

## PRE-BOARD EXAMINATION-2 (JANUARY-2020)

CLASS: XII

BIOLOGY

Time: 3 hrs.

MAX. MARKS: 70

**General Instructions:**

- i.) There are a total of 27 questions and five sections in the question paper. All questions are compulsory.
- ii.) Section A contains question numbers 1 to 5, multiple choice questions of one mark each. Section B contains question numbers 6 to 12, short answer type I questions of two marks each. Section C contains question numbers 13 to 21, short answer type II questions of three marks each. Section D contains question number 22 to 24, case-based short answer type questions of three marks each. Section E contains question numbers 25 to 27, long answer type questions of five marks each.
- iii.) There is no overall choice in the question paper. However, internal choices are provided in two questions of one mark, one question of two marks, two questions of three marks and all three questions of five marks. An examinee is to attempt any one of the questions out of the two given in the question paper with the same question number.

**SECTION-A**

1. Which type of immune response is responsible for the rejection of tissues/organs in the patient's body post transplantation? 1
- a. Auto-immune response                      b. Humoral immune response  
c. Physiological immune response        d. Cell-mediated immune response

**OR**

Rheumatoid arthritis is caused when . . .

- i.) Lymphocytes become more active  
ii.) Body attacks self cells  
iii.) More antibodies are produced in the body  
iv.) The ability to differentiate pathogens or foreign molecules from self-cells is lost Choose the correct answer from the options given below:  
a. i and ii    b. iii and iv    c. i and iii    d. ii and iv
2. A biotechnologist wanted to create a colony of E.coli possessing the plasmid pBR322, sensitive to Tetracycline. Which one of the following restriction sites would he use to ligate a foreign DNA? 1
- a. Sal I              b. Pvu I              c. EcoRI              d. Hind III

3. Androgens are synthesized by: 1
- a. Sertoli Cells b. Leydig cells c. Seminal vesicles d. Bulbourethral gland

**OR**

A procedure that finds use in testing for genetic disorders, but is also misused for female foeticide is:

- a. Lactational amenorrhea b. Amniocentesis c. Artificial insemination d. Parturition
4. The most important cause of biodiversity loss is: 1
- a. Over exploitation of economic species
- b. Habitat loss and fragmentation
- c. Invasive species
- d. Breakdown of plant-pollinator relationships
5. A human female with Turner's syndrome 1
- a. Has 45 chromosomes with XO
- b. Has one additional X chromosome
- c. Exhibits male characters
- d. Is able to produce children with normal husband

**SECTION-B**

6. a. Name any two copper releasing IUDs. 2
- b. Explain how they act as effective contraceptives in female.

**OR**

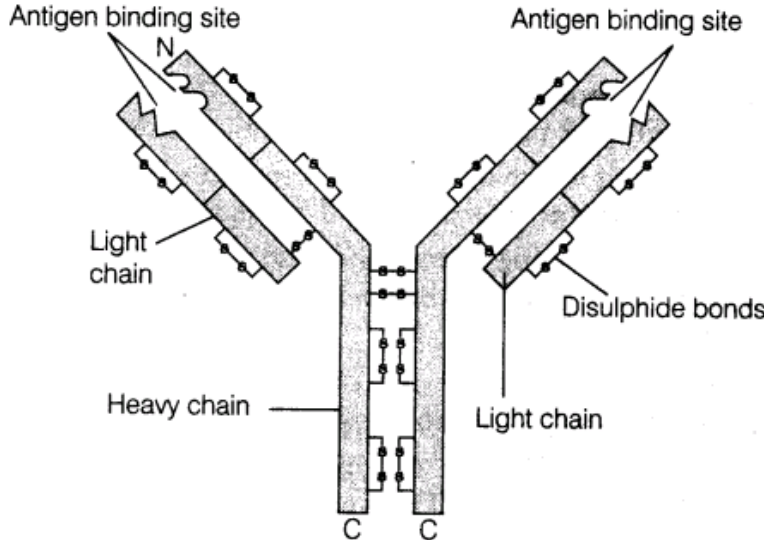
Removal of gonads cannot be considered as a contraceptive option. Why?

7. What are "cloning sites" in a cloning vector? Explain their role. Name any two such sites in PBR322. 2
8. What are exotic species? Explain with the help of two examples, how exotic species disturb the native species of an ecosystem? 2
9. Describe how changing levels of FSH, LH and progesterone during menstrual cycle induce changes in the ovary and uterus of the human female. 2
10. a. Organ transplant is preferred between close relatives. Why? 2
- b. Even the infected cells of our body can render significant protection to the non-infected cells. How?

**OR**

What is the basic principle of vaccination? How do vaccines prevent microbial infections? Name the organism from which hepatitis B vaccine is produced.

11. a) Patient who have undergone myocardial infarction are given clot buster. Mention the clot buster administered and its microbial source. 2
- b) A person is recovering from illness is advised to have curd regularly. Why?

12.  2

Antibody has a variable region and a constant region. Study the structure and point the possible variable region. Give reason for your choice.

### SECTION-C

13. Explain accelerated eutrophication. Mention any two consequences of this phenomenon. 3
14. What are satellite DNA in a genome? Explain their role in DNA fingerprinting. 3

**OR**

How do ribosomes in the cells act as factories for protein synthesis?

