 2

3. Match the contents of column A with column B

Column I	Column II
(i) Spirulina	(a) Hybrid of tomato and potato
(ii) Explants	(b) Micropropagation
(iii) Somaclones	(c) Single cell protein
(iv) Pomato	(d) Tissue culture

4. Match the contents of column A with column B

Column I	Column II
(i) Catla	(a) Marine fish
(ii)Common carp	(b) Improved breed of chicken
(iii) Sardine	(c) Fresh water fish
(iv) Leghorn	(d) Fresh water fish

Answers. **1. (i)-b, (ii)-c, (iii)-d, (iv)-a** **2. (i) –c, (ii) d, (iii)-b, (iv)-a**

3. (i)-c, (ii)-d, (iii)-b, (iv) a **4. (i)-c, (ii)-d, (iii)-a, (iv)-b**

III Multiple Choice Questions

1. A group of animals related by descent and similar in most characters are called ----------.

   (i) Breed (ii) Variety (iii) Race

2. Sonalika and Kalyan sona are the varieties of ----------.

   (i) Wheat (ii) Rice (iii) Millets

3. The term 'Totipotency' refers to the capacity of ----------.

   (i) Seed to germinate (ii) Cell to generate whole plant

   (iii) Cell to enlarge in size

4. Inbreeding increases ----------.

   (i) Heterozygosity (ii) Disease resistance (iii) Homozygosity

5. Crosses between different breeds of animals is called ----------.

   (a) Inbreeding (b) outbreeding (c) Tissue Culture

6. Male and female animals of two different related species are mated in ----------.

   (a) Interspecific Hybridisation (b) Inbreeding (c) Breeding

7. The process by which crop plants are enriched with certain desirable nutrients is called ----------.

   (a) Crop protection (b) breeding (c) Biofortification

8. The entire collection of plants or seeds having all the diverse alleles for all genes in a given crop is called ----------.

   (a) Herbarium (b) Germplasm collection (c) protoplasm collection

Answers :

1-(i)Breed **5-(b) outbreeding**

2-(i)Wheat **6-(A)Interspecific Hybridisation**

3-(ii)Cell to generate whole plant **7-(c) Biofortification**

4-(iii) Homozygosity **8-(b) Germplasm Collection.**

IV True or False

1. Animal Husbandry is the agricultural practice of breeding and raising livestock.
2. More than 30% of world livestock population is in India and China.
3. Poultry farm management is the management of animals for milk and its products for human consumption.
4. A superior female in case of cattle is the cow or buffalo that produces more milkper lactation.
5. Jersey is an improved breed of cattle.
6. In MOET, a cow produces 6-8 eggs per cycle.
7. Jaya is a high yielding and disease resistant variety of wheat.

8. Saccharum officinarum, a variety of sugarcane has higher sugar content.

Answers:

1-True	**5-True**
2-False	**6-True**
3-False	**7-False**
4-True	**8-True**

V Very Short Questions (3 marks)

1. Expand MOET.
2. Expand SCP.
3. Define Totipotency.
4. What is Micropropagation?
5. Define Tissue culture.
6. Which part of plant is best suited for making virus free plants.
7. What are somaclones?

VI Short Questions (4 marks)

1. What is the difference between inbreeding and outbreeding?
2. What is inbreeding depression.
3. List the main steps of Plant Breeding.
4. Write the aims of Plant Breeding.
5. List the important methods of crop improvement.
6. Write a short note on Mutation Breeding.
7. Write a note on Biofortification.
8. Write a note on Single Cell Protein.
9. What is golden Rice?

Lesson 10

Micro-organisms in Human Welfare

I Fill in the blanks

1. Micro-organisms such as ----------grow in milk and convert it to curd. (Lactobacillus/E. Coli)
2. ----------is the baker's yeast. (Saccharomyces cerevisiae/Microsporum)
3. ----------is a traditional drink of South India made by fermenting sap from palms. (Brandy/Toddy)
4. The large holes in swiss cheese are due to production of a large amount of ----------by a bacterium. (Oxygen/Carbon dioxide)
5. ----------Cheese are ripened by growing a specific fungi on them. (Roquefort/Swiss)
6. Fruit juices are clarified by an enzyme ----------. (Streptokinase/Pectinases)
7. Presence of more organic wastes in waste water increases ----------. (BOD/COD)
8. ----------are useful to get rid of aphids. (Lady bird beetle/Trichoderma)

Answers :

1-Lactobacillus

2- Saccharomyces Cerevisiae

3- Toddy

4- Carbon dioxide

5- Roquefort

6- Pectinases

7- BOD

8- Lady Bird Beetle

II Match the Column

1.

Column I	Column II
(i)Azotobacter	(a) Biofertilizer
(ii) Cyanobacteria	(b) fix atmospheric Nitrogen
(iii) Trichoderma	(c) Biogas
(iv) Methanogens	(d) Biocontrol agent

2.

