

ROLL NO:							

Candidate must write code on the title page of answer book

1. Please check this question paper contains 10 printed pages
2. Code number given in the right hand side of the question paper should be written on the title page of the answer book by the candidate.
3. Please check that this question paper contains 36 of questions
4. Please write down the serial number of question papers before attempting it
5. Fifteen minutes are allotted to read this question paper during this time student will read the question papers and will not write any answer during this time

PRE BOARD EXAMINATION 2021
BIOLOGY (CLASS XII)

Time Allowed: 3.00Hrs.

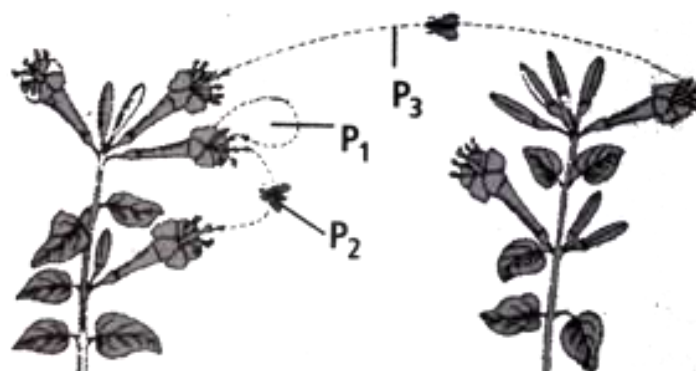
Maximum Marks: 70

GENERAL INSTRUCTIONS:

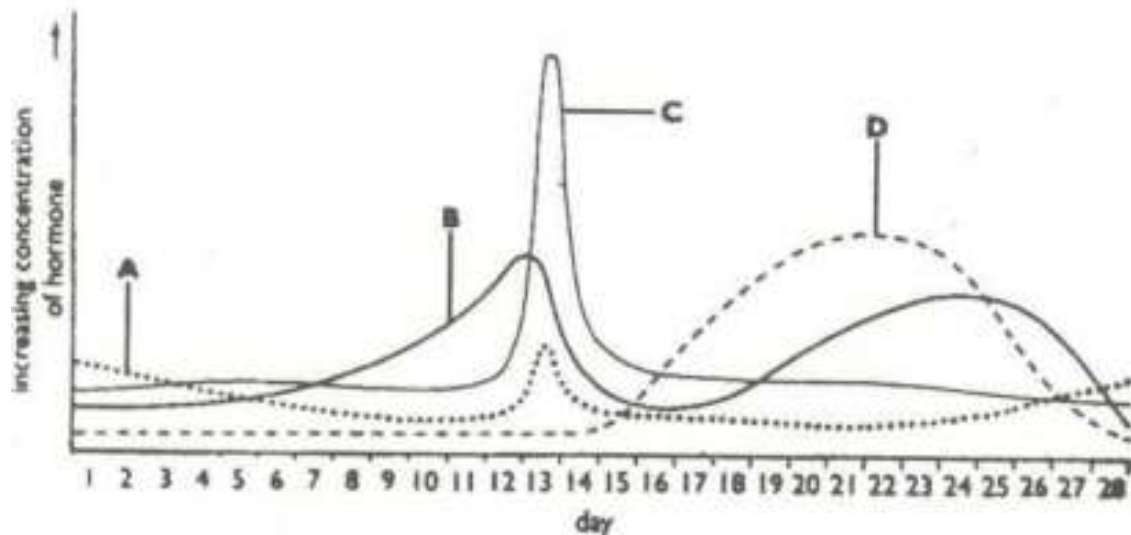
1. All questions are compulsory.
2. The question paper has four sections: Section A, Section B, Section C and Section D. There are 33 questions in the question paper.
3. Section–A has 14 questions of 1 mark each and 02 case-based questions. Section–B has 9 questions of 2 marks each. Section–C has 5 questions of 3 marks each and Section–D has 3 questions of 5 marks each.
4. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
5. Wherever necessary, neat and properly labeled diagrams should be drawn.

