



**BIOLOGY**

**Class 12 - Biology**

**Time Allowed: 3 hours**

**Maximum Marks: 70**

**General Instructions:**

1. All questions are compulsory.
2. The question paper has five sections and 33 questions. All questions are compulsory.
3. Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E 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. Which of these is a condition that makes flowers invariably autogamous? [1]  
a) Xenogamy  
b) Cleistogamy  
c) Self-incompatibility  
d) Dioecy
2. In Nostoc, enzyme nitrogenase occurs in: [1]  
a) Only in hormogones  
b) Both Vegetative cells and Heterocysts  
c) Heterocysts  
d) Vegetative cells
3. The term Darwinian fitness among populations living together signifies: [1]  
a) Carrying capacity  
b) Population density  
c) Reproductive fitness  
d) Growth fitness
4. The thermostable enzymes **Taq** and **pfu** isolated from thermophilic bacteria are: [1]  
a) DNA ligases  
b) Restriction endonucleases  
c) RNA polymerase  
d) DNA polymerases
5. What is common to Lantana, Eichhornia, and African catfish? [1]  
a) All the species are neither threatened nor indigenous species of India.  
b) All are mammals found in India.  
c) All are endangered species of India.  
d) All are keystone species.
6. Which one is called the pregnancy hormone: [1]  
a) Progesterone  
b) Estrogen

c) Testosterone

d) Oxytocin

7. The nematode that infests and damages tobacco roots:

[1]

a) Trichinella

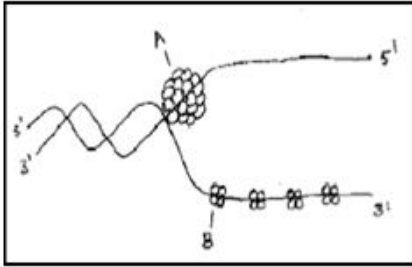
b) Ancylostoma

c) Meloidogyne incognitia

d) Ascaris megalocephala

8. What does A & B represent?

[1]



a) Gyrase, Helicase

b) Helicase, Single strand binding protein

c) Double-Stranded Protein, Helicase

d) Topoisomerase Helicase

9. Which one of the following pairs of plant structures has a haploid number of chromosomes?

[1]

a) Nucellus and antipodal cells

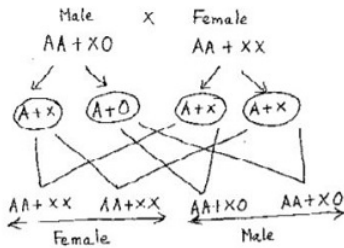
b) Megaspore mother cell and antipodal cell

c) Egg and antipodal cells

d) Egg nucleus and secondary nucleus

10. What does the chart give below represent?

[1]



a) XX - XO type of sex determination

b) XX - XY type of sex determination

c) XO - XX type of sex determination

d) xy - xx type of sex determination

11. The technique of DNA fingerprinting was initially developed by

[1]

a) S. Mond

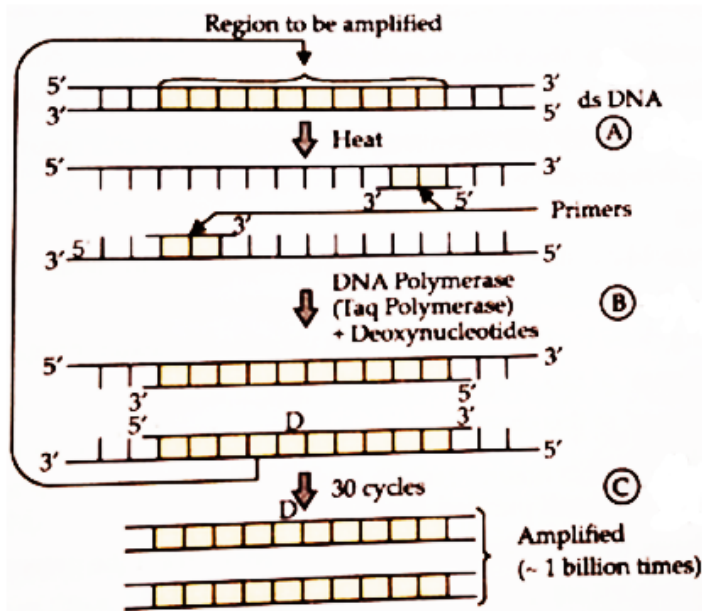
b) Alec Jefferys

c) Robert Sanford

d) D.Pollard

12. Figure given below represents the reactions associated with Polymer Chain Reaction (PCR). Name the steps A, B, C in the process.

