

## Biology

Time: 3 Hours 15 Minutes

Total Marks: 70

### Instruction to Candidates:

1. Candidates are required to give their answers in their own words as far as practicable
2. Figures in right hand margin indicate full marks.
3. 15 minutes of extra time has been allotted for the candidate to read the questions carefully.
4. This questions paper is divided into two sections: Section-A and Section-B.
5. In Section-A there are 35 objective type Questions which are compulsory, each varying 1mark. Darken the circle with blue/black ball pen against the correct option OMR Answer sheet provided to you. Do not use Whitener/Liquid/Blade/Nail etc. on OMR Sheet: otherwise the result will be invalid.
6. In Section-B, there are 18 short answer type Questions (each carrying 2 marks), out of which any 10 questions are to be answered. Apart from this there are 6 Long Answer types questions (Each carrying 5 marks). Out of which any 3 questions to be answered.
7. Use of any electronic appliances is strictly prohibited.

### Section-A (Objective type Question)

Question Nos. 1 to 35 have four options, out of which only one is correct. You have to mark, your selected option, on the OMR-sheet.

35 x 1 = 35

1. RNAi is used to control pests on which plant?  
(A) Tobacco                      (B) Mango                      (C) Potato                      (D) Poppy

ANS:(C) Potato

2. Cry IAb controls  
(A) Corn Borer                      (B) Wheat Rust  
(C) Cotton insects                      (D) Maize height insects

ANS:(C) Cotton insects

3. For Nitrogen fixation in soil we may use  
(A) Cyanobacteria                      (B) Protozoans  
(C) Nematodes                      (D) Wheat Plants

ANS:(A) Cyanobacteria

4. Transgenic mice may be used for testing of  
(A) The safety of vaccines (B) Efficiency of fertilizers  
(C) Doses of antibiotics (D) All of these

**ANS:**(A) The safety of vaccines

5. Restriction enzymes are known as  
(A) Biological guns (B) Molecular scissors  
(C) Plasmid (D) Micro Pipette

**ANS:**(B) Molecular scissors

6. Water holding capacity is one of the qualities of  
(A) Soil (B) Plants  
(C) Water (D) animals

**ANS:**(A) Soil

7. Number of deaths during a limited time period in a place for a particular population is known as  
(A) Natality (B) Mortality  
(C) Migratory (D) Integrity

**ANS:**(B) Mortality

8. Lac operon represents  
(A) Inducible gene system (B) Repressible gene system  
(C) Housekeeping gene system (D) All of these

**ANS:**(D) All of these

9. Sick cell anemia is related to which type of disease?  
(A) Sex linked disease (B) Autosomal linked disease  
(C) Deficiency disease (D) Metabolic disease

**ANS:** (B) Autosomal linked disease

10. The anterior portion of sperm is covered by a cap like structure known as  
(A) Acrosome (B) Mesosome

(C) Episome (D) Spherosome

ANS:(A) Acrosome

11. Brewery is concerned with

(A) Saccharomyces (B) Protozoans

(C) Pteridophytes (D) Marsupials

ANS:(A) Saccharomyces

12. For induction of alien DNA in host cell we may use

(A) Gene gun (B) Micro-pipette

(C) Both (A) & (B) (D) None of these

ANS:(C) Both (A) & (B)