Column I	Column II
(i) Aspergillus niger	(a) Lactic acid
(ii) Acetobacter	(b) Citric Acid
(iii) Clostridium butylicum	(c) Acetic acid
(iv) Lactobacillus	(d) Butyric Acid

3.

Column I	Column II
(i) Saccharomyces cerevisiae	(a) Clear fruit juice
(ii)Lipases	(b) Ethanol
(iii) Proteases	(c) clot buster
(iv) Streptokinase	(d) Laundry

4. Match the raw material with the fermented food product obtained from them.

Column I Raw material	Column II Fermented food product
(i) Wheat	(a) Dhokla
(ii) Rice	(b) Ethanol
(iii) Bengal gram	(c) Bread
(iv)Malted cereals	(d) Dosa

5. Match the contents of column A with the contents of Column B

Column I	Column II
(i) Mycorrhiza	(a) Legumes
(ii)Rhizobium	(b) Paddy fields
(iii) Cyanobacteria	(c) Biofertilizer
(iv)Anabaena	(d) Glomus

Answers:

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

2-(i)-b (ii)-c, (iii)-d, (iv) –a

3-(i)-b, (ii)-d, (iii)-a, (iv) –c

4-(i)-c, (ii) –d, (iii)-a, (iv)-b

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

III Multiple Choice Questions

1. Which one of these is not a nitrogen fixing organism.

   (a) Anabaena (b) Pseudomonas

   (c) Nostoc

2. Content of ---------- increase following its conversion from milk into curd by lactic acid bacteria.

   (a) Vitamin c (b) Vitamin B

   (c) Vitamin B_{12}

3. Microbial digestion of organic wastes of sewage is called ----------.

   (a) Secondary treatment (b) Primary Treatment

   (c) Tertiary treatment

4. The chemical substances which are produced by some microbes to kill or retard the growth of disease causing microbes are called ----------.

   (a) Vaccine (b) Antibiotics

   (c) Toxin

5. The treatment of waste water is done by ----------microbes naturally present in the sewage.

   (a) Autotrophic (b) parasitic

   (c) heterotrophic

6. A Completely free living organism which takes part in Nitrogen fixing is ----------.

   (a) Azotobacter (b) Rhizobium

   (c) E coli

Answers:

1-(b) Pseudomonas **4-(b) Antibiotics**

2-(c) Vitamin B_{12} **5-(c) Heterotrophic**

3-(a) Secondary treatment **6-(a) Azotobacter**

IV True/False

1. Fermentation tank where fermentation is carried out in the presence of microbes is called Fermentor.
2. Wine and beer are produced by distillation of fermented broth.
3. Penicillin was the first antibiotic to be discovered.
4. Whisky, brandy and rum are produced without distillation.
5. Biogas plant provides energy source as well as manure.
6. Biogas is a mixture of gases like methane, carbon dioxide and Hydrogen sulphide.
7. Presence of high amount of organic matter in the sewage decrease BOD.
8. Organic farming involves the use of biofertilizers and biopesticides.
9. The ministry of Environment and forests has initiated Ganga Action Plan and Yamuna Action Plan to save these major rivers from pollution.

Answers :

1-True **6-True**

2-False **7-False**

3-True **8-True**

4-False **9-True**

5-True

V Very Short Questions (3 marks)

1. Expand BOD.
2. What are Bioactive molecules?
3. What is Cyclosporin A?
4. What are Baculo viruses?
5. Name any two species of fungus, which are used in the production of antibiotics?

6. Do you think microbes can be used as a source of energy? If yes, how?
7. Name the microbes from which cyclosporine A and statins are obtained.
8. What are flocs?

VI Short Answer Type Questions

1. How is curd prepared? How does preparation of curd improve its nutritional value?
2. What is sewage? In which way can this be harmful?
3. What is BT Cotton? How does microbe Bacillus thuringiensis act as biocontrol agent?
4. Write a note on Cyclosporin A, and streptokinase as Bioactive molecular.
5. What are biofertilizers? What are the main source of biofertilizers? Name any two organisms that can fix Nitrogen symbiotically and two organisms that fix Nitrogen asymbiotically.
6. Write a note on Mycorrhiza.

Unit IV

Biotechnology

Chapter 11

Biotechnology: Principles and Processes

I Fill in the blanks

1. Recombinant DNA technology is also popularly called genetic ..... . (Engineering/Science)
2. E.Coli is a gram .....bacteria. (Positive/negative)
3. The specific DNA sequence where replication is initiated is called ..... . (origin of replication/Termination of replication)
4. The process by which separate bands of DNA are cut from agarose gel and extracted from gel pieces is called..... .
(Elution/Purification)

5. The enzyme used to open up the cell to get DNA for genetic experiments is called…….. . (Lysing enzyme/DNA ligase)
6. The plasmid DNA act as …….. to transfer the piece of DNA attached to it. (Vector/clone)
7. ……..enzyme is used to join the sticky ends together to form recombinant DNA. (DNA Ligase/DNA polymerase)
8. *Agrobacterium tumefaciens* is known as ……..genetic engineer of plants. (natural/artificial)
9. Microinjection and gene gun are the methods to introduce alien DNA into …….cell. (host/vector)
10. Large scale production involves the use of …… .
(Bioreactors/Glass vessels)

Answers:

1-engineering	**6-vector**
2-negative	**7-DNA ligase**
3-origin of replication or Ori	**8-natural**
4-elution	**9-host**
5-Lysing enzyme	**10-bioreactors**

II Match the column:

1.

