Blue Print III
Biology
Class XII

Types of Questions → **Units** ↓	**VSA** **(1 mark)**	**SA II** **(2 marks)**	**SA I** **(3 marks)**	**LA** **(5 marks)**	**Total** **-**
Sexual Reproduction	2 (2)	4 (2)	6 (2)	_	12 (6)
Genetics and Evolution	2 (2)	4 (2)	9 (3)	5 (1)	20 (8)
Biology and Human Welfare	1 (1)	2 (1)	9 (3)	_	12 (5)
Biotechnology and its applications	2 (2)	2 (1)	3 (1)	5 (1)	12 (5)
Ecology and Environment	1 (1)	8 (4)	_	5 (1)	14 (6)
Total	8 (8)	20 (10)	27 (9)	15 (3)	**70 (30)**

SAMPLE PAPER III
XII - BIOLOGY

Time : 3 Hours **Max. Marks : 70**

GENERAL INSTRUCTIONS :

1. *All questions are compulsory.*
2. *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.*
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. Cite an example of an inverted ecological pyramid. What kind of pyramid of energy would it have? 1

2. When is the structure and composition of a community expected to remain unchanged? 1

3. At what stage of life is oogenesis initiated in a human female? When does the oocyte complete oogenesis? 1

4. After a successful in-vitro fertilisation, the fertilised egg begins to divide. Where is this egg transferred before it reaches the 8-cell stage and what is this technique named? 1

5. AaBb was crossed with aabb. What would be the phenotypic ratio of the progeny? Mention the term to denote this kind of cross. 1

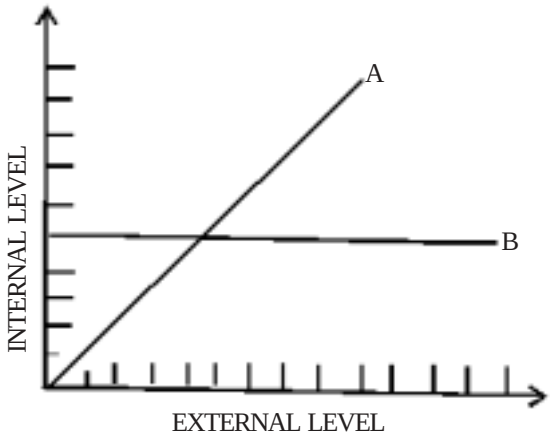
6. In F.Griffith's experiment, how did the nonvirulent strain of *Streptococcus Pneumoniae* become virulent?

7. State the use of :
   (i) *Trichoderma* with respect to organ transplant, and
   (ii) Nucleopolyhedrovirus with respect to pest management 1

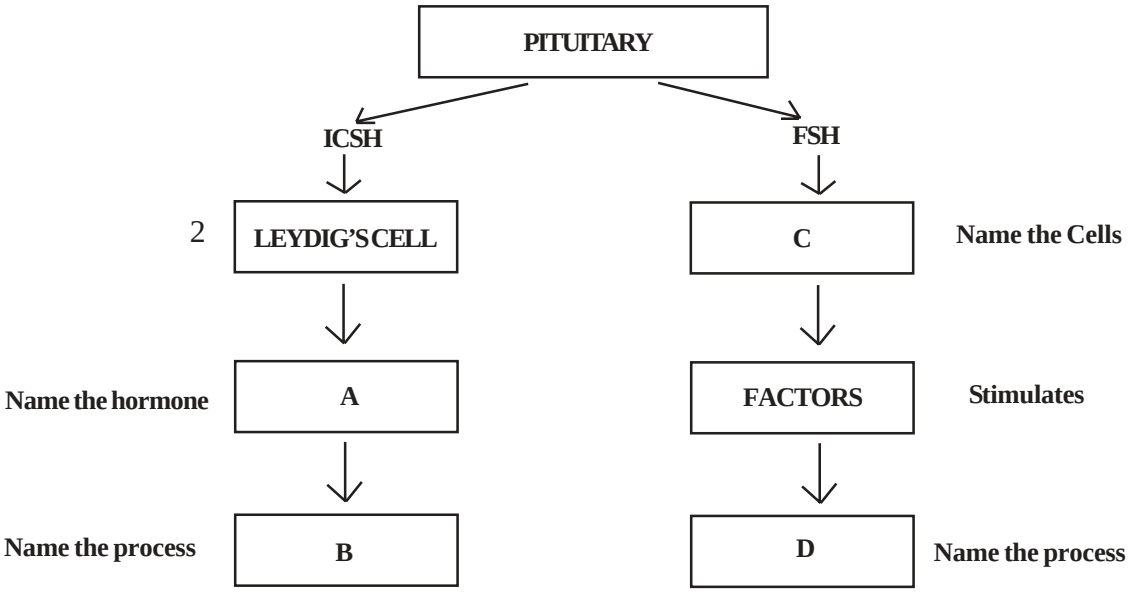
8. Bacteria that convert milk into curd play two other beneficial roles. What are they?

SECTION B

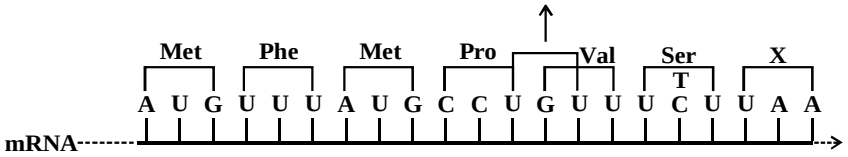
9. Given below is a graph depicting organismic response to changing external conditions. According to their response the organisms are grouped into two types. Name the type which will show (i) pattern A and (ii) pattern B. 2



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



11. Read the sequence of the nucleