

XII- BIOLOGY

Time- 3 Hours

Max. Marks-70

SET-A

General Instructions:

- I. All questions are compulsory.
- II. The question paper consists of four sections A,B,C,&D. Section A contains 8 questions of 1 mark each, Section B is of 10 questions of 2 marks each, Section C has 9 questions of 3 marks each whereas Section D is of 3 questions of 5 marks each.
- III. There is no overall choice. However, an internal choice has been provided in one question of 2 marks, one question of 3 marks, and all the three questions of 5 marks weightage. A student has to attempt only one of the alternatives in such questions.
- IV. Wherever necessary, the diagrams drawn should be neat and properly labeled.

SECTION-A

1. What out-breeding device the Papaya exhibit to prevent both Autogamy and Geitonogamy? 1
2. State the Ernst Haeckel's Biogenetic Law. 1
3. In 1997 the first transgenic cow, Rosie was developed. Why its milk was considered nutritionally more balanced product for human babies than natural cow-milk? 1
4. Why the larger warm-blooded animals can effectively regulate their body temperature than the smaller ones? 1
5. What is the principle of DNA Gel Electrophoresis? 1
6. How the cloning vectors are engineered to facilitate their use in rDNA technology? 1
7. Each species of organisms occupies a distinct ecological niche and no two species occupy the same niche. What is meant by ecological niche? 1
8. Give the scientific name of the genetically modified organism and its product, which is a recombinant protein used as a clot buster to remove clots from blood vessels of the heart attack patients. 1

SECTION-B

9. What is productivity? Differentiate between primary and secondary productivity. 2
10. Describe the mechanism of sex determination in Grasshopper. 2

11. What is CNG? Why it is a better fuel than diesel or petrol to run vehicles? 2
12. Mention the ways by which a foreign gene (DNA) can directly be introduced in a plant cell and in an animal cell. 2
13. In what ways the oral contraceptive 'Saheli' developed by Central Drug Research Institute, Lucknow different from the conventional oral contraceptives? 2
14. Certain molecular processes are given in column A. Provide the term given to these in column B selecting from the following:
 Recombination, Transcription, Gene regulation, Replication, Reverse transcription, DNA Isolation, Translation, Transformation

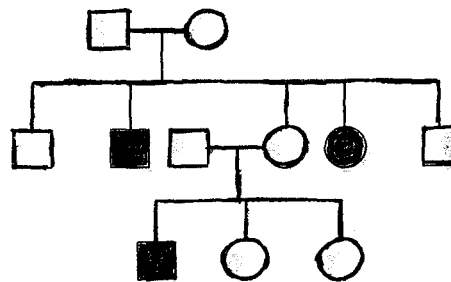
Column A

Column B

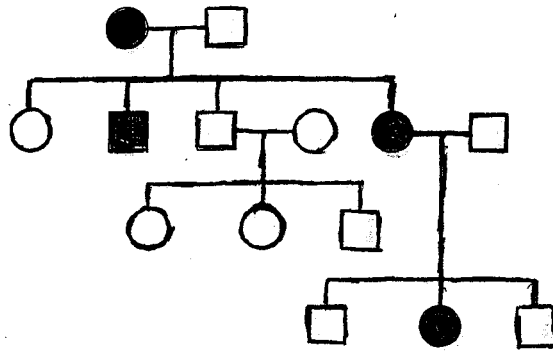
- | | |
|------------------------|-------|
| i. DNA-----→DNA | ----- |
| ii. DNA-----→hnRNA | ----- |
| iii. mRNA-----→Protein | ----- |
| iv. RNA-----→DNA | ----- |

2

15. Mention any four advantages of organic farming over the modern farming. 2
16. A multinational company marked 'Azadirachtin' extracted from Neem tree grown in a foreign country. This plant is a native of our country and we have traditional knowledge related to this bio-resource. No compensation paid or permission taken by this multinational company from relevant authority in India.
- What is the term used to refer to such an act committed by the foreign company?
 - Justify the meaning of the term.
 - What has our government done to prevent such deeds? 2
17. In the following pedigree chart, state if the trait is autosomal dominant, autosomal recessive or sex-linked. Give the reason to your answer. 2



