

**CBSE Question Paper 2017**

**Foreign Set-1**

**Class-12 Biology**

**Time allowed: 3 hours, Maximum Marks: 70**

**General Instructions:-**

1. All questions are compulsory.
2. This question paper consists of four Sections A, B, C D and E. Section A contains 5 questions of one mark each, Section B is of 5 questions of two marks each, Section C is of 12 questions of three marks each, Section D is 1 question of four mark and Section E is of 3 questions of five marks each.
3. 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.
4. Wherever necessary, the diagrams drawn should be neat and properly labelled.

**Section-A**

1. Name the vegetative propagules in
  - i. Potato, and
  - ii. Pistia
2. Mention the combination(s) of sex chromosomes in a male and female bird.
3. A region of a coding DNA strand has the following nucleotide sequence:  
-ATTIC-  
What shall be the nucleotide sequence in
  - i. sister DNA segment it replicates, and
  - ii. m-RNA polynucleotide it transcribes?
4. List the type of fury genes that provide resistance to corn plants and cotton plants respectively against lepidopterans
5. Very small animals are rarely found in polar regions, Give two reasons.

**Section-B**

6. Mention the relationship between concentration of luteinising hormone and maintenance of endometrium in the human uterus.
7. Explain codominance with the help of one example.

**OR**

What do the forelimbs of whales, bats and cheetah with respect to evolution signify?  
Provide one such example in plants.

8. What is outbreeding? Mention any two ways it can be carried out.
9. State how does ex-situ conservation help in protecting biodiversity.
10. Explain the relationship between green house gases and global warming.

### **Section-C**

11. Apomixis resembles asexual reproduction, as well as mimics sexual reproduction in plants. Explain with the help of suitable example.
12. Describe the embryonic development of a zygote upto its implantation in human.
13. Explain the cause of chromosomal disorder in humans. Describe the effect of such disorder with the help of an example each involving (i) autosomes, and sex chromosomes.
14. Describe the experiments that established the identity of "transforming principles" of Griffith.
15. State the contribution of Louis Pasteur in understanding the origin of life on earth. Explain the procedure that he followed to arrive at his conclusion.
16. A farmer while working on his farm was bitten by a poisonous snake. The workers in the farm immediately rushed him to the nearby health centre. The doctor right away gave him an injection to save his life. What did the doctor inject and why? Explain.
17. Explain three basic steps to be followed during genetic modification of an organism.
18. How can a bioreactor be made to function at optimal state in order to obtain a desired foreign gene product? Explain.
19. How does  $\beta$ -galactosidase coding sequence act as a selectable marker? Explain. Why is it a preferred selectable marker to antibiotic resistance genes?
20. When do you describe the relationship between two organisms as mutualistic, competitive and parasitic? Give one example of each type.
21. Describe the effect of human activities in influencing natural ecosystem cycle with

special reference to carbon cycle.

22. Combination and introduction of alien species to are responsible for the loss of bio diversity. Explain, how

**OR**

Explain how bio magnification of DDT occurs in an aquatic food chain.

### **Section-D**

23. Your school's athletic team along with athletic teams from different schools reach the venue two days before the inter district school athletic event was to be held. A day before the competition, a team of officials from an agency arrive and ask for blood and urine samples from all the participating athletes.
- Would you support or object to this sample collection? Provide explanation to your answer.
  - Write a note that you would like to read out to your team-mates to explain the purpose of this visit of these officials.

### **Section-E**

24. a. What are the benefits of choosing a dioecious plant species for plant breeding experiments.
- b. How would you proceed to cross-pollinate a monoecious flower?
- c. Draw a labelled schematic diagram of T.S of an anther of an angio sperm.

**OR**

- Explain the hormonal regulation of spermatogenesis in humans.
  - Draw the diagram of a human sperm. Label and write the functions of the components of its head.
25. Describe the dihybrid cross carried on *Drosophila melanogaster* by Morgan and his group. How did they explain linkage, recombination and genemapping on the basis of their observation?

**OR**

Describe the interaction of t-RNA and ribosomes during the events of translation.

26. a. Name the types of lymphoid organs lymph nodes and thymus. Explain the role played by them in causing immune response.
- b. Differentiate between innate immunity and acquired immunity.

**OR**

- a. How does *Bacillus thuringiensis* acts as a bio control agent for protecting Brassica and fruit trees? Explain.
- b. i. List the components of biogas.
- ii. What makes methanogens a suitable source for biogas production?