15. a. How do surgical procedures prevent conception in humans? Mention the way it is achieved in human males. 3
- b. All reproductive tract infections (RTIs) are STDs but all STDs are not RTIs. Justify with example.
16. a. How does the Hardy-Weinberg's expression ( $p^2 + 2pq + q^2$ ) explain that genetic equilibrium is maintained in a population? 3
- b. List any two factors that can disturb the genetic equilibrium.
17. a. Draw the embryo sac of a flowering plant and label the important parts. 3
- b. Name the cell that develops into the embryo sac.
18. a. A cistron consists of 20 codons. How many amino acids will it code in the polypeptide transcribed? Why? 3
- b. Differentiate between codon and anticodon.

**OR**

State any two structural and one functional difference between DNA and rRNA.

19. a. "Cleistogamous flowers are strictly self-pollinating. Explain. 3
- b. "Incompatibility is a natural barrier in the fusion of gametes." Justify the statement with reference to plants.

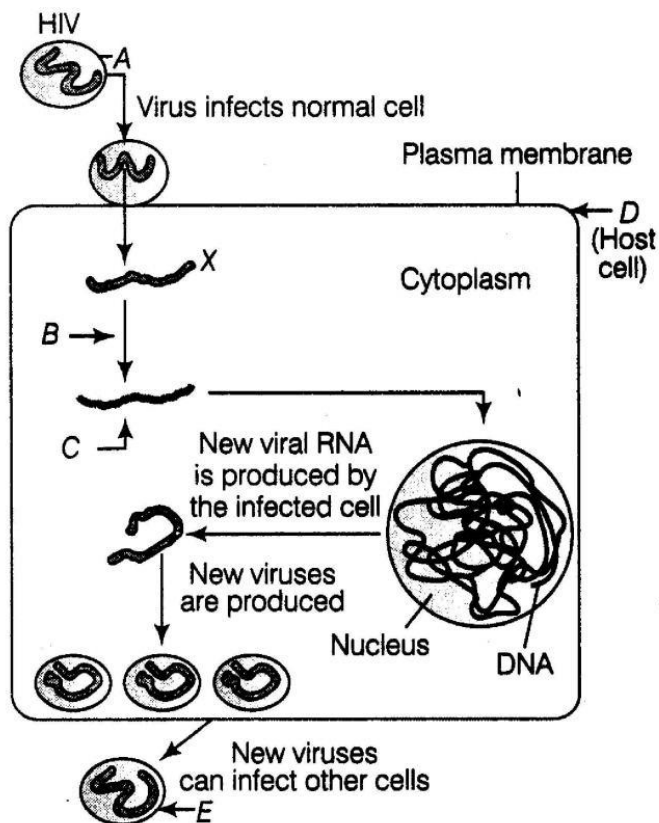
OR

What is pregnancy hormone? Why is it called so? Name the two sources of this hormone in human female.

20. Amazonian forest has the greatest biodiversity on earth. Explain the hypotheses that are proposed by the biologists to account for the greater biological diversity. 3
21. Why is *Agrobacterium* – mediated genetic transformation described as natural genetic engineering in plant? 3

SECTION-D

22. 3



- a. Study the diagram showing replication of HIV in humans and answer the following questions accordingly:
- Write the chemical nature of the coat 'A'
  - Name the enzyme 'B' acting on 'X' to produce molecule 'C'. Name C.
  - Mention the name of the host cell 'D' the HIV attacks first when it enters the human body.
  - Name the two different cells that the new viruses 'E' subsequently attacks.
- b. Mention the diagnostic test performed to detect the disease caused by above virus.

23. Explain the role of baculo-viruses as biological control agents. Mention their importance in organic farming. 3

OR

Explain the role of the following in increasing the soil fertility and crop yield :

- a) Leguminous plants
- b) Cyanobacteria
- c) Mycorrhiza

24. Expand MOET. Explain the procedure of this technology in cattle improvement. 3

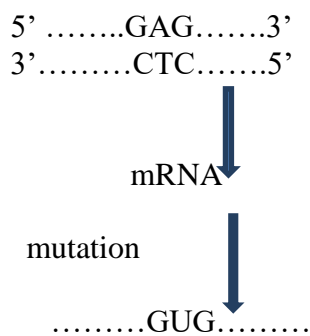
### SECTION-E

25. Name the genes that constitute an operon. How does lac operon get switched on in the presence of lactose? 5

**OR**

From the following diagram of molecular mechanism of mutations.

Identify the type of mutation. Which disease is represented by such a mutation? Explain with the help of one such example.



26. How is the 'sixth episode of extinction' of species on earth, now currently in progress, different from the five earlier episodes? What is it due to? Explain the various causes that have brought about this difference. 5

**OR**

Draw and explain the logistic growth curve for a population density  $N$  at time  $t$  whose intrinsic rate of natural increase is  $r$  and carrying capacity is  $k$ . Write necessary equation also.

27. Explain the role of *Eco* RI in the formation of recombinant DNA. How insertional inactivation is used in the selection of recombinants in Biotechnology? 5

**OR**

Biotechnology has used transposons for genetic pest resistant plants. Name the pest and the plant that serve as examples for the same. Detail the process involved in producing such disease resistant plants.