Column I	Column II
(i) Gel electrophoresis	(a) Separation and purification of products before marketing
(ii) PCR	(b) Separation and isolation of DNA fragments
	(c) Amplification of Gene of interest

2.

Column I	Column II
(i) Hind II	(a) Restriction Endonuclease Enzyme
(ii) pBR322	(b) Selectable Marker
	(c) Cloning vector

3.

Column I	Column II
(i) Molecular Scissor	(a) Cloning vector
(ii) Plasmid	(b) Restriction endonuclease
	(c) Lysing enzyme

4.

Column I	Column II
(i) Genetic engineering	(a) Recombinant DNA technology
(ii) Bioreactor	(b) Gel Electrophoresis
	(c) Large Scale production

Answers

Set 1

i-b, ii-c

Set 2

i-a, ii-c

Set 3

i-b, ii-a

Set 4

i-i, ii-c

III Multiple Choice Questions (2 marks each)

1. The first isolated type II restriction endonuclease enzyme is.
   a. Eco RI
   b. Hind –II
   c. Bam-II
   d. Eco R1I
2. The full form of PCR is.
   a. Polymerase Chain response

b. Polymerase Chain reaction
c. Planned Chain Response
d. Planned chain reaction

3. Plasmids are extra chromosomal genetic material of.
   a. Bacteria
   b. Virus
   c. Algae
   d. Amoeba
4. Gel electrophoresis is used for.
   a. Isolation of DNA molecule
   b. Cutting of DNA molecule
   c. Separation of DNA fragments
   d. None of the above
5. Restriction endonuclease enzymes are also called.
   a. Molecular scissors
   b. Molecular Knives
   c. Molecular Saw
   d. None of the above
6. In recombinant DNA technique the term vector refers to.
   a. Plasmid that can cut DNA at specific base sequence
   b. Plasmid that can transfer the foreign DNA into a living cell
   c. Enzyme that can join the different DNA fragments
   d. All of the above
7. Restriction enzymes are used to.
   a. Cut the double standard DNA
   b. Lysis of the cell wall
   c. Join the DNA fragments
   d. None of the above
8. The process of separation and purification of expressed protein before marketing is called.
   a. Micropropagation
   b. Downstream Processing
   c. Bioprocessing
   d. None of the Above
9. Large Scale production of desired products of recombinant DNA technology is done in.
   a. Glass flask

b. Bioreactors
c. Steel tanks
d. All of the above

10. The technique by which recombinant DNA is directly injected into nucleus of host cell is called.
    a. Gene Gun Method
    b. Electroporation
    c. Chemical method
    d. Microinjection

Answers:

1-b	**6-b**
2-b	**7-a**
3-a	**8-b**
4-c	**9-b**
5-a	**10-d**

IV True/False

1. Function of Ori site in a vector is to initiate replication.
2. Restriction enzymes produces same kind of sticky ends in different DNA molecules.
3. The cutting of DNA at specific location is done by DNA Ligases.
4. The plasmid DNA act as vector to transfer the DNA.
5. Plasmid is linear DNA molecule present in cell.
6. Restriction enzymes are used to cut the double standard DNA.
7. In microinjection method of transfer of DNA the cells are bombarded with high velocity particles of gold or tungsten.
8. Gel electrophoresis is used for cutting of DNA at specific locations.

Answers:

1-true	**5-false**
2-true	**6-true**

3-False **7-false**

4-true **8-false**

V Very short questions (3 marks)

1. Name any two recombinant proteins which are used in medical practice.
2. Define biotechnology. Write any two applications of biotechnology.
3. Write about the two core techniques which serve as principles for biotechnology.
4. What do you understand by palindromic nucleotide sequence?
5. Why is *Agrobacterium tumefaciens* a good cloning vector ? Explain.
6. What do you understand by term selectable marker?
7. How is genetic material (DNA) needed for r DNA technology isolated from cell?
8. What are cloning vectors? Write name of commonly used vectors.
9. Explain gene gun method for introduction of alien DNA into host.
10. What is microinjection method for introduction of alien DNA into host.
11. What essential features must be present in a good cloning vehicle?
12. Briefly write about bioreators.
13. What is plamid DNA ? How is it different from chromosomal DNA?
14. What is difference between exonuclease and endonuclease enzymes?
15. Define Elusion. What is its use in gel electrophoresis?