---

### **Answering**

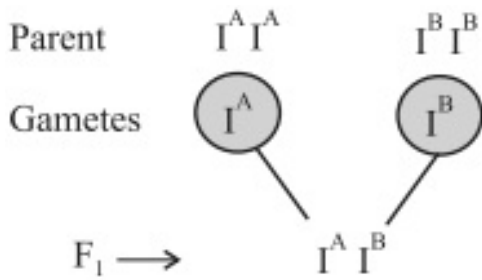
---

#### **Section-A**

1. i. Eye/Eye buds
- ii. Offset
2. Male - ZZ, Female - ZW
3. i. TACG
- ii. AUG C
4. Cry IAC/Cry IIAb-cotton
- Cry IAb-corn
5. Small animals have larger surface area relative to their volume loose heat veryfast. Due to small size, expend much energy to generate body heat through metabolism.

#### **Section-B**

6. (Mid cycle) LH surge → formation of corpus luteum → progesterone, maintains the growth of endometrium.
  7. When the dominant alleles of the same gene which are contributed by both parents are expressed in called codominance. F1 generation resembles both the parents
- In human blood group



OR

- Homologous organs or divergent evolution.
- Thorns of Bougainvillea and tendrils of cucurbita.

8.

- Breeding of unrelated animals, if from the same breed having no common ancestors for 4-6 generations.
- Out crossing/crossbreeding/ interspecific hybridisation (any two).

9. Threatened animals and plants are taken out from their natural habitat and placed in special settings/by cryopreservation technique, in vitro fertilisation of eggs, tissue culture, seed banks (any four).

10. Green house gases absorb a major fraction of infrared radiation emitted by earth, and do not allow it to escape into space and reflects it back to earth, leading to considerable heating of earth and its atmosphere causing global warming.

### Section-C

11. Since there is no fertilisation in apomixis it resemble asexual reproduction and development of embryo/seed/fruit formation is mimicing sexual reproduction.

- In citrus/Mango some of the nuclellar cells surrounding the embryo sac, act as diploid egg cell. Which are formed without reduction division, and develop into embryo, without fertilisation.

12. Zygote moves through isthmus and undergoes cleavage (forming morula), morula, continues to divide and transform into blastocyst, Blastomeres in the blastocyst are arranged into an outer layer trophoblast, and inner cell mass, The trophoblast layer gets attached to endometrium, uterine cells divide and cover the blastocyst.

13. Gain or loss of chromosome (due to non disjunction)

- i. Down syndrome. Additional copy of 21<sup>st</sup> chromosome/trisomy of 21.

- ii. Klinefelter's syndrome. Presence of an additional copy of X-chromosome leading to XXY.

Turner's syndrome-absence of one of the X chromosome i.e., 45 with XO.

14. Purification of biochemical like proteins, RNA and DNA from 'S' cells (heat killed).  
Presence of protein and RNA in medium did not affect transformation.  
DNA alone from 'S' Bacteria caused 'R' Bacteria to transform.  
Digestion with DNA ase did inhibit transformation.  
Conclusion : DNA is the transforming biochemical.
15. Pasteur in his experiment took a flask containing sugar solution and added yeast to it.  
Then boiled the constants of the flask so that yeast got killed.
  - In pre sterilized sealed flask, life did not come from killed yeast.
  - In open flask life comes from pre-existing life, new living organisms arose in presence of killed yeast.
16. Antitoxin/Antivenoms/Performed antibodies.
  - Whenever quick immune response is required we need to directly inject performed antibodies/Antitoxins.
  - To neutralize snake venom quickly, passive immunity is provided.
17.
  - i. Identification of DNA with desirable genes, so that the genetically modified organisms has largely desirable genes.
  - ii. Introduction of the DNA with desirable genes, into the host using vector.
  - iii. Maintenance of introduced DNA in the host, and transfer of the DNA to its progeny through cloning.
18. By providing optimum growth conditions:  
Temperature, pH, substrate, salts, vitamins, oxygen
19.
  - i. Presence of a chromogenic substrate gives blue colour, if the plasnid in the bacteria does not have an insert (non-recombinants)
  - ii. With has insert do not produce any colour, recombinant colories.
  - iii. Selection of recombinants due to inactivation of antibiotics requires simultanneous plating on two plates having different antibiotics process is more cumber some.
20. **Mutulistic:** Both the interacting organisms are benefited from each other eg.  
**Lichens:** Algal and fungi or any other appropriate example.  
**Competition:** Two organisms belonging to closely related species unrelated groups compete for the same resources that are limiting both are losers eg superior barnacle

dominates and excludes the small barnacles or any other appropriate example.

