

Class XII  
**BLUE PRINT**

**Subject : Biology**

<b>S. No.</b>	<b>Type of Questions → Units</b>	<b>VSA (1 mark)</b>	<b>SAII (2 marks)</b>	<b>SAI (3 marks)</b>	<b>LA (5 marks)</b>	<b>TOTAL</b>
1.	Sexual Reproduction	2(2)	4(2)	6(2)	---	12(6)
2.	Genetics and Evolution	2(2)	4(2)	9(3)	5(1)	20(8)
3.	Biology and Human Welfare	1(1)	2(1)	9(3)	---	12(5)
4.	Biotechnology and its applications	2(2)	2(1)	3(1)	5(1)	12(5)
5.	Ecology and Environment	1(1)	8(4)	---	5(1)	14(6)
	<b>Total</b>	8(8)	20(10)	27(9)	15(3)	70(30)

**SAMPLE PAPER**  
**Subject : Biology**  
**Class XII**

**Time : 3 HRS**

**Max. Marks : 70**

**GENERAL INSTRUCTIONS :**

- (i) *All questions are compulsory.*
- (ii) *The question paper consists of four sections A, B, C and 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 have 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 is the advantage of making the hybrid seeds in to apomicts? 1
- 2) The meiocyte of rice has 24 chromosomes. How many chromosomes will be present in its endosperm? 1
- 3) How do deoxyribonucleoside Triphosphates serve dual purposes in replication of DNA? 1
- 4) Name the type of evolution exhibited by thorn of Bougainvillia and tendril of cucurbita? 1
- 5) It was diagnosed by a specialist that the immune system of the body of a patient has been suppressed. Name the disease the patient is suffering from and its causative agent? 1
- 6) Why does DNA move towards the anode in gel electrophoresis ? 1
- 7) Many fresh water animals can not live in sea for long and vice-versa .Why? 1
- 8) What are e-wastes ? 1

**SECTION – B**

- 9) i) What is lactational amenorrhoea ?  
ii) Expand IUD and MTP 2
- 10) What is pericarp ? Mention any two of its functions ? 2
- 11) What is splicing ? Why is splicing necessary in eukaryotic genes ? 2

**OR**

Why is DNA and not RNA, the genetic material in majority of organisms ? 2

- 12) Stanley Miller and Harold Urey performed an experiment by recreating in the laboratory the probable conditions of the atmosphere of the primitive earth
  - i) What was the purpose of the experiment ?

- ii) In what forms was the energy supplied for the chemical reactions to occur 2
- 13) Find out the name of the microbes from which cyclosporine A( an immunosuppressive drug) and statins( blood cholesterol lowering agents) were obtained ? 2
- 14) How is *Agrobacterium tumefaciens* used as a vector for transformation of plant cells ? 2
- 15) Lichen is considered a good example of obligate mutualism. Explain? 2
- 16) What is biological magnification ? How does DDT as a water pollutant undergo biological magnification ? 2
- 17) Differentiate between *in situ* and *ex situ* conservation ? 2
- 18) Why is the length of a food chain in an ecosystem generally limited to 3-4 trophic levels ? Explain with an example ? 2

### SECTION – C

- 19) Represent diagrammatically the process of oogenesis in a human female, indicating the number of chromosomes at various stages ? 3
- 20) Following table gives certain terms associated with ARTs. Fill in the blanks a, b and c in the table:-

IVF and ET	a
b	Introduction of zygote/embryo with 8 Blastomeres into fallopian tube
c	Introduction of ova of a donar into the fallopian tube

3

- 21) Fill in the blanks a, b and c in the following table by writing the corresponding genotype or the phenotype in Pea Plant:-

Genotype	Phenotype
RrYY	a
RrYy	b
c	Wrinkled yellow

3

OR

If ATG GAG TAC TTC GTG TGA is the coding strand of DNA in the transcription unit .

- i) Write the mRNA transcribed from it.
- ii) How many amino acids will it code for ? 3
- 22) What is meant by R-cells and S-cells with which Frederick Griffith carried out his experiments on *Diplococcus pneumoniae* ? What did he prove from these experiments ? 3
- 23) List any four symptoms shown by a Down's Syndrome afflicted child. Explain the cause of this disorder ? 3

- 24) Biopesticides/Biocontrol measures are preferred to chemical pesticides. Give two examples from microbial biocontrol agents and their functions ? 3

- 25) Name the type and give the effects of the following drugs in human ? i) LSD ii) Morphine iii) Barbiturates 3  
26) Explain what is meant by biofortification ? Write two of its objectives ? 3  
27) What is gene therapy ? Illustrate using the example of adenosine deaminase (ADA) deficiency ? 3

**SECTION-D**

- 28) What does *lac operon* consist of ? How is the operator switch turned on and off in the expression of genes in this operon ? 5

OR

Work out a dihybrid cross between a tall *Pisum sativum* plant bearing purple flowers ( dominant homozygous for both the traits) and a dwarf plant bearing white flowers through two filial generations using Punnet square. Give the dihybrid penotypic ratio ? 5

- 29) Enumerate the steps in the construction of recombinant DNA ? 5  
OR

Name the soil bacterium that produces a protein/chemical that is toxic to insect pests. Show with example that the different forms of them encoded by different forms of the genes are insect specific. 5

- 30) i) What is meant by ozone shield ?  
ii) Name two ozone depleting substances ?  
iii) How do the ozone depleting substances affect the ozone shield ?  
iv) Write one damaging effect of ozone depletion on humans and plants respectively ? 5

OR

- i) What are ecosystem services ? Enumerate the ecosystem services of a forest? 3  
ii) How is biodiversity important for ecosystem functioning ? 2

**SCORING KEY / MARKING SCHEME****SECTION – A**

- 1) They do not segregate and maintain hybrid characters 1
- 2) Meiocyte =  $24=2n$  endosperm =  $3n=36$  1
- 3) They serve as substrate for replication 1/2  
provide energy when phosphate bonds break for polymerization 1/2 1
- 4) Divergent evolution 1
- 5) AIDS. It is caused by HIV. 1
- 6) DNA fragments are negatively charged. 1
- 7) They are Osmo regulators and not confirmers. 1
- 8) Irreparable computers and other electronic goods, are known as electronic wastes 1

**SECTION – B**

- 9) i) Absence of menstruation during the period of intense lactation following parturition 1  
ii) IUD- intra uterine devices  
MTP- Medical termination of pregnancy  $\frac{1}{2} + \frac{1}{2} = 1$
- 10) Pericarp is the wall of the fruit. 1  
Functions :- i) To protect seeds till they mature  
ii) To help in dispersal  $\frac{1}{2} + \frac{1}{2} = 1$
- 11) The process by which the introns in the hnRNA are removed during the processing of the mRNA and exons are joined together.  
Splicing is necessary as introns are non-coding sequences.  $1 + 1 = 2$
- OR**
- DNA is the genetic material as:-  
i) The genetic material should be stable- DNA is double stranded  
ii) DNA has more stable Thymine base.  
iii)  $2'$ —OH group of RNA nucleotide is reactive any two –  $1 + 1 = 2$
- 12) i) To provide evidence for the chemical evolution of life  
ii) Electric discharge and heating the water chamber.  $1 + 1 = 2$
- 13) Cyclosporin A – *Trichoderma polysporum*  
Statins – *Monascus purpureus*.  $1 + 1 = 2$
- 14) The T-DNA of *Agrobacterium tumefaciens* is delivered to normal plant cells, which transform into a tumour. The tumour inducing (Ti) Plasmid of *A. tumefaciens* has been modified into a cloning vector, which is no more pathogenic to the plants but can deliver genes into host plant. 2
- 15) The two species are completely dependent on each other and both are benefited. Fungi provide protection and help in absorption. Alga provide food. 2

- 16) Harmful chemicals get accumulated in tissues of organisms in increasing conc: as they travel along the food chain. 1  
 Phytoplanktons had 800 times more DDT than in lake water.  
 Zooplanktons had 5 times more DDT than phytoplanktons.  
 Fish had 9 – 40 times more DDT than zooplanktons.  
 Fish eating birds had 25 times more DDT than fish.. 1
- 17) In situ conservation – protecting the habitat itself for defending the species from predators. Eg :-National parks, Biosphere reserves, Wildlife sanctuary 1  
 Ex situ conservation – protecting by removing it from the unsafe habitat and placing under the care of humans. Eg:- Zoos, Botanical gardens Gene bank 1
- 18) Only 10 % of the energy is transferred from one trophic level to the next. The Cost of respiration also increases along the successive trophic levels.  $1 + 1 = 2$

