

# Biology - 2018

## General Instructions:

- ♦ This question paper consists of four Groups, i.e. A, B, C and D.

### Section-A (Botany)

#### (Multiple Choice/Objective Type Questions)

Choose the correct answer:

Q.1. Conidia is an asexual reproducing structure of which organism?

- (a) Algae (b) Fungi  
(c) Bryophytes (d) Protozoa

Ans. (b) Fungi

Q.2. Which law of Mendel is discarded by incomplete dominance?

- (a) Law of dominance (b) Law of segregation  
(c) Law of independent assortment  
(d) All of these

Ans. (b) Law of segregation

Q.3. What is the distance between two strands of DNA?

- (a) 34Å (b) 20Å  
(c) 10Å (d) 9.8Å

Ans. (a) 34Å

Q.4. In a typical embryo sac, how many cells and nuclei are found?

- (a) 6 cells and 8 nuclei (b) 7 cells and 8 nuclei  
(c) 8 cells and 8 nuclei (d) 8 cells and 7 nuclei

Ans. (b) 7 cells and 8 nuclei

Q.5. Marijuana' drug is obtained from which plant?

- (a) Papaver somniferum (b) Connabis sativa  
(c) Erythroxylum coca (d) Datura stramonium

Ans. (b) Connabis sativa

Q.6. Who is the father of Green revolution?

- (a) Verghese Kurien (b) M.S. Swaminathan  
(c) P. Maheswari (d) Mendel

Ans. (b) M.S. Swaminathan

Q.7. The toxic protein produced by *Bacillus thuringiensis* is.

- (a) Auxin (b) Leg-haemoglobin  
(c) Cry Protein (d) Cytokinin

Ans. (c) Cry Protein

Q.8. Which region is known as 'Lungs of the planet'?

- (a) Silent valley (b) Amazon rain forest  
(c) Western ghats (d) Eastern ghats

Ans. (b) Amazon rain forest

Q.9. Who is secondary consumer in a food chain?

- (a) Omnivorous (b) Herbivorous  
(c) Carnivorous (d) Producer

Ans. (b) Herbivorous

Q.10. The edible part of Apple is.

- (a) Endocarp (b) Mesocarp  
(c) Endosperm (d) Thalamus

Ans. (d) Thalamus

### Group - B

#### (Very Short Answer Type Questions)

Q.11. What is Single Cell Protein (SCP)? Give two examples.

Ans. SCP Single cell protein is protein rich cell biomass which is used as food or feed. Earlier spirulina, a cyanobacterium has long been used as human food and fodder.

Ex- (1) Curd (2) Cheese

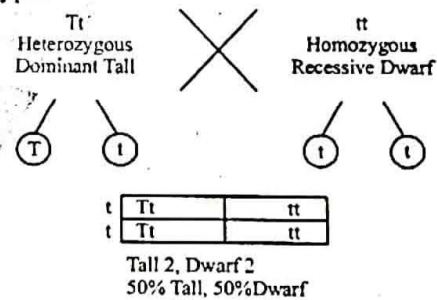
Q.12. What is triple fusion? Name the nuclei involved in triple fusion.

Ans. Triple Fusion: The fusion involving two polar nuclei and a sperm nucleus that occurs in double fertilization in a seed plant and result in the formation of the endosperm.

Polar nuclei involved in triple fusion.

Q.13. What is test cross? Show phenotypic ratio 1 : 1 in a Monohybrid test cross through Punnet square.

Ans. A test cross is a way to explore the genotype of an organism. Early use of the test cross was as an experimental mating test used to determine what alleles are present in the genotype.



### Group - C

#### (Short Answer Type Questions)

Q.14. Give the difference between Homologous and Analogous organ with examples. Which type of evolution is shown by these two organs?

Ans. Homologous Organs

1. They differ Phenotypically.
2. Internal Structure is Similar.
3. Developmental stages are similar.
4. They develop from similar position over the body.
5. The organisms having homologous organs are phylogenetically related.

Ex. Men legs, cheetah legs.

Analogous Organs

1. They resemble phenotypically
2. There is no similarity in internal structure.
3. Developmental stages are quite different.
4. They develop from different position over the body.
5. The organism having analogous organs are



phylogenetically unrelated.

Ex- Butterfly wings, Bird feather.