13. Gynoecium is made up of

(A) Stigma (B) Style

(C) Ovary (D) all of these

ANS:(D) all of these

14. S.L Miller is related to

(A) Origin & Evolution of life

(B) Use and disuse theory of evolution

(C) Neo-Darwinism (D) Neo-Lamarckism

ANS:(A) Origin & Evolution of life

15. Uracil is related to

(A) RNA (B) DNA

(C) Both (A) & (B) (D) none of these

ANS:(A) RNA

16. amp<sup>R</sup> gene is responsible for developing resistance in

(A) Pest (B) Insect (C) Antibiotic (D) Draught

ANS:(C) Antibiotic

17. Organic evolution was preceded by chemical evolution, the champions of this theory are

(A) A.I Oparin and J.B.S Haldane (B) Charles Darwin

(C) Arrhenius (D) Baptiste Lamarck

ANS:(A) A.I Oparin and J.B.S Haldane

18. Flowers of Vallisneria spp are

- (A) Anemophilous (B) Entomophilous  
(C) Hydrophilous (D) Zoophilous

ANS:(C) Hydrophilous

19. Amphibians among plants belong to  
(A) Algae (B) Bryophytes (C) Fungi (D) Pteridophytes

ANS:(B) Bryophytes

20. B0lymphocytes are produced in  
(A) Bone marrow (B) Thymus  
(C) Blood (D) Lymph

ANS:(A) Bone marrow

21. Opium is obtained from  
(A) Papaver somniferum (B) Frythroxyllum coca  
(C) Cannabis Sativa (D) Atropa belladonna

ANS:(A) Papaver somniferum

22. Amplification of gene for interest may be done by  
(A) MMR (B) PCR  
(C) MRI (D) All of these

ANS:(B) PCR

23. Gamates are usually  
(A) Haploid (B) Diploid (C) Polypoid (D) Nulliploid

ANS:(A) Haploid

24. Pisciculture is related culture of  
(A) Aquatic plants (B) Aquatic animals  
(C) Silk worm (D) Lac worm

ANS:(B) Aquatic animals

25. The phenotypic ratio for F<sub>2</sub> generation in incomplete dominance is  
(A) 3:1 (B) 2:1 (C) 1:2:1 (D) None of these

ANS:(C) 1:2:1

26. Bio reactors provide optimal conditions to produce desired.  
(A) Product (B) Organism (C) Medium (D) Allof these

**ANS:(D)** All of these

27. Taichung is a variety of  
(A) Rice                      (B) Wheat                      (C) Maize                      (D) Sugarcane

**ANS:(A)** Rice

28. Uterus is related to  
(A) Male reproductive system                      (B) Female reproductive system  
(C) Plant reproductive system                      (D) All of these

**ANS:(B)** Female reproductive system

29. Which of the following is a wrong pair?  
(A) G=C                      (B) T=A                      (C) A=U                      (D) T=U

**ANS:(D)** T=U

30. Climax community is present in which area?  
(A) In equilibrium                      (B) In transition                      (C) Bare land                      (D) None of these

**ANS:(A)** In equilibrium

31. Synthesis of RNA on DNA template is known as  
(A) Translation                                              (B) Transcription  
(C) Transduction                                              (D) Replication

**ANS:(B)** Transcription

32. Yeast reproduces by means of  
(A) Budding                                                                                              (B) Fragmentation  
(C) Pollination                                                                                              (D) All of these

**ANS:(A)** Budding

33. Dryopithecus is more similar to  
(A) Ape                      (B) Gorilla                      (C) Chimpanzee                      (D) Man

**ANS:(A)** Ape

34. Tuberculosis is transmitted by  
(A) Air                      (B) Water                      (C) Insect                      (D) contact

**ANS:(A)** air

35. In certain cases for early and accurate detection of disease we may use  
(A) ELISA                      (B) Culture                      (C) Chemical                      (D) Analytical

**ANS:(A)** ELISA

**Section-B : (Non-Objective Type Question)**

**Short Answer Type Questions**

Question Nos. 1 to 18 are of short answer type. Answer any ten(10) questions. Each question carries 2 marks. Answer should be in maximum 50 words

(10x2=20)