VI Short questions (4 marks)

1. What is origin of replication? What is its importance in recombinant DNA technology?
2. What are molecular scissors? Explain their role in recombinant DNA technology?
3. Make a list of tools of recombinant DNA technology.
4. Write a note on downstream processing.
5. Describe various types of enzymes needed for recombinant DNA technology.
6. What is PCR? Explain its working mechanism with the help of diagrammatic sketch.
7. What is gel electrophoresis? How is it useful in recombinant DNA technology?

8. Explain any two methods of introduction of alien DNA into host.

Chapter 12

Biotechnology and its applications

I Fill in the blanks

1. .....toxin is produced by bacteria *Bacillus thuringiensis*. (Bt/Neurotoxin)
2. Bt toxin is coded by a gene named..... (Cry/Try)
3. The two polypeptide chains of insulin are linked together by .....bridges. (disulphide/diphosphate)
4. Adenosine deaminsae enzyme is crucial for proper functioning of .....system of body. (Immune/Digestive)
5. Genetic modification of plants enhances the .....value of food. (nutritional/Calorific.)
6. The first hormone produced artificially by culturing bacteria is..... (Insulin/Growth)
7. The animals that contain and express a forgein gene are called .....animals. (Transformed/transgenic)
8. Nematode *Meloidegyne incognitia* infects the ..... of tobacco plants. (Roots/stem)
9. Indian .....rice is distinct for its unique aroma and flavor. (Basmati/Boiled)
10. Full form of GMO is .....modified organisns. (Genetically/Genomically)

Answers:

1-Bt	**6- insulin**
2-cry	**7-transgenic**
3- disulphide	**8-roots**
4-immune	**9-basmati**
5-nutritional	**10-genetically**

II **Match the column**

1

Column I	Column II
(i) Bacillus thuringiensis	(a) reduction in yield of tobacco plant
(ii) Meloidegyne incognitia	(b) transgenic animal
	(c) Produces insecticidal protein

2

Column I	Column II
(i) Bacillus thuringiensis	(a) Production of enzyme chitinase
(ii) Escherichia coli	(b) Production of Bt toxin
	(c) Production of human insulin

3

Column I	Column II
(i) Human Insulin	(a) Replacement of missing hormone in short stature people
(ii) Human growth hormone	(b) Stimulation of immune system
	(c) Treatment of diabetes

4

Column I	Column II
(i) Bt cotton	(a) Vitamin A rich variety
(ii) Golden rice	(b) Increased shelf life
	(c) Pest resistant

5

Column I	Column II
(i) Basmati rice	(a) Rich in Vitamin A

(ii) Golden Rice	(b) Distinct for its unique aroma and flavor
	(c) Dwarf variety of rice

Answers

Set 1

i-c,ii-a

Set 2

i-b,ii-c

Set3

i-c,ii-a

Set 4

i-c,ii-a

Set 5

i-b, ii-a

III Multiple Choice Questions (2 marks)

1. Genetic modification has.
   a. Made crops more tolerate to cold , drought and salty conditions
   b. Reduced dependence on chemical pesticides.
   c. Enhanced the nutritional value of food.
   d. All of the above
2. Nematode *Meloidegyne incognitia* infects the roots of tobacco plants and causes.
   a. An increased production of tobacco plant
   b. A reduction in yield of tobacco by plant
   c. A loss of water absorbing capacity of roots
   d. None of the above

3. Meaning of prefix 'Bt' in Bt cotton is.
   a. Bacterial Toxin
   b. Biological Toxin
   c. Toxin released by *Bacillus thuringiensis*
   d. Biotechnology
4. The organism which infects the roots of tobacco plants and causes a great reduction in yield is
   a. Nicotiana tobaccum
   b. Meloidegyne incognitia
   c. Bacillus thuringiensis
   d. Agrobacterium tumefaciens
5. Golden rice is.
   a. A variety of rice which is golden in colour
   b. A transgenic rice having gene for beta carotene
   c. A yellow coloured variety of rice with enhanced flavor
   d. None of the above
6. GEAC stand for.
   a. Genetic engineering approval committee
   b. Genetic engineering action committee
   c. Genome engineering approval committee
   d. Genome engineering action committee
7. The site of production of ADA in body is.
   a. Lymphocytes
   b. Monoytes
   c. Plasma
   d. RBC
8. The first clinical gene therapy was done for the treatment of.
   a. AIDS
   b. Cancer
   c. Diabetes
   d. ADA deficiency
9. The part of Human insulin which is removed during maturation of proinsulin to insulin is.
   a. C – peptide
   b. A –peptide
   c. D -peptide
   d. B -peptide

10. The drug which was earlier produced by sacrificing animals but is now produced by biotechnology is.
    a. Pencillin
    b. Insulin
    c. Cocaine
    d. LSD
11. Which of the following crop is first to be approved for commercial cultivation in India?
    a. Bt brinjal
    b. Bt Cotton
    c. Transgenic tomato plant
    d. Golden rice
12. Which of the following committee make decision regarding safety of introducing GM organisms for public services.
    a. Genetic engineering approval committee
    b. Genetic engineering action committee
    c. Genome engineering approval committee
    d. Genome engineering action committee

Answers:

1-d,	**7-a**
2-b ,	**8-d**
3-c,	**9-a**
4-b,	**10-b**
5-b,	**11-b**
6-a	**12-a**

IV True/False

1. Plants , bacteria, fungi and animals whose genes have been altered by manipulation are called genetically modified organisms(GMO).
2. Genetic modification of crops has increased the use of chemical pesticides.