Section A

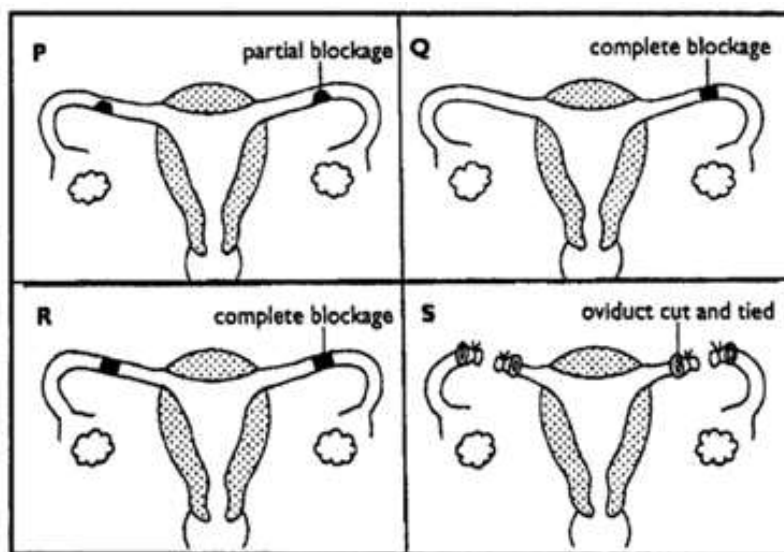
1. The below diagram shows 2 plants of the same species. Identify the types of pollination indicated as P1, P2 and P3.



2. The following graph of relative concentrations of the four hormones present in the blood plasma of a woman during her menstrual cycle. Identify the hormones.



3. The accompanying diagram shows the uterine tubes of four women (P, Q, R and S).



In which two women is fertilisation impossible at present?

4. In humans, the gene for red blood corpuscle shape (alleles elliptical E and normal e) is linked to the gene for Rhesus blood (alleles Rhesus positive R and Rhesus negative r). If crossing over occurs between these two genes, then what are the two additional types of gametes?
5. What is a split gene?
6. What is the effect of opiates?
7. Mention one positive and one negative application of amniocentesis.
8. Why is repeated transfusions of genetically engineered cells required in SCID patients?

9. What is Hirudin?
10. Whales, the world's largest living mammals, live in the ocean, but there are no very small aquatic mammals why?
11. **Assertion:** In a Graafian follicle, the primary oocyte and the follicular cells may be regarded as sibling cells.

Reasons: Both arise from the same parent cell the oogonium by mitotic division.

- The assertion is a true statement but the reason is false.
- Both assertion and reason are true and the reason is the correct explanation of the assertion.
- Both assertion and reason are true but the reason is not the correct explanation of the assertion.
- Both assertion and reason are false.

OR

Assertion: Intra cytoplasmic sperm injection (ICSI) is a procedure to form an embryo in vitro.

Reason: Sperm is directly injected into the ovum.

- The assertion is a true statement but the reason is false.
 - Both assertion and reason are true and the reason is the correct explanation of the assertion.
 - Both assertion and reason are true but the reason is not the correct explanation of the assertion.
 - Both assertion and reason are false.
12. **Assertion:** A monocistronic mRNA can produce several types of polypeptide chains.
Reason: The terminator codon is present on the rRNA.
- The assertion is a true statement but the reason is false.
 - Both assertion and reason are true and the reason is the correct explanation of the assertion.
 - Both assertion and reason are true but the reason is not the correct explanation of the assertion.
 - Both assertion and reason are false.

13. **Assertion:** Nitrogenase enzyme gets inactivated in presence of oxygen yet N₂ fixation occurs in aerobic cells of legume nodules.

Reason: Leghaemoglobin allows presence of oxygen just sufficient for cellular respiration only.

- a. The assertion is a true statement but the reason is false.
- b. Both assertion and reason are true and the reason is the correct explanation of the assertion.
- c. Both assertion and reason are true but the reason is not the correct explanation of the assertion.
- d. Both assertion and reason are false.