**Q.15. Match the following:**

Column - A		Column-B	
1. Lactobacillus	(a)	Fermentation	
2. Saccharomyces cerevisiae	(b)	Antibiotics	
3. Penicillium notatum	(c)	Curd	
Ans. 1. Lactobacillus	(c)	Curd	
2. Saccharomyces cerevisiae	(a)	Fermentation	
3. Penicillium notatum	(b)	Antibiotics	

**Q.16. Describe the following in brief:**

- (a) PCR (b) Restriction enzyme  
(c) Gene cloning

**Ans. (a) PCR -** Polymerase chain reaction is the in vitro synthesis of multiple copies of a gene or DNA segment. It uses two sets of small chemically synthesized oligonucleotide primers complementary to the regions of DNA and a thermo stable DNA polymerase like tag polymerase obtained from hot spring bacterium thermos aquaticis.

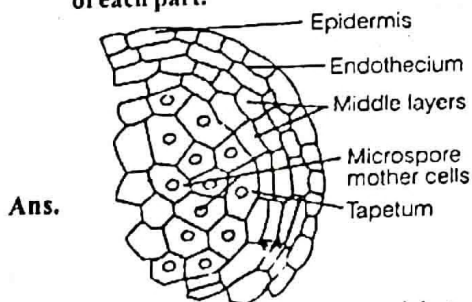
**(b) Restriction enzyme -** the enzyme is a nuclease which recognises a particular palindromic DNA sequence and degrades the same. It was called restriction enzyme because it restricted the propagation of bacteriophage in the bacterium.

**(c) Gene Cloning-** Formation of multiple copies of a particular gene is called gene cloning. A gene is separated and ligated to a vector like plasmid. The recombinant plasmid is introduced into a plasmid free bacterium through transformation. The transformed bacterium is made to multiply and form a colony. Each and every bacterium of the colony has a copy of the gene.

#### Group - D

(Long Answer Type Questions)

**Q.17. Describe the structure of typical Angiospermic microsporangium with diagram. Also explain the functions of each part.**



Microsporangium is a sporangial structure which contains microspores which are the pollensais giving rise to male gametes in an angiosperm. Anthers shows the four lobes forming the tetragonal structure. In the corner of each lobe is the microsporangium.

Function of its parts:

- Epidermis :** It is a common covering layer of the anther. In the mature anther, the epidermal cell get stretched and shrivel.
- Endothelium :** It present in the region of shallow groove between the microsporangium of an anther lobe remain thin walled to function as stromtium of dehiscence.

- Middle Layers:** It develop some fibrous thickening.
- Tapetum:** It provides nourishment to growing porogenous cells, microspore mother cells as well as young microspores.
- Microspore mother cell :** A diploid cell in plants that divides by meiosis to give rise to four haploid microspores.

OR

**What are the differences between Incomplete dominance and Co-dominance? Explain with example.**

Ans. Incomplete dominance	Codominance
1. the phenotype of hybrid does not resemble either of the parent.	The phenotype of hybrid resembles both the parents
2. Hybrid possesses a new phenotype	New phenotype is not farmed.
3. No allele possesses an independent effect.	Both the alleles produce independent effect.
4. The phenotypic effect of one allele is more pronounced than of other	The effect of both the alleles is equally pronounced
5. An intermixing of the effect of two alleles can be noticed	No blending or intermixing of the two alleles is observed.
Ex- Red, white flower colour in snapdragon	Ex- AB blood group

**Q.18. Define Biodiversity. What are the major causes of loss of Bio-diversity?**

**Give two conservation strategies to protect Bio-diversity.**

**Ans. Biodiversity:** The occurrence of different types of genes, gene pools, species, habitats and ecosystems in a particulars place and various parts of earth is called biodiversity.

**Loss of biodiversity:**

- Habitat Lass and fragmentation :** Habitat loss is identified as main threat to 85% of all species described as endangered.
- Over - exploitation:** Over - exploitation of resources has casted more environmental degradation than earning.
- Pollution :** Pollution is a major threat to biodiversity, and one of the most difficult problems to overcome.
- Anthropogenic Extinction:** It is extermination of species caused directly or indirectly by human activities like hunting, pollution, etc.

**Conservation strategies to protect Bio-diversity:**

- In situ conservation strategies.
- Exist conservation strategies.