3. Bt toxin is converted into its active form due to alkaline pH of gut of insects.
4. The insulin molecule consist of two polypeptide chains A and B which are linked together by disulphide bridges.
5. Gene therapy is a collection of methods that allow correction of a gene defect that has been diagnosed in child/embryo.
6. Bt cotton is resistant to attack of all pests and insects.
7. Cry proteins are nontoxic in nature.
8. Very low concentration of bacteria or virus in body can be detected by amplification of their nucleic acid by PCR.
9. All plants which are resistant to insect pests are called transgenic plants.
10. Biopiracy means the use of bioresources of a country by multinational companies for their own benefit.

Answers:

1-true	**6-false**
2-false	**7-false**
3-true	**8-true**
4-true	**9-false**
5-true	**10-true.**

V Very short questions (3 marks)

1. Name the bacteria from which Bt toxin is produced. Why does this toxin not kill the Bactria itself?
2. What are the advantages of production of genetically modified organisms?
3. What are Cry proteins? Name the organism that produces it.
4. How does Bt toxin causes death of insect.
5. What is golden rice? What is its importance?
6. Name the nematode that infects and damages tobacco roots. How does the biotechnology helped us in this regard?
7. How is the mature insulin different from pronsulin secreated by pancreas in human?
8. How was insulin obtained before advent of r DNA technology?

9. Explain the structure of insulin molecule with the help of diagram.
10. Write a short note on Gene therapy.
11. Expand 1. PCR 2. ELISA 3. GEAC
12. How transgenic animals are useful in study of human disease?

VI Short questions (4 marks)

1. Discuss the role of biotechnology in the field of agriculture.
2. Enlist any four transgenic organisms and their applications.
3. What is Bt cotton. How is it produced?
4. How is transgenic tobacco plant protected against *Meloidegyne incognitia*? Explain the process?
5. Discuss the role of biotechnology in field of medicine.
6. What is Gene therapy? Illustrate using example of Adenosine deaminase deficiency.
7. What are transgenic animals? How these are useful to mankind?
8. Discuss the various ethical issues concerned with biotechnology.
9. Write short notes on
   A. Biopatent
   B. Biopiracy

Lesson-13

Organisms and Populations

Objective Type Questions

I Fill in the blanks :

1. The organisms which can tolerate and thrive in a wide range of temperatures are called ..... (Eurythermal/Stenothermal)
2. ..... is the number of deaths in the population during a given period. (Natality/Mortality)
3. The organisms which can tolerate a wide range of salinity are called ..... . (Euryhaline/Stenohaline)
4. The interaction in which one species benefits and the other is neither harmed nor benefitted is called ..... .
   (Amensalism/Commensalism)
5. .....contributes to the population growth.
   (Emigration/Immigration)

6. ..... flourish in hot springs and deep sea hydrothermal vents where temperatures far exceed 100^0C . (Eubacteria/Archaebacteria)

Answers :

1. Eurythermal
2. Mortality
3. Euryhaline
4. Commensalism
5. Immigration
6. Archaebacteria

II Match the column

1.

Column I	Column II
(i) Mutualism	(a) Both the species lose
(ii)Competition	(b) Only one is benefitted
(iii) Predation	(c) Both the species benefitted
(iv) Amensalism	(d) One is harmed one is neither benefitted nor harmed

2.

Column I	Column II
(i) Hibernation	(a) Summer sleep
(ii) Aestivation	(b) Organisms which can't maintain constant internal temp.
(iii)Homeostasis	(c) Winter Sleep
(iv) Conformers	(d) Process of maintaining constant internal temperature

3.

Column I	Column II
(i) Natality	(a) Increase population
(ii) Immigration	(b) Birth rate
(iii) Mortality	(c) Decrease population
(iv) Emigration	(d) Death rate

4.

Column I	Column II
(i) Euryhyaline	(a) Organism which tolerate narrow range of salinity.
(ii) Eurythermal	(b) Organisms which tolerate wide range of temperature.
(iii) Stenohaline	(c) Organisms which tolerate wide range of salinity
(iv) Stenothermal	(d) Organisms which tolerate narrow range of temperature

5.