14. **Assertion:** If the species-area relationships are analyzed among very large areas like the entire continents, the value of Z i.e., slope of line lies in the range of 0.1 to 0.2.

Reason: The value of Z i.e., slope of line of species area relationships lies in the range of 0.6 to 1.2 when analysis is done among small areas.

- a. The assertion is a true statement but the reason is false.
- b. Both assertion and reason are true and the reason is the correct explanation the assertion.
- c. Both assertion and reason are true but the reason is not the correct explanation of the assertion.
- d. Both assertion and reason are false.

15. **Read the following and answer any four questions from 15(i) to 15(v) given below:**

Knowledge about the effects of DNA variations among individuals can lead to revolutionary new ways to diagnose, treat and someday prevent the thousands of disorders that affect human beings. Besides providing clues to understanding human biology, learning about non-human organism's DNA sequences can lead to an understanding of their natural capabilities that can be applied toward solving challenges in health care, agriculture, energy production, environmental remediation. Many non-human model organisms, such as bacteria, yeast, *Caenorhabditis elegans* (a free-living non-pathogenic nematode), *Drosophila* (the fruit fly), plants (rice and *Arabidopsis*), etc., have also been sequenced.

15 (i). The paragraph is referring to which technique developed recently?

- a) Sequencing the genome.
- b) Sequencing the proteins.
- c) Identifying the coding sequences among the genome.
- d) All of the above.

15 (ii). The maximum number of genes are found in:

- a) Chromosome 5
- b) Chromosome 21
- c) Chromosome 1
- d) Chromosome 10

15 (iii). What percentage of genome codes for proteins?

- a) 3%
- b) 8%
- c) 10%

d) 2%

15 (iv). What is the total estimated number of genes in human genome?

a) 30000

b) 20000

c) 25000

d) 80000

15 (v). **Assertion:** Human Genome Project was a mega project coordinated by U.S Department of Health and Nutrition.

Reason: The project was Launched in 2001.

a. The assertion is a true statement but the reason is false.

b. Both assertion and reason are true and the reason is the correct explanation of the assertion.

c. Both assertion and reason are true but the reason is not the correct explanation of the assertion.

d. Both assertion and reason are false.

16. Read the following and answer any four questions from 16(i) to 16(v) given below:

Severe combined immunodeficiency (SCID) is a group of rare disorders caused by mutations in different genes involved in the development and function of infection-fighting immune cells. Infants with SCID appear healthy at birth but are highly susceptible to severe infections. The condition is fatal, usually within the first year or two of life, unless infants receive immune-restoring treatments, such as transplants of blood-forming stem cells, gene therapy, or enzyme therapy. More than 80 percent of SCID infants do not have a family history of the condition. However, development of a newborn screening test has made it possible to detect SCID before symptoms appear, helping ensure that affected infants receive life-saving treatments. Gene therapy is the process of introduction of DNA into an organism e.g. human beings in order to treat a disease. It is used to replace a missing gene product or to correct mutant alleles. ADA is an autosomal-recessive inherited disorder that occurs due to defective adenosine deaminase (ADA) enzyme. People with this enzyme deficiency suffer from severe combined immunodeficiency (SCID) conditions. Human gene therapy trial can be used for ex vivo introduction of functional ADA gene in bone marrow cells of the patient, suffering from SCID. For this process, an engineered retrovirus containing a functional ADA gene is used to transfer the ADA gene into stem cells isolated from the patient with SCID. The treated cells or modified cells with the good ADA gene are reintroduced into the patient's marrow.

i. ADA deficiency is a _____

a) Autosomal-recessive inherited disorder

b) Sex linked recessive inherited disorder

c) Sex linked dominant inherited disorder

d) Autosomal-recessive inherited disorder

ii. Infants with ADA deficiency are

a) healthy at birth but are highly susceptible to severe infections

- b) healthy at birth but and develop resistant to severe infections later on
- c) They are very sick at the time of birth
- d) None of the above

iii. Infants with ADA deficiency are also called

- a) AIDS
- b) SCID
- c) HLA Deficient
- d) None of the above

iv. ADA deficiency may occur in a child if the parents are

- a) Both dominant for the ADA gene
- b) One is heterozygous and the other parent is dominant for both the genes
- c) Both are heterozygous for the genes
- d) It is not heritable.