OR



18. Fill in the blanks A, B, C, and D in the different columns of the table given below. 2

Disease	Causal agent	Mode of transmission	Symptoms
Filariasis	Wuchereria bancrofti	A	Chronic inflammation of lymphatic vessels
B	Trichophyton	From soil or using clothes or combs of infected person	Dry scaly itching lesions on body
Hepatitis B	A virus	C	Severe anemia and jaundice
Ascariasis	Ascaris lumbricoides	Contaminated water and food	D

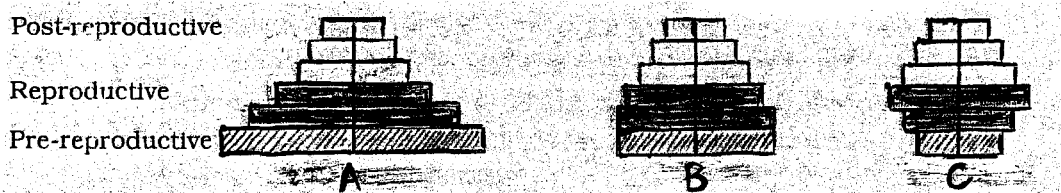
SECTION-C

19. Describe the monosporic development of the female gametophyte (embryo sac) in a typical angiospermic plant with the help of a neat and labeled diagram. 3
20. Following are the steps in DNA finger printing. Arrange them in order according to its procedure and write in your answer booklet.
- i. Separation of DNA fragments by gel electrophoresis.
 - ii. Digestion of DNA by restriction endonucleases.
 - iii. Hybridization using radio-labeled VNTR probes.
 - iv. Isolation of DNA.
 - v. Transferring of separated DNA fragments to synthetic membrane, such as nylon or nitrocellulose. (Southern blotting)
 - vi. Detection of hybridized DNA fragments by autoradiography. 3
21. Draw a labeled diagram of a typical floating lid biogas plant. Also mention why the cow dung slurry essential for the generation of biogas in biogas plants? 3
22. A recent study declared 'The Royal Bengal Tiger' of Sunder bans as 'Endangered'. As a naturalist which conservation approach/s, in-situ or ex-situ, Dr. XYZ suggest to save this beautiful animals from extinction. What values he is showing in this regard? 3

23. Give the diagrammatic representation showing the steps in the formation of rDNA by action of EcoRI. 3
24. What is biological control? Explain it with the examples of (a) Nucleopolyhedrovirus, (b) *Bacillus thuringiensis*, and (c) Lady Bird Beetles. 3
25. If a true breeding homozygous pea plant with violet colored and axial flowers as dominant characters is crossed with a recessive homozygous pea plant with white colored and terminal flowers, then what would be the:
- Genotypes of the two parent plants.
 - Phenotype and genotype of the F_1 offspring.
 - Phenotypic distribution ratio in F_2 population? 3
26. How are assisted reproductive technologies helpful to humans? Explain how ZIFT and GIFT are different from Intra Uterine transfer.

OR

- What are the objectives of introducing sex education in schools? 3
27. Study the age-pyramids related to the human population and answer the questions that follow.



- What trends in population growth rate is indicated by these 3 kinds A, B, C of age profiles?
- Which one of them is said to be ideal for a population?
- How do such age-pyramid studies help policy makers in a country? 3