Column I	Column II
(i) Desert Plant	(a) Fish
(ii) Aquatic animal	(b) Kangaroo rat
(iii) Desert Animal	(c) Seal
(iv) Aquatic mammal	(d) Opuntia

Answers:

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

(ii) (a)

(iii) (b)

(iv) C

III Multiple Choice Questions

1. The most ecologically relevant environmental factor is
   (a) Water
   (b) Temperature
   (c) Light
   (d) Soil
2. The interaction in which both the species lose is
   (a) Parasitism
   (b) Mutualism
   (c) Competition
   (d) Commensalism
3. Animals eating plants are called
   (a) Carnivores
   (b) Omnivores
   (c) Detrivores
   (d) Herbivores
4. Winter Sleep in animals is called
   (a) Hibernation
   (b) Migration
   (c) Diapause
   (d) Aestivation
5. Some organisms experience nausea, vomiting at heights is called
   (a) Magnitude sickness
   (b) Altitude sickness
   (c) Attribute sickness
   (d) Lattitude Sickness
6. The study of the relationship of living organisms with the abiotic and biotic component of their environment is called
   (a) Biology
   (b) Biotechnology
   (c) Ecology
   (d) Anthropology

Answers:

1 (b) Temperature **4 (a) Hibernation**

2 (c) competition **5 (b) Altitude sickness**

3 (d) Herbivores **6 (c) Ecology**

IV True/False

1. Temperature is the most ecologically relevant environmental factor.
2. Bears goes into aestivation during winter.
3. Seals have a thick layer of fat (Blubber) below their skin.
4. Emigration is the number of individuals of the population who come into the habitat.
5. The interaction in which both the species interacting benefits each other is called mutualism.
6. Maintenance of a constant internal environment by the organism is called Homeostasis.

Answers:

1. **True**
2. **False (Hibernation)**
3. **True**
4. **False (Immigration)**
5. **True**
6. **True**

V Very Short Questions (3 Marks)

1 Define Ecology.

2 Define Homeostasis.

3 Define Population

4 Write the four population attributes.

5 How population grow and decline?

6 What are Lichens?

7 What are Ectoparasites?

VI Short Questions (4 Marks)

1 Give an example of Brood Parasitism.

2 Name important defence mechanisms in plants against herbivory.

3 Distinguish between Hibernation and Aestivation.

4 Define Commensalism and give one example.

5 Write a short note on behavioural adaptations in animals.

6 Define Mutualism and give one example.

7 Which are the four basic processes due to which density of a population in a given habitat during a given period, fluctuates.

Lesson 14

Ecosystem

Objective Type Questions

I. Fill in the blanks

1. An ---------- is a functional unit of nature and comprises abiotic and biotic components. (Ecosystem/Ecology)
2. Abiotic components are ---------- materials air, water and soil. (Inorganic/organic)
3. Common detritivores in our ecosystem are ---------- . (Earthworn/Cockroach)
4. The major reservoir of carbon on earth is ---------- . (Land /Ocean)
5. The natural reservoir of phosphorus is ---------- . (soil/Rock)
6. The products of ecosystem processes are named as---------- . (Ecosystem Reservoir/Ecosystem Services)

Answers:

1- Ecosystem, **4-Ocean**
2- Inorganic, **5-Rock**
3- Earthworm **6-Ecosystem services**

II Match the column

1.

Column I	Column II
(i) Man	(a) Primary consumer
(ii) Green plants	(b) Decomposer
(iii) Goat	(c) Secondary consumer
(iv) Bacteria	(d) Producers

2.

Column I	Column II
(i) Man	(a) Third Trophic level
(ii) Zooplankton	(b) First Trophic level
(iii) Fishes	(c) Second Trophic level
(iv)Phytoplankton	(d) Fourth Trophic level

3.

Column I	Column II
(i) Pyramid of biomass in sea	(a) Upright
(ii) Pyramid of energy	(b) Xerarch succession
(iii) Succession of plants in wetter areas	(c) Inverted
(iv) Succession of plants in dry areas	(d) Hydrarch succession

4.

(i) Gaseous nutrient cycle	(a) Rock
(ii) Fossil fuel	(b) Sulphur cycle
(iii) Sedimentary nutrient cycle	(c) Reservoir of carbon
Natural reservoir of phosphorus	(d) Carbon cycle

Answers:

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

III. Multiple Choice

1. Which one of the following has the largest population in a food chain?
   a) Producers
   b) Primary Consumers
   c) Secondary consumers
   d) Decomposers

2. The Second trophic level in a lake is
   a) Phytoplankton
   b) Zooplankton
   c) Benthos
   d) Fishes
3. Secondary producers are
   a) Herbivores
   b) Producers
   c) Carnivores
   d) None of the above
4. What is the percentage of photosynthetically active radiation (PAR) in the incident solar radiation?
   a) 100%
   b) 50%
   c) 1-5%
   d) 2-10%
5. Which is the gaseous type of nutrient cycle?
   a) Sulphur cycle
   b) Helium cycle
   c) Nitrogen Cycle
   d) Phosphorous cycle

Answers:

1. (d) Decomposers

2. (b) Zooplankton

3. (a) Herbivores

4. (b) 50%

5. (c) Nitrogen cycle.