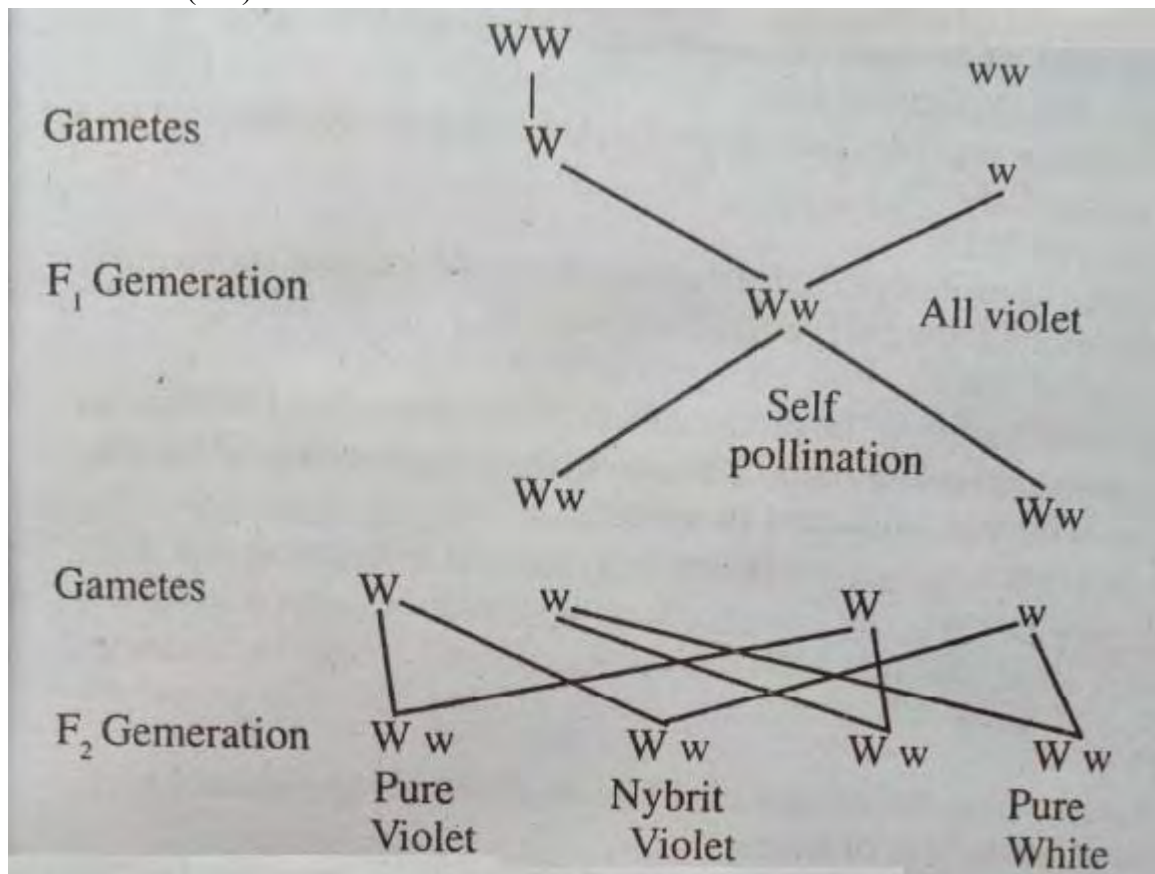
1. Describe the law of segregation with any one example.

**ANS: Law of segregation:**The allelomorphic characters of individual do not get missed up but they segregate during gametes formation. Each gametes receives only one character of the two allelomorphs and a paired condition is restored by fusion of gametes during fertilization.

Example – Cross between violet flower and white flower:

Violet flower (WW)

White flower (ww)



2. Differentiate between Euchromatin and Heterochromatin.

ANS:

Euchromatin		Heterochromatin
(i)	Euchromatin contains less DNA	Heterochromatin have more DNA.
(ii)	Here loosely coiled regions.	Here tighter DNA packing.
(iii)	It is highly packed form of chromatin	It is densely packed
(iv)	Size – 30-80 Å	Size – 250 Å

3. What are analogous organs? Give any two examples.

ANS: Analogous organs are the organs that perform similar functions while the basic structure of origin might be different. Example of Analogous organs are wings of birds, insects and rats.

4. Differentiate between Ramapithecus and Dryopithecus.

ANS:

Dryopithecus		Ramapithecus	
(i)	Legs are smaller than arms & less erect posture	(i)	Legs are longer than arms and erect posture
(ii)	Less developed brain	(ii)	Highly developed brain

5. Describe transcription in brief.

ANS: **Transcription:** It is the first step of gene expression in which particular segment of DNA is copied into RNA in presence of enzyme RNA polymerase.