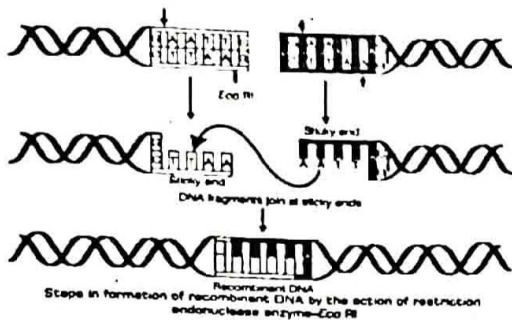
OR

**What is Recombinant DNA technology ? How is Recombinant DNA prepared by using Restriction enzyme? Describe briefly with the help of diagram.**

**Ans. Re combatant DNA technology :** It is the field of biotechnology that specializes in developing new combinations of genetic material, called DNA, which are artificially constructed in the laboratory for introduction in host cells for propagation and multiplication.



Recombinant DNA prepared by using Restriction enzyme: It is found to cut DNA at particular points having specific sequence of six base pairs. Up to now some 900 restriction enzymes have been isolated from over 230 strain of bacteria. The enzyme name has the first letter from bacterial genus, next's two letters from species and the fourth letter from strain there the last roman numerical signifies the first end nuclease from the bacterium.



### Section-B (Zoology) Group-A

Choose the correct Answer:

Q.1. Which of the following is sexually transmitted disease ?

- (a) AIDS (b) Polio  
(c) Elephantiasis (d) Tuberculosis.

Ans. (a) AIDS

Q.2. Leydig cells are present in

- (a) Ovary (b) Testis  
(c) Kidney (d) Uterus.

Ans. (b) Testis

Q.3. The chromosomal type of sex-determination in human being is

- (a) XX—XO (b) XX—XY  
(c) ZZ—ZO (d) ZZ—ZW.

Ans. (a) XX—XO

Q.4. Mendel monohybrid ratio is

- (a) 2:1 (b) 3:1  
(c) 9:3:3:1 (d) 9:7

Ans. (b) 3:1

Q.5. Main cause of extinction of species from tropical area is

- (a) Pollution (b) Soil erosion  
(c) Deforestation (d) Forest fire.

Ans. (c) Deforestation

Q.6. Which of the following is not an air pollutant ?

- (a) SO<sub>2</sub> (b) CFC  
(c) CO<sub>2</sub> (d) Aerosol.

Ans. (d) Aerosol.

Q.7. Which is the most polluted river of Jharkhand ?

- (a) Damodar (b) Swarnarekha  
(c) Koel (d) None of these.

Ans. (a) Damodar

Q.8. How many pairs of contrasting characters were studied by Mendel ?

- (a) 5 pairs (b) 6 pairs  
(c) 7 pairs (d) 8 pairs.

Ans. (a) 7 pairs

Q.9. 'Inheritance of acquired characters' was proposed by

- (a) Darwin (b) Lamarck  
(c) Morgan (d) Mendel.

Ans. (b) Lamarck

Q.10. Which enzyme is used to join the cut in DNA ?

- (a) Ligase (b) Cellulase  
(c) Pectinase (d) EcoRT.

Ans. (d) EcoRT.

### Group - B

Answer the following questions :

Q.11. Define crossing over.

Ans. The exchange of genes between homologous chromosomes, resulting in a mixture of parental characteristics in offspring is known as crossing over.

Q.12. Name two sex-linked diseases in human beings.

Ans. Two sex-linked diseases in human beings:

- (i) Hemophilia A and B  
(ii) Colour blindness.

Q.13. What is green-house effect ?

Ans. The trapping of the sun's warmth in a planet's lower atmosphere, due to the greater transparency of the atmosphere to visible radiation from the sun than to infrared radiation emitted from the planet's surface is known as green house effect.

### Group - C

Answers the following Questions:

Q.14. How many types of blood groups are found in human being? Which blood group is universal donor ?

Ans. Type of blood groups are found in human being:

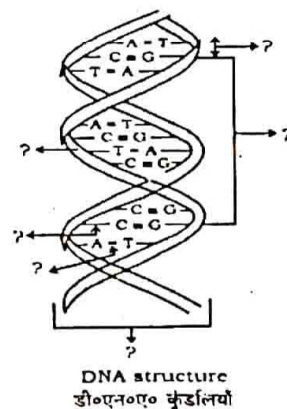
- (i) Group A (ii) Group B  
(iii) Group AB (iv) Group O

Blood group O is universal donor.