IV True /False

1. The green plants are called producers.
2. Pyramid of energy is always upright.
3. Nitrogen and carbon cycle are sedimentary cycle.
4. Natural inter connections of food chains is known as food web.
5. Earth's crust is the reservoir for sedimentary type (Phosphorus).
6. Carbon constitutes 69% of dry weight of organisms.

Answers: 1- True

2-True

3-False

4-True

5-True

6-False

V Very Short Questions (3 Marks)

1 What are ecosystem services?

2 What is standing state?

3 Define pioneer species.

4 Why pyramid of energy is always upright?

5 What is grazing food chain.

6 What is trophic level?

7 What is fragmentation?

VI Short Questions (4 Marks)

1 Give example of food chain in pond.

2 Write difference between Grazing food chain and detritus food chain.

3 Draw phosphorous cycle in a terrestrial ecosystem.

4 Write difference between food chain and food web.

5 Write limitations of ecological pyramid.

6 Write about 10% energy law.

7 Why earthworm is referred to as farmer's friend?

Lesson-15

Biodiversity And Conservation

I. Fill in the blanks

1. There are nearly ---------- species of orchids. (20,000/12,000)

2. ---------- Ghats have a greater amphibian species diversity than the Eastern Ghats. (Southern/Western)
3. The number of ---------- species in the world is more than the combined total of the species of fishes, amphibians, reptiles and mammals. (Bacteria/Fungi)
4. Species diversity ----------as we move away from the equator towards the poles. (Increases/Decreases)
5. Fruit-eating birds are called ----------. (Frugivorous/Herbivorous)
6. Dodo bird is example of ---------- organism. (Extinct/Endangered)

Answers:

(i) 20,000
(ii) Western
(iii) Fungi
(iv) Decreases
(v) Frugivorous
(vi) Extinct

II. Match the column

1.

Column I	Column II
(i) Invertebrate	(a) Reptiles
(ii) Plant	(b) Bacteria
(iii) Vertebrate	(c) Crustaceans
(iv) Micro-organisms	(d) Mosses.

2.

Column I	Column II
(i) Mega diversity countries	(a) 1.5 million
(ii) Total plant and animal species	(b) Amazon Rain Forest
(iii) Lungs of the earth	(c) Dodo
(iv) Extinct Bird	(d) 12

3.

Column I	Column II
(i) The Earth Summit	(a) Indo-Burma
(ii) Sacred grove	(b) Colombia
(iii) Biodiversity Hotspot	(c) Aravali Hills
(iv) Located near Equator	(d) Rio de Janeiro

4.

Column I	Column II
(i) India has Biosphere reserves	(a) 90
(ii) India has national Parks	(b) 1000
(iii) India has wildlife sanctuaries	(c) 14
(iv) India sacred groves	(d) 448

Answers:

1. **(i) c (ii) d (iii) a (iv) b**
2. **(i) d (ii) a (iii) b (iv) c**
3. **(i) d (ii) c (iii) a (iv) b**
4. **(i) c (ii)a (iii) d (iv) b**

III. Multiple Choice

1. On Earth the total number of plant and animal species are more than
   (a) 2.5 Million
   (b) 1.5 million
   (c) 2.3 million
   (d) 1.8 million
2. Which Ghats have a greater amphibian species diversity?
   (a) Eastern Ghats
   (b) Southern Ghats
   (c) Western Ghats
   (d) Northern Ghats
3. Which Animal Group are the most species rich taxonomic group?
   (a) Sponges
   (b) Insects
   (c) Annelids
   (d) Mammals
4. Which forest has the greatest biodiversity on Earth?
   (a) Meghalaya Rain Forest
   (b) Tropical Rain Forest

(c) South Africa Rain Forest
(d) Amazon Rain Forest

5. Which one is Invertebrate?
   (a) Fishes
   (b) Birds
   (c) Molluscs
   (d) Mammals
6. Which forest is known as the 'Lungs of the Planet?
   (a) Tropical Rain Forest
   (b) Himalaya Rain Forest
   (c) Amazon Rain Forest
   (d) Temperate Rain Forest

Answers:

1 (b) 1.5 million

2 (c) Western Ghats
3 (b) Insects
4 (d) Amazon Rain Forest
5 (c) Molluscs
6 (c) Amazon Rain forest

IV. True/False

1. The group fungi has more species than all the vertebrate species combined.
2. Species diversity is uniformly distributed on earth.
3. Biodiversity conservation may be In-situ as well as Ex-situ.
4. Recently 54 'Biodiversity Hotspots' in the world have been proposed.
5. In India there are 17 biosphere reserve.
6. Among animals, insects are the most species-rich taxonomic group.