6. Comment upon Klinefelter syndrome

ANS: (ii) **Klinefelter's Syndrome:** Klinefelter's syndrome is generally present in one child per five thousand. Such child has primary male sex organ but will age testis do not develop proportionally. But deposition takes place and appearance are like a female. The mammary glands also develop to some extent and the man becomes sterile with insufficient androgen in the blood.

Cells of such syndrome contains 47 chromosomes instead of usual 46. It is due to the presents of two XX chromosomes and one Y chromosome with usual number of autosomes i.e. 2S+xy. It appears that Y-chromosome has some specific genes which are responsible for the expression of male characteristics but in such syndromes the two xx-chromosomes check the expression of these genes.

7. Comment upon G.M.O.

**ANS:** Genetically modified organisms are produced by rtransfer of foreign gene. Such organisms/planty have structuak adaptation to toterate unfavorable conditions.

**8. Explain Bio-piracy in brief.**

**ANS:** Some multinational companies or organizations patent biological resources of other nations without proper authorization from the concerns person or organization, It is called bio piracy.

**9. What is amoebiasis? Name in Pathogen and describe the symptoms of the disease.**

**ANS:** It is caused by Entamoeba histolytica. It is also called Amoebic dysentery.

**Epidemiology:** by contaminated food or drink

**Symptom:** Acute diarrhea and blood with mucus in the stool.

**10. Describe the ill-effects of alcohol.**

**ANS:** The use of alcohols damages nervous system and liver. The warming right of alcohol abuse among fourth include drop in academic performance and depression etc.

**11. Comment upon Innate immunity.**

**ANS:** Innate immunity provides first line of defense from infection in a non specific manner to the body.

**12. What are adaptation? Explain with examples.**

**ANS: Adaptation:** It is the functional and structural change of an organism or any part that is a natural choice by it means the organism suits and survives better in the environment is called adaptation.

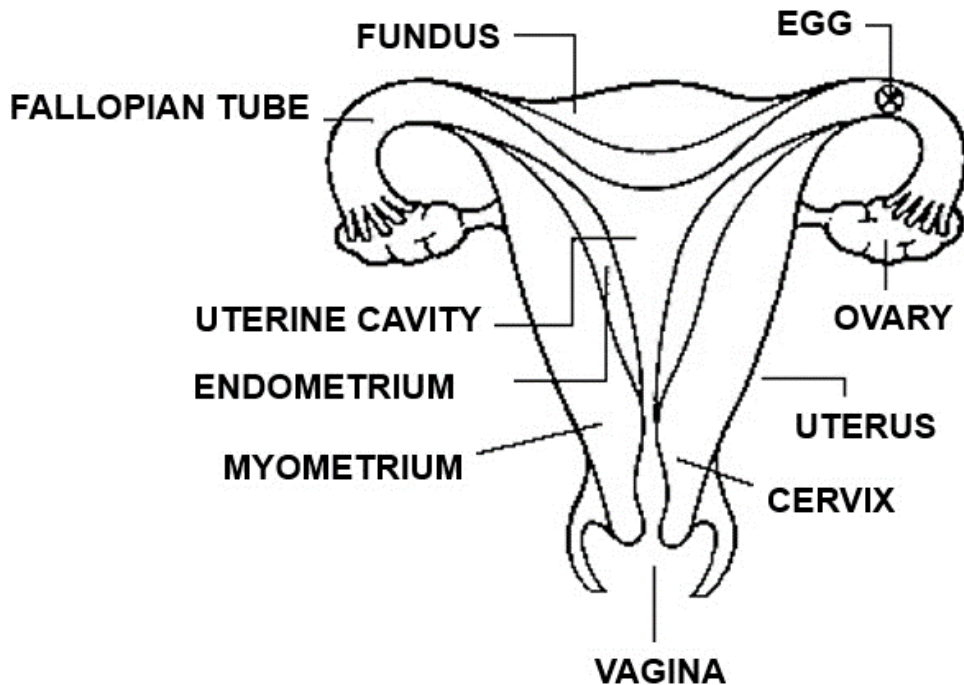
**13. What is inbreeding?**

**ANS:** It is production of offspring from the mating individuals that are genetically related, then it is called inbreeding.