v. The permanent cure of ADA deficiency is by

- a) Enzyme replacement therapy
- b) Gene therapy after attaining age more then 5 years
- c) Gene therapy at embryonic stage
- d) Bone marrow transplant

Section B

- 17. How is a vegetative cell different from a generative cell?
- 18. Make a diagrammatic sketch of the microscopic view of mammalian sperm and label it's parts.
- 19. The human male never passes on the gene for haemophilia to his son. Why is it so?

OR

What is the role of tRNA in protein synthesis?

- 20. How is polarity of DNA determined?
- 21. State the use of following enzymes/acids produced by the microbes
(i) lipase (ii) lactic acid. (iii) streptokinase. (iv) pectinase
- 22. What is unique of transgenic animals ?
- 23. What is innate immunity? List the four types of barriers which protect the body from the entry.
- 24. Explain brood parasitism with the help of an example.

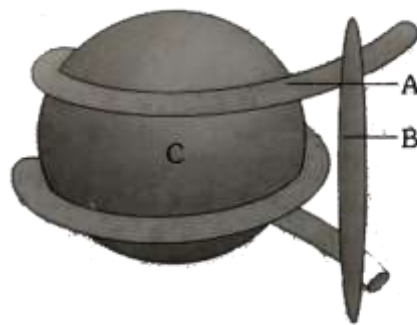
OR

Define phynotypic adaptation .Give one example.

25. Explain any two most important levels of biological organisation showing biodiversity with the help of an example each

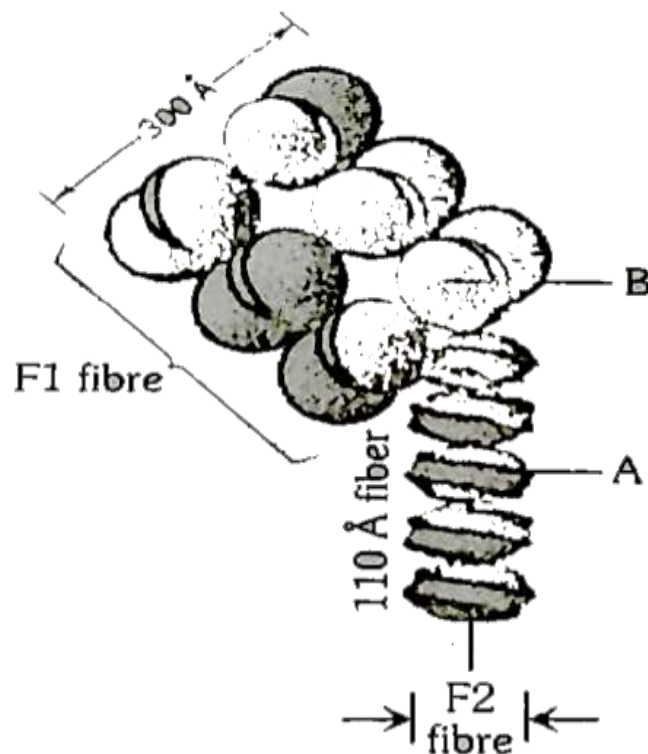
Section C

26. Describe megasporogenesis in an angiosperm.
27. How are ZIFT and GIFT different from intra uterine transfers? Explain.
28. Go through the following diagram of Nucleosome (structural unit of chromatin). Identify its componental parts indicated by A, B and C.