Answers:

1-True **4-False**

2-False **5-False**

3-True **6-True**

V Very Short Questions (3 Marks)

1 What makes India one of the 12 mega diversity countries of the world?

2 What happens to the species diversity as we move away from the equator towards the poles?

3 How tropics contributes indirectly to greater diversity?

4 What is the cause of rapid decline of our biological wealth?

5 Give three examples of extinct animals.

6 What the loss of biodiversity may lead to?

7 Which is the most important cause driving animals and plants to extinction?

VI Short Questions (4 marks)

1 What are sacred groves? What is their role in conservation?

2 What happens when Alien species turn invasive ? Give example.

3 Write note on Biodiversity hotspots.

4 What is Ex-situ conservation?

5 Write direct and indirect benefits we receive through ecosystem services.

6 What is In-situ conservation?

7 Species diversity on earth is not uniformly distributed. Comment.

Lesson-16

Environmental Issues

Objective Type Questions

I. Fill in the blanks

1. Any undesirable change in physical, chemical or biological characteristics of air, land, water or soil is called ---------- .
(Pollutants/Pollution)

2. The Government of India has passed the Environment (Protection)Act in ---------- . (1986/1996)
3. Electrostatic precipitator remove over ----------particulate matter present in the exhaust from a thermal power plant. (97%, 99%)
4. Full form of CNG is ---------- . (Compressed Nitrogen Gas /Compressed Natural Gas)
5. Presence of large amounts of nutrients in waters causes excessive growth of algae called as ---------- . (Algal Bloom/algal blast)
6. Increase in concentration of the toxicant at successive trophic levels is known as ----------. (Eutrophication/Biomagnification)

Answers:

1- Pollution
2- 1986
3- 99%
4- Compressed Natural Gas
5- Algal Bloom
6- Biomagnification

II. Match the column

1.

(i) Environment (Protection)Act	(a) 1981
(ii) Air (Prevention & control of pollution) Act	(b) 1974
(iii) Montreal Protocol	(c) 1986
(iv) Chipko Movement	(d) 1987

2.

(i) Terror of Bengal	(a) Methane
(ii) Natural aging of lake	(b) Stratosphere
(iii) Green house gas	(c) Water hyacinth
(iv) Ozone	(d) Eutrophication

3.

Column I	Column II
(i) National Forest Policy	(a) Paper
(ii) Water (Prevention and control of	(b) e-waste

pollution) Act	
(iii) Biodegradable	(c) 1974
(iv) Irreparabel computer	(d) 1988

4.

Column I	Column II
(i) Green house gases	(a) UV-rays
(ii) Ozone layer	(b) UV-B
(iii) Deforestation	(c) Global warming
(iv)Snow-blindness	(d) soil erosion

Answers: **1. (i) c, (ii) a, (iii) d, (iv) b**

2. (i) c, (ii) d, (iii) a, (iv) b

3. (i) d, (ii), c, (iii) a, (iv) b

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

III. Multiple Choice questions

1. Chipko Movement was started in
   (a) 1979
   (b) 1971
   (c) 1974
   (d) 1981
2. High dose of UV-B causes inflammation of cornea, called
   (a) Glucoma
   (b) Snow-blindness
   (c) Cataract
   (d) Low vision
3. Ozone is found in the upper part of the atmosphere called
   (a) Stratosphere
   (b) Mesosphere
   (c) Thermosphere
   (d) Ionosphere
4. A fine powder of recycle modified waste is known as
   (a) Bitumen
   (b) Silicon
   (c) Cobalt
   (d) Polyblend

5. Which aquatic weed is known as 'Terror of Bengal'
   (a) Chara
   (b) Water hyacinth
   (c) Hydrilla
   (d) Valisnaria
6. A scrubber in electrostatic precipitator can remove gases
   (a) Helium
   (b) Carbon monoxide
   (c) Sulphur dioxide
   (d) Nitrogen oxide

Answers :

1- (c) 1974
2- (b) Snow blindness
3- (a) Stratosphere
4- (d) Polyblend
5- (b) Water Hyacinth
6- (c) sulphur-di-oxide

IV. True or false:

1. In catalytic converters, expensive metals like platinum-palladium and rhodium are used as the catalysts.
2. In India, the Air (Prevention and control of Pollution)Act came into force in 1991
3. High Sound level, 150db or more is generated by the take off a jet plane or rocket.
4. In 1990s, Mumbai ranked fourth among the 41 most polluted cities of the world.
5. Water hyacinth is the world's most problematic aquatic weed.
6. Low concentration of DDT disturb calcium metabolism in birds.

Answers:

1. True

2. False

3. True

4. False

5. True

6. False

V **Very Short Questions (3 marks)**

1. Define Pollution.
2. What are Pollutants?
3. Why CNG is better than diesel?
4. What is algal bloom?
5. What is Biomagnification?
6. What is Eutrophication?
7. What is the disadvantage of open dumps?

VI **Short Questions (4 marks)**

1. What is soil erosion? Write its causes.
2. Discuss the role of women and communities in protection and conservation of forests.
3. What initiatives were taken for reducing vehicular air pollution in Delhi?
4. What is Ozone hole? How will enhanced ultraviolet radiation affect us?
5. Write the causes of Global warming. What measures need to be taken to control global warming?
6. What is Noise? Write its causes.
7. Write the effect of thermal waste water.