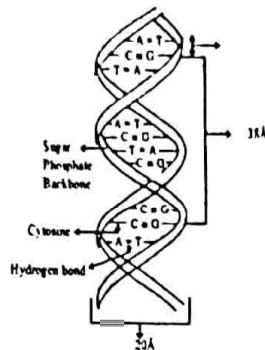
Q.15. What are transgenic animals ? Name any two such animals.

Ans. Transgenic animals are animals that have a foreign gene deliberately inserted into their genome. Such animals are most commonly created by the microinjection of DNA into the pronuclei of a fertilised egg which is subsequently implanted into the oviduct of a pseudo pregnant surrogate mother.

Q.16. Label the diagram given below:



Ans.



Group - D

17. Match the following from Column A with Column B :

**Column A**

- (a) Water
- (b) Grasshopper
- (c) Nucleotide
- (d) Testis
- (e) Decomposer

**Column B**

- (i) Spermatogenesis
- (ii) Micro-organism
- (iii) Abiotic component
- (iv) Consumer
- (v) DNA.

Ans. Column A

- (a) Water
- (b) Grasshopper
- (c) Nucleotide
- (d) Testis
- (e) Decomposer

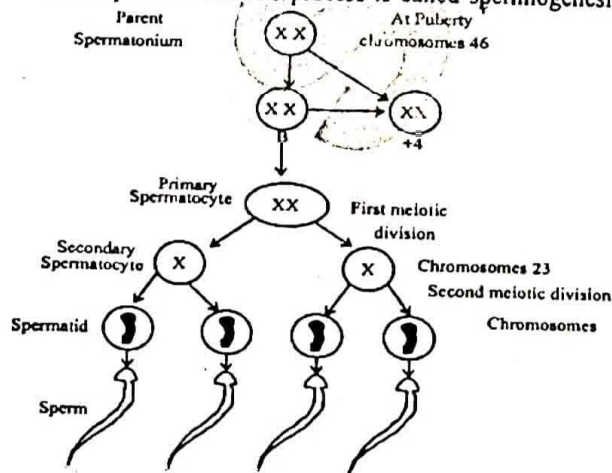
**Column B**

- (iii) Abiotic component
- (iv) Consumer
- (v) DNA.
- (i) Spermatogenesis
- (ii) Micro-organism

OR

Describe the process of spermatogenesis with suitable diagrams.

Ans. Spermatogenesis is the process of formation of haploid spermatozoa from diploid spermatogonia inside the testes of male. A fresh spermatogonium divides mitotically to form two types of spermatogonia. A and B. A-type spermatogonia function as mother spermatogonia. B-type spermatogonia divide further and grow in size to function as primary spermatocytes. A primary spermatocyte undergoes meiosis to produce four haploid spermatids. The products of meiosis I are called secondary spermatocytes. Spermatids attach themselves to Sertoli cells for obtaining nourishment and undergo differentiation to form spermatozoa. The process is called spermiogenesis.



18. What is Eutrophication? What are its effects on aquatic organisms?

Ans. Eutrophication : It is a nutrient enrichment of water body resulting in increased growth of algae, other plants and animals.

Its effects on aquatic organisms:

- (i) Dissolved oxygen depletion or hypoxia resulting in increased incidences of fish kills.
- (ii) Increased biomass of phytoplankton resulting in algal blooms.
- (iii) Toxic or inedible phytoplankton species cause harm through the production of toxins, which can effect cooccurring organisms.
- (iv) Species biodiversity decreases and the dominant biota changes.

OR

How does the sex-determination take place in human ?

Ans. XX-XY. This type of sex determination is found in mammals and in some insects including fruit fly drosophila. The female is homomorphic with two similar sex chromosomes, XX. The male is Heteromorphy with one X-chromosome similar to that of female and one shorter and morphologically different Y-chromosome. The Y-chromosome of Drosophila is, however, longer than X-chromosomes. It is also hooked. Despite difference in morphology, the X and Y chromosomes synapse during zygotene. The synapsing part is called homologous region. The region which does not synapse is called differential region. The homologous part possesses similar genes in two chromosomes. They are called XY-linked genes, e.g, SRY (sex determining region). Produced TDF or testis, determining factor. It is the smallest gene with only 204 base pairs. Zfy gene controls sperm formation.