[1]



- a) A - Primer Extension, B - Annealing, C - Denaturation  
 b) A - Denaturation, B - Annealing, C - Primer Extension  
 c) A - Annealing, B - Primer Extension, C - Denaturation  
 d) A - Annealing, B - Denaturation, C - Primer Extension

13. **Assertion (A):** Mendel was successful in his hybridisation experiments. [1]

**Reason (R):** Garden pea proved to be an ideal experimental material.

- a) Both A and R are true and R is the correct explanation of A.  
 b) Both A and R are true but R is not the correct explanation of A.  
 c) A is true but R is false.  
 d) A is false but R is true.

14. **Assertion (A):** The earliest organisms that appeared on the earth were non-green and presumably anaerobes. [1]

**Reason (R):** The first autotrophic organisms were the chemo-autotrophs that never released oxygen.

- a) Both A and R are true and R is the correct explanation of A.  
 b) Both A and R are true but R is not the correct explanation of A.  
 c) A is true but R is false.  
 d) A is false but R is true.

15. **Assertion (A):** Regulation of expression of genes is required by the organisms. [1]

**Reason (R):** Wastage of energy is thus avoided.

- a) Both A and R are true and R is the correct explanation of A.  
 b) Both A and R are true but R is not the correct explanation of A.  
 c) A is true but R is false.  
 d) A is false but R is true.

16. **Assertion (A):** Tissue matching, blood group matching are essential before undertaking any graft/transplant. [1]

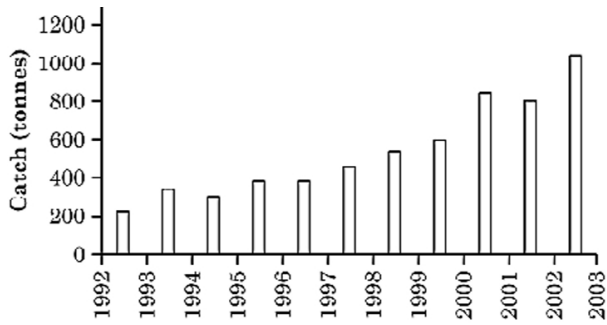
**Reason (R):** The body is able to differentiate self and non-self.

- a) Both A and R are true and R is the correct explanation of A.  
 b) Both A and R are true but R is not the correct explanation of A.  
 c) A is true but R is false.  
 d) A is false but R is true.

### Section B

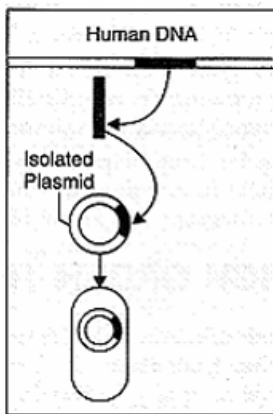
17. Write the various major steps of fermentation. [2]

18. The histogram given below representing the data for annual shark harvest in the great barrier reef/coral reef located on the east coast of Queensland, Australia. Study the histogram and answer the questions that follow. [2]

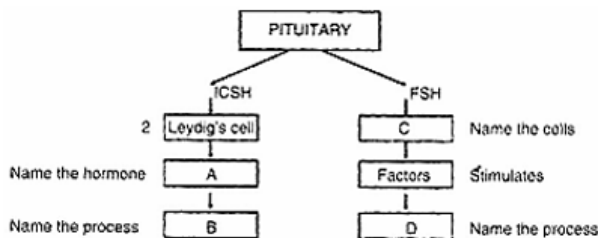


Source : Fijisharkdiving.blogspot.com

- a. Write your interpretation of the data given.  
 b. Write the impact on the biodiversity of the area that you can interpret on the basis of given data.
19. Name the particular technique whose steps are shown in the following figure. Use the figure to summarise the technique in three steps. [2]



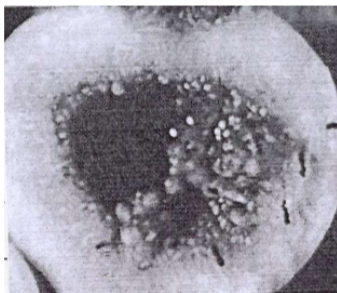
20. Given below is an incomplete chart showing the influence of hormones on gametogenesis in males. Observe the chart carefully and fill in the blanks A, B, C and D [2]



21. Name and explain the type of interaction between big trees and certain species of wasps? [2]

OR

- i. Name and explain the kind of interaction in the following figure.

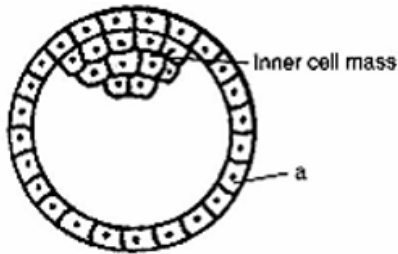


- ii. Explain two other examples where the same type of interaction among organisms is commercially useful in agriculture.