**SECTION – C**

- 19) Refer Fig 3.8 page 49 in text book.  
 Oogonia → primary oocyte → secondary oocyte → ovum  
 46                      46                      23                      23                       $2 + 1 = 3$

- 20)
- |  |   |
|--|---|
| IVF and ET                                     | <u>Test tube baby program : Fertilisation outside female body,</u><br><u>In a simulated condition in laboratory and embryo transfer</u> |
| <u>Zygote intra fallopian transfer ( ZIFT)</u> | Introduction of zygote/embryo with 8 Blastomeres into fallopian tube  |
| <u>Gamete intra fallopian transfer (GIFT)</u>  | Introduction of ova of a donar into the fallopian tube  |
- $1 + 1 + 1 = 3$

- 21)
- | Genotype   | Phenotype           |
|------------|---------------------|
| RrYY       | <u>Round yellow</u> |
| RrYy       | <u>Round yellow</u> |
| rrYY/ rrYy | Wrinkled yellow     |

$1 + 1 + 1 = 3$

**OR**

- i) AUG GAG UAC UUC GUG UGA 2  
 ii) It will code for 5 amino acids. Last UGA codon is stop codon. 1
- 22) R-cells form rough colonies without a capsule and are non-virulent  
 S-cells form smooth colonies protected by capsule and are virulent.  
 He showed that DNA is the transforming principle.  $1 + 1 + 1 = 3$
- 23) Partially open mouth with furrowed tongue, broad flat face with slanting eyes  
 broad palm, small and arched palate, epicanthic eye fold, congenital heart  
 diseases, mental retardation any four –  $\frac{1}{2} \times 4 = 2$   
 genetic basis is trisomy of 21<sup>st</sup> chromosome. 1
- 24) Biopesticides are specific and pollution free. 1  
 Eg :- i) *Bacillus thuringiensis* produces spores toxic to insect larvae.  
 ii) Baculoviruses are pathogenic on arthropods  
 iii) Dragon flies get rid of mosquitoes



29) Recombinant DNA technology involves the following steps:

- i) isolation of DNA
- ii) Fragmentation of DNA by restriction endonucleases
- iii) Isolation of the desired DNA fragments
- iv) Amplification of the gene of interest
- v) Ligation of the DNA fragment into the vector using DNA ligase
- vi) Transfer of DNA fragment into the host  $\frac{1}{2} \times 6 = 3$   
Explanation with figure 2

**OR**

*Bacillus thuringiensis* is the soil bacterium. 1

Bt toxins are specific to insect groups :

- i) *cry I Ac* and *cry II Ab* – control cotton bollworms
  - ii) *cry I Ab* – control corn borer
  - iii) *cry III Ab* – controls Colorado potato beetle
  - iv) *cry III Ab* controls corn root worm  $1 \times 4 = 4$
- 30) i) Ozone shield is the layer of ozone in the stratosphere that protects the biota of the earth from the harmful UV rays. 1
- ii) CFCs, methane and nitrous oxide can cause ozone depletion. 1
  - iii) CFCs break into active chlorine in the presence of UV. The Cl atoms degrade ozone into molecular oxygen 1
  - iv) UV-B causes Skin cancer, Cataract, weakening of immune system, Damage to DNA and mutation, death of plants. 2

**OR**

- i) The products of ecosystem processes are called ecosystem services. 1  
The ecosystem services of forests include :-
  - a) Purification of air and maintenance of gaseous composition
  - b) Cycling of nutrients
  - c) Mitigation of Droughts and Floods
  - d) Storehouse of carbon
  - e) Maintenance of biodiversity
  - f) Habitat to wild life
  - g) Influence on the hydrological cycle any four –  $\frac{1}{2} \times 4 = 2$
- ii) Biodiversity is important for ecosystem functioning in following ways
  - a) Communities with more species diversity tend to be more stable
  - b) Higher productivity
  - c) More resistant to seasonal disturbances
  - d) More resistance to invasion by alien species  $\frac{1}{2} \times 4 = 2$