**Parasitic:** one of the two organisms is dependent on the other (host) for nutrition and support the host is harmed and the parasite is benefited. eg. malarial parasite and human or cuscuta on host plant or any other appropriate example.

21. Rapid deforestation, massive burning of fossil fuel have significantly increased the rate of release of carbon dioxide, polluting atmosphere, this green house gas, contributes to global warming.
22. Co-extinction - When a species becomes extinct, the plant and animal species associated with it in the obligatory way, also becomes extinct.

### OR

DDT in water taken up by an organism cannot be metabolised or excreted and thus passed on to successive trophic level in higher concentration.

Water 0.003 ppm → Zooplankton 0.04 ppm → small fish 0.5 ppm → large fish 2 ppm → fish eating birds 25 ppm.

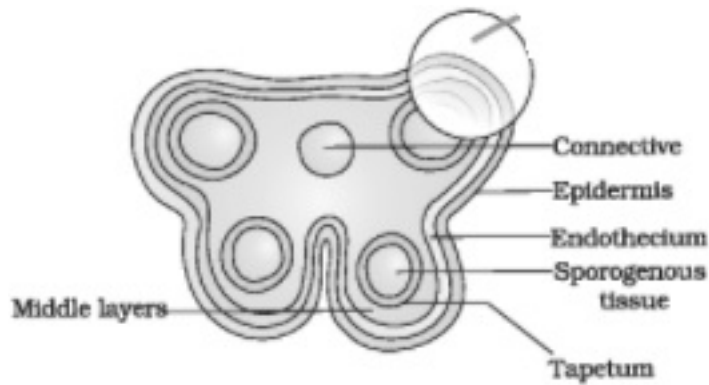
### Section-D

23. a. Yes I support
  - Many times children take drugs, to improve their performance in sports out of curiosity/anxiety/intentionally.
  - To test the fact that performance of child in the sports is natural or drug induced, to be fair on everybody's part this test is essential.
- b. A team of officials from an agency have asked for blood and urine sample from all participants because these samples when analysed will show the presence of drugs, if anybody has taken, this is as per the rule all over the world for any sports competition.

### Section-E

24. a. (Unisexual) self pollination avoided, emasculation not required.
- b. Emasculation
  - Bagging,
  - Pollination by spraying desired pollen grains
  - Rebagging

c. Diagram of T.S. of an anther of an angio sperm.



OR

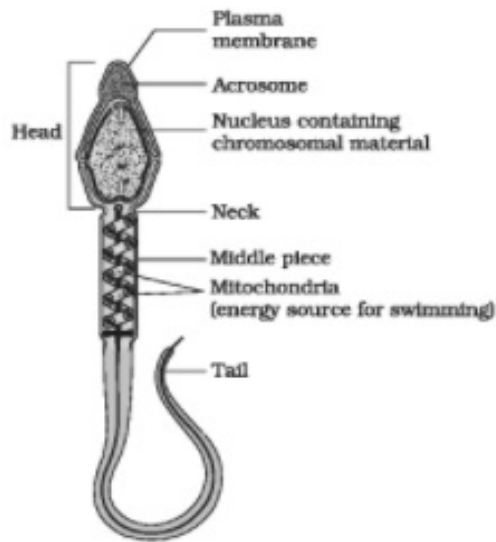
a. Initiation by GnRH from hypothalamus which acts on Anterior Pituitary to release FSH and LH (gonadotropins).

LH acts on cells of Leydig/Interstitial cells to secrete androgens.

Androgens in turn stimulate the process of spermatogenesis.

FSH acts on Sertoli cells and stimulates the secretions of some factors that stimulate spermiogenesis.

b. Diagram of human sperm.