OR

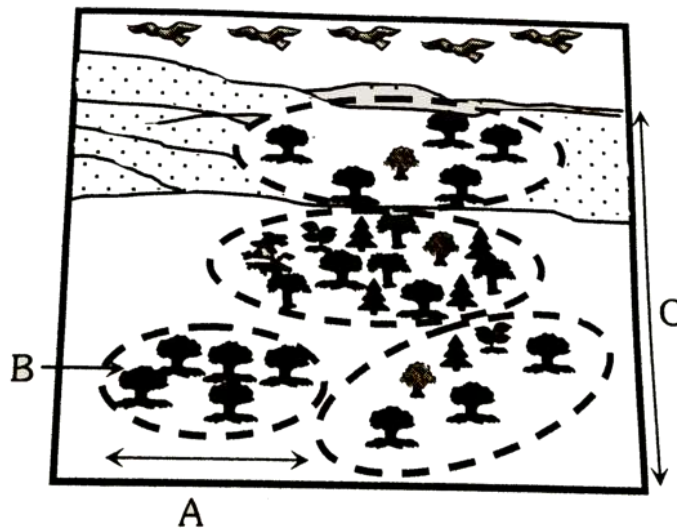
The adjoining figure represents the structure of basic 30 nm fibre of chromosome of eukaryotes. Identify F1, F2, A and B shown in the figure.



29. The birth and death rates of three countries are given below. Calculate the population growth rate of each country.

Country	Birth rate / 1000	Death rate / 1000
<i>P</i>	15	5
<i>Q</i>	25	10
<i>R</i>	35	18

30. Different types of diversity are shown in the figure. Identify them.



Section D

31. i) Explain the menstrual cycle in human females.

ii) How can the scientific understanding of the menstrual cycle of human females help as a contraceptive measure?

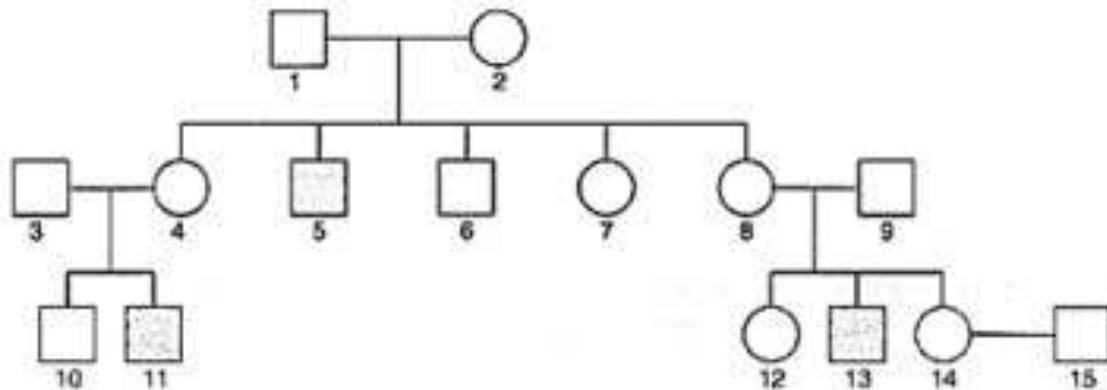
OR

What develops into a microspore mother cell in a flower? Trace the development of this cell into a pollen grain which is ready for germination.

Draw a labelled figure by a mature pollen grain.

32. Haemophilia is a sex-linked recessive disorder of humans. The pedigree chart given

below shows the inheritance of haemophilia in one family. Study the pattern of inheritance and answer the questions given.



- a) Give all the possible genotype of the members 4, 5 and 6 in the pedigree chart.
- b) A blood test shows that the individual 14 is a carrier of haemophilia. The member numbered 15 has recently married the member numbered 14. What is the probability that their first child will be a haemophilic male?

OR

Differentiate between the process of transcription in prokaryotes and eukaryotes.

33. (a) Why are herbivores considered similar to predators in the ecological context? Explain.

- (b) Differentiate between the following interspecific interactions in a population: Mutualism and Competition.

OR

Many plant and animal species are on the verge of their extinction because of loss of forest land by indiscriminate use by the humans. As a biology student what method would you suggest along with its advantages that can protect such threatened species from getting extinct?