**14. Draw well labeled diagram of female reproductive system in humans.**

**ANS:**





**15. Comment upon ex-situ conservation.**

**ANS:** Ex-situ conservation is the preservation of components of biological diversity outside their natural habitats. This involves conservation of genetic resources as well as wild cultivated or species.

**16. What are allergies? Describe its symptoms in brief.**

**ANS:** Allergy is a reaction by your immune system to something that does not bother most other people. The allergy causing substances are called allergens. The allergens then combine with the mast cells and causes its bursting.

**17. Comment upon Ethical Issues in context of modern biological and advancement.**

**ANS:** Modern biological advancement creates ethical issues in some societies. Many species like frog, rat etc. are used by scientist for experiment which causes extinction of such type of species.

**18. Differentiate between commensalism and Amensalism**

**ANS: Commensalism:** Interaction between two organisms where one is benefited and the other is neither benefited nor harmed.

**Amensalism:** Amensalism is the relationship between organizations of different species in which one organism is destroyed and other organism remains unaffected.

**Long Answer Type Questions**

**Question Nos. 19 to 24 are of long answer type questions. Each question carried 5 marks. Answer any 3 questions Answer should be in maximum 120 words.**

**(3x5 = 15)**

**19. What are microbes? Describe their role in human welfare in brief.**

**ANS: Microbes are microscopic organisms Exe- Bacteria**

Microbes are beneficial for human welfare in house hold products, industrial products, sewage treatment, in production of biogas, in biocontrol agents bio fertilizers etc.

- (i) Microbes in household products: In bread making fermentation takes place. During fermentation sugars that are naturally present in the form are converted to glucose, which is then fermented by the yeast to carbon dioxide and alcohol, yogurt is milk product made using bacterial cultures.

**Cheese is also prepared by bacteria :**

- (ii) Microbes in industrial products yeasts are microscopic single celled fungi. They help in fermentation of grape juice, converting them into ethanol. Carbon dioxide and other products, that contribute to the chemical composition and taste of wine penicillin is used as antibiotic chemicals enzymes and other bioactive molecules are products of microbes.
- (iii) Microbes in sewage treatment microbes bacteria are also used in treatment of sewage. Treatment of sewage takes place in two steps. Primary treatment and secondary treatment.
- (iv) Microbes in production of biogas microbes are used in production of biogas like  $\text{CH}_4$ ,  $\text{CO}_2$  and other gases methane bacterium takes part in biogas production.
- (v) Microbes in biocontrol agents: Microbes also control different types of pests curd helps crop productivity.
- (vi) Microbes as bio fertilizer: Blue green algae or cyno bacteria, nastoc, Anabaena etc. takes part in production of bio fertilizers. Rzobium bacteria takes parts in fixation of nitrogen some plants.

Thus microbes are essential for human welfare.

**20. What do you mean by sex? Discuss different types of sex determination in brief.**

**ANS:** The predominant sexual identity of an individual as in male or female is known as sex.

In human being, male is heterogametic and thus posses AA & XY while female is homogametic & has AA and XX.

The male gametes produced are of two types. One containing A +X & other containing A+Y chromosome (1:1 ratio) whereas female gamete is always A+X. When male (A+X)

fertilizes an (A+X), 2A and XX individual is produced which is daughter. On the contrary, if the A+Y male gamete fertilizes an egg (A+X) the result is a son-

AA+XX	X	AA+XY
Mother		Father
Gamete A+X egg	A+X	A+Y sperms
AA+XX	AA+XY	
Daughter	Son	

**Fig: Sex determination in human being at the time of fertilization**

**21. Comment upon cancer in brief.**

**ANS:** Cancer is an abnormal and uncontrolled division of cells that invade and destroy the surrounding tissues.

Cancer cells are different from normal cells in the same aspects. They do not remain confined to one part of the body. They penetrate and infiltrate into the adjoining tissues and dislocate their function. Some of the cancer cells get detached from the main site of the origin and travel by the blood and lymph to sites distant from the original tumor and form fresh colonies called metastasis.