Function of plasma membrane : Envelopes the whole body of sperm

**Acrosome:** contains enzymes for fertilisation

**Nucleus:** contains haploid chromosomal material. (Any two)

25. According to Morgan and his group if genes were very tightly linked they showed very low recombination.

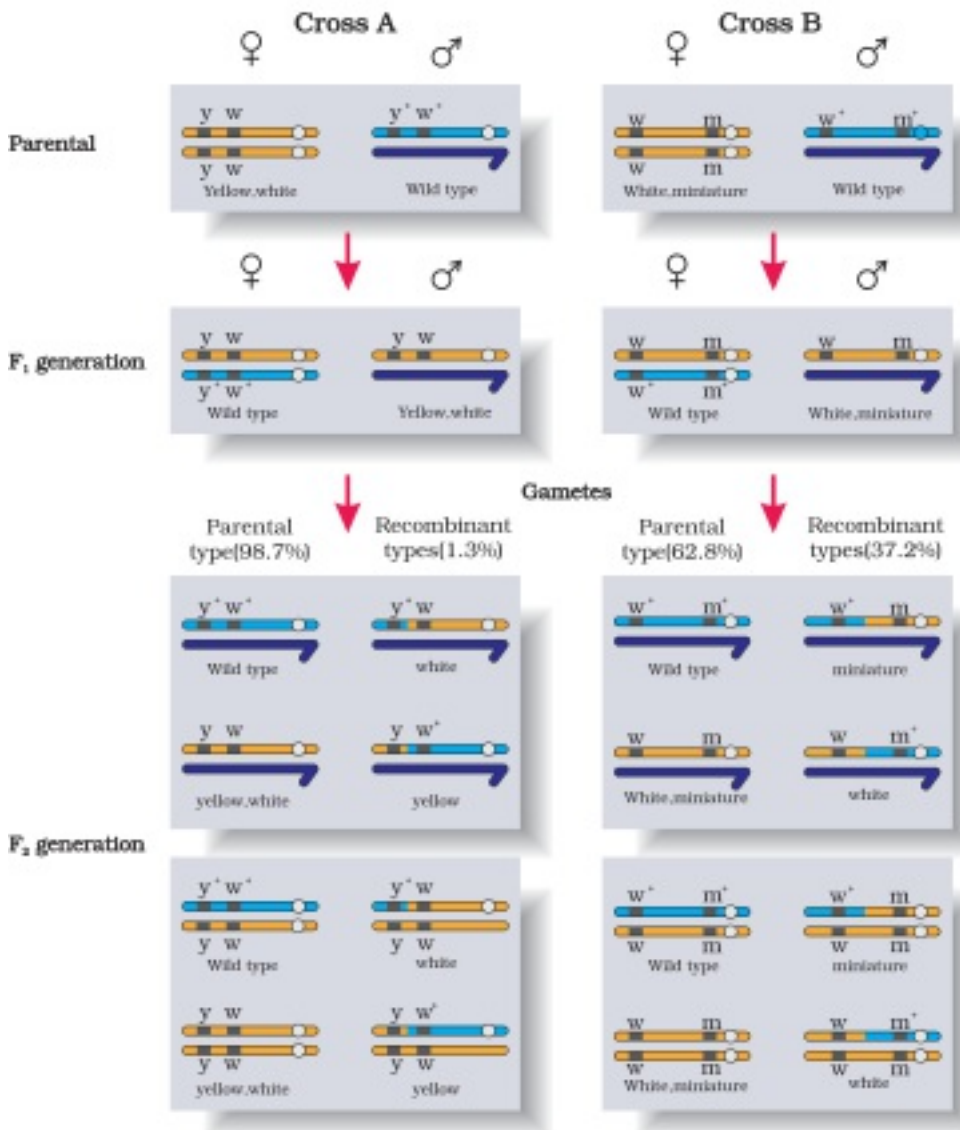
(Shown in cross A) in text book.

If genes were loosely linked they showed very high recombination.



(Shown in cross B) in text book.

The group used the frequency of recombination between gene pairs on the same chromosome as a measure of distance between genes and 'mapped' their position on the chromosome.



OR

For imitation the ribosome binds to the m RNA at the start codon AUG.

Charged t-RNA binds to the appropriate codon on m-RNA forming complementary base pairs on t-RNA as anticodon in the ribosome.

Ribosomes moves from codon to codon along m RNA. amino acids are added one by one brought by t-RNA, from the polypeptide chain.

26. a. Thymus- Primary lymphoid organ, immature lymphocytes differentiate here, into antigen. Sensitive lymphocytes.

**Lymph Nodes:** secondary lymphoid organ, they seen to trap the micro organisms or other antigen, which are responsible for activation of lymphocytes present there.

b.

<b>Innate Immunity</b>	<b>Acquired Immunity</b>
non-specific type of response	Pathogen specific defense
Present at the time of birth	acquired by the body after birth
Provide barrier to the entry of foreign agents into our body	Characterised by memory
Four types (physical barriers) physiological barriers, cellular barriers, cytokine barriers	four types primary and secondary

**OR**

- a. Bacterium *Bacillus thuringiensis* (Bt) are available in sachets as dried spores, mixed with water and sprayed on to plants, these are eaten up by the insect larvae, the toxins are released in the gut and larvae gets killed.
- b.
  - i. Methane,  $H_2S$ ,  $CO_2$ ,  $H_2$ .
  - ii. Methanogens grow anaerobically, on cellulosic material produce large amount of methane, alongwith  $CO_2$  and  $H_2$ .