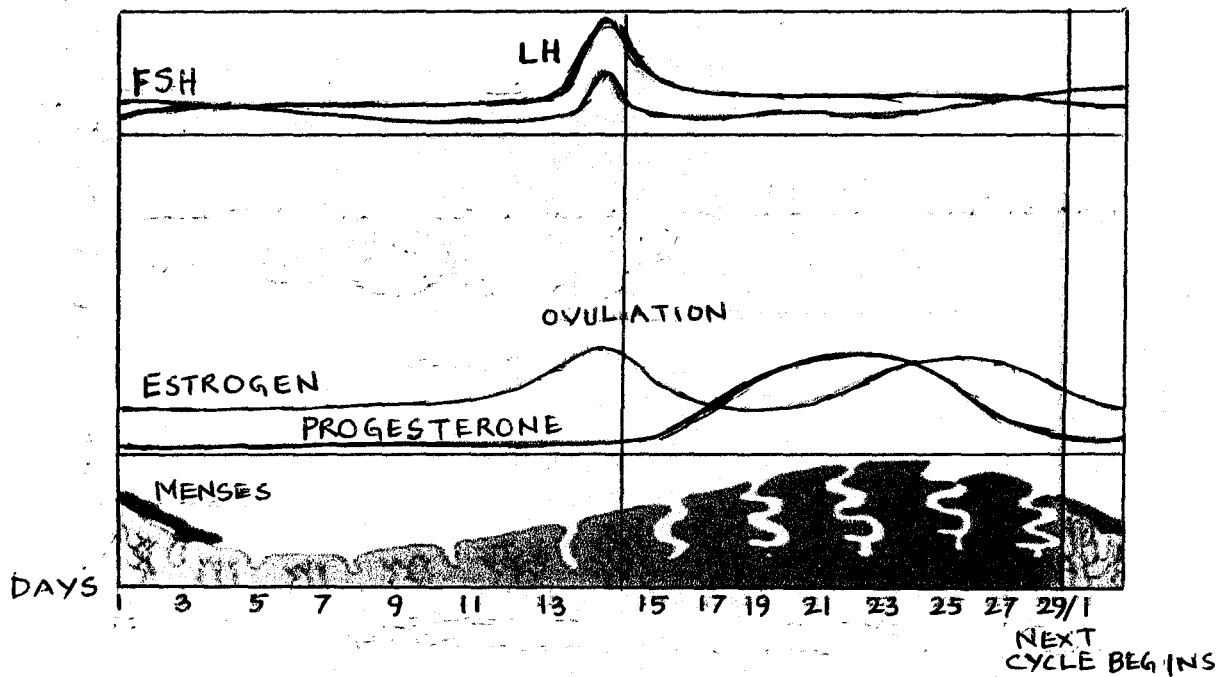
SECTION-D

28. (a) Breakdown of controlled and regulated cell division and differentiation process due to any factor results in cancer.
- How is cancer detected?
 - How do interferons help in controlling cancer?
- (b) In the life cycle of *Plasmodium* the following events takes place in which part of the body of the hosts? Name both the body part and the host.
- Release of Sporozoites.
 - Asexual reproduction (multiple fission).
 - Development of male and female gametocytes.
 - Fertilization or syngamy. 3+2=5

OR

Dr. M.S. Swaminathan who brings about '1st Green Revolution' in India chalked out the plant breeding programme to develop a new genetic variety of a crop plant. Describe the main steps involved in such breeding programmes. 5

29. Study the graph given below showing the levels of pituitary and ovarian hormones during menstrual cycle in human females. Correlate this with the events taken place in any one of the ovary and in the uterus.



OR

Answer the following.

- i. Why do all mammals have their testes located outside the abdominal cavity?
- ii. How is placenta formed?
- iii. During fertilization the ovum is surrounded by many sperms but only one can enter and fertilizes the egg. What prevents the entry of more than one sperm in the egg?
- iv. What are stem cells?
- v. What are the two probable reasons for the population explosion in India between the years 1947 to 2000.

5

30. (a) How did Louis Pasteur successfully disprove the theory of spontaneous generation? What was his conclusion?

(b) State in what ways Stanley Miller simulated in his experiment to prove the theory of chemical evolution the conditions of:

i. Primitive atmosphere on Earth.

ii. Energy source at the time of origin of life.

iii. Formation of organic molecules of life.

2+3=5

OR

State the Hardy-Weinberg Principle. Explain how natural selection causes change in allelic frequencies of a population leading to the evolution of a new species. Represent the allelic frequency changes through rough graphs.