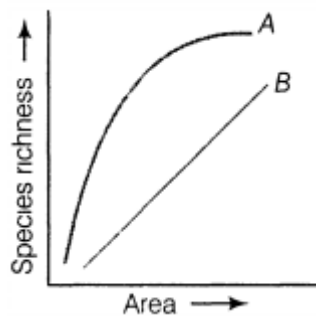
**Section C**

22. Explain the different steps involved during primary treatment phase of sewage. [3]

23. Study the below figure and answer the question that follows: [3]



- Identify 'a' and which part of the placenta is formed by 'a'?
  - Mention the fate of the inner cell mass after implantation in the uterus.
  - Where are the stem cells located in this embryo?
24. What is Down's syndrome? Give its symptoms and cause. Why is it that the chances of having a child with Down's syndrome increases if the age of the mother exceeds forty years? [3]
25. The given graph shows species-area relationship. Write the equation of the curve A and explain. [3]



26. Explain the role of tapetum in the formation of pollen grain wall. [3]

OR

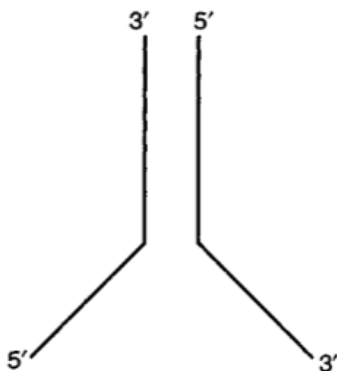
Where are the following structures present in a male gametophyte of an angiosperm? Mention the function of each one of them.

- Germ pore
  - Sporopollenin
  - Generative cell
27. What are the shortcomings of ecological pyramids in the study of an ecosystem? [3]
28. Name two new techniques for determining the condition of the foetus. [3]

#### Section D

29. Read the following text carefully and answer the questions that follow: [4]

Study the image below:



- Identify the structure shown above. (1)
- Redraw the structure as a replicating fork and label the parts. (1)

iii. Write the source of energy for this replication and list the enzymes involved in this process. (2)

**OR**

Mention the difference in the synthesis based on the polarity of the two template strands. (2)

30. **Read the following text carefully and answer the questions that follow:** [4]

Animals with manipulated genetic material (carrying recombinant DNA) are known as transgenic animals. Transgenic technology provides a method to rapidly introduce new genes into animals without cross breeding. It is a powerful technique for studying fundamental problems of mammalian development. Transgenic technology has been developed and found perfect in the laboratory on mice. The three most common gene transfer techniques namely: DNA microinjection, ES-cell mediated and Retrovirus mediated gene transfer are the most important to have enabled the production of transgenic cattle, sheep, goat, pig and other animals. Transgenic animals have the potential of agricultural applications like improved growth rate and carcass composition, improved resistance to disease, increased milk yield, improved wool production and so on. The scientific outlook of right and wrong opinions about transgenic animals is called ethics of transgenic animals. These ethical and animal welfare issues surround transgenic animal technology and can only be minimized or avoided through awareness creation about the merit of this technology.

i. How are humans benefitted from transgenic animals? (1)

ii. Name any r-DNA vaccine produced from transgenic organism? (1)

iii. Name the vector which is most commonly used to produce transgenic animals and the organization set up by Indian Government to check safety of introducing transgenic animals for human services. (2)

**OR**

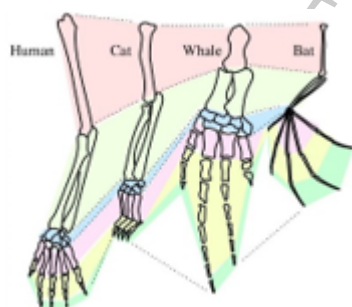
Why are transgenic animals important? (2)

#### Section E

31. Explain the origin of simple organic compounds on the primitive earth. [5]

**OR**

Observe the diagram and answer the following question with reference to evolution:



i. Name the type of organs that are illustrated in the above diagram.

ii. Which type of evolution is represented by the above diagram?

iii. Give one example of homologous structures in plants.

32. Diagrammatically represent the experimental steps in cloning and expressing a human gene (say the gene for growth hormone) into a bacterium like E. coli? [5]

**OR**

i. **EcoRI** has played very significant role in r-DNA technology.

I. Explain the convention for naming EcoRI.

II. Write the recognition site and the cleavage sites of this restriction endonuclease.

- ii. What are the protruding and hanging stretches of DNA produced by these restriction enzymes called? Describe their role in formation of r-DNA.
33. A person in your colony has recently been diagnosed with AIDS. People/residents in the colony want him to leave the colony for the fear of spread of AIDS. [5]
- i. Write your views on the situation, giving reasons.
- ii. List the possible preventive measures that you would suggest to the residents of your locality in a meeting organised by you so that they understand the situation.
- iii. Write the symptoms and the causative agent of AIDS.

OR

- a. Write the specific name of the genus Plasmodium that causes one of the most serious types of diseases in humans. Name the disease.
- b. Describe the events in the life cycle of Plasmodium which take place in the female Anopheles.
- c. Explain what happens in the RBCs of the humans when Plasmodium gains entry into them. How does the human body get affected?

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