**22. What is pisciculture? Mention its role in enrichment of our food.**

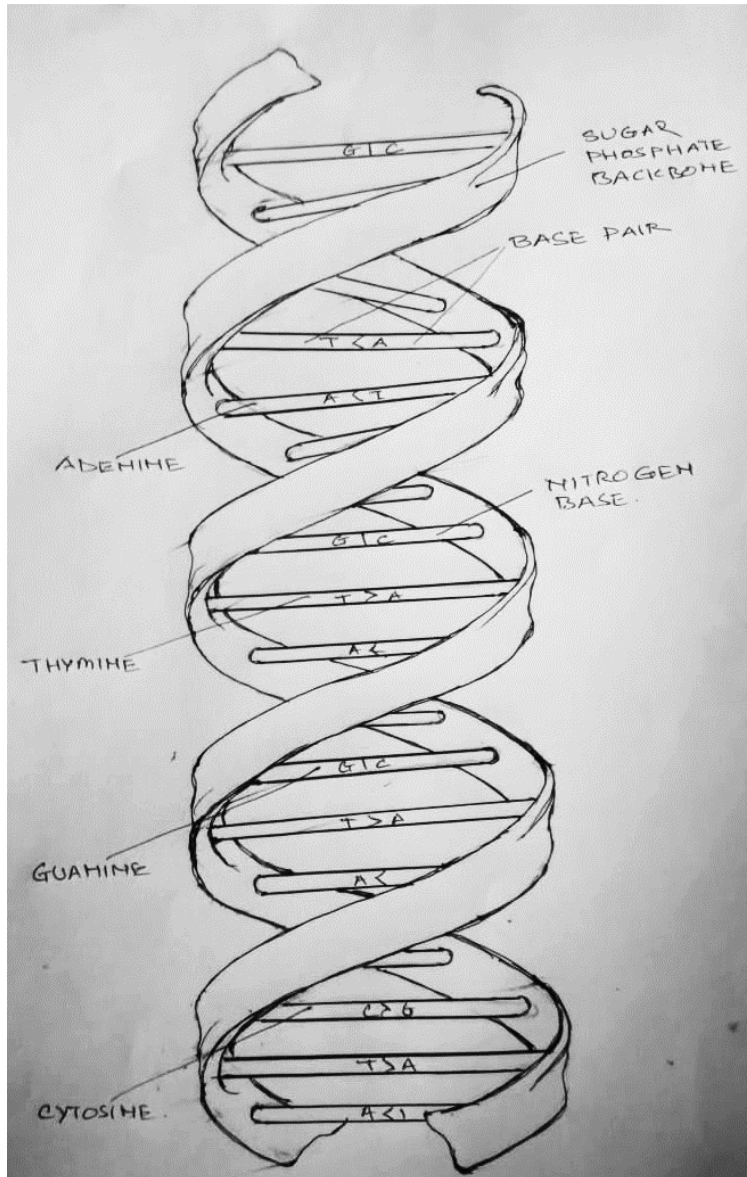
**ANS:** The production of fish is called pisciculture. It involves proper utilization of fresh water and coastal areas. Quick growing fishes are selected for this purpose. Fishes are reared in small rivers lakes and canals. Aquaculture techniques of induced breeding by administration of pituitary hormones have helped in production of seed fish. Fish eggs are introduced into hatcheries. The young ones hatched from eggs are fed, nursed and harvested when full grown.

Fish is a valuable source of food rich in proteins. Fish proteins occupy an important place in human nutrition.

**23. What is sewage? Describe any one method of its treatment in brief.**

**ANS:** Sewage is a type of waste water that is produced from a community of people. Microbes consume the major part of the organic matter in the sewage and reduce B.O.D.

**24. Draw a detailed diagram of DNA and label it properly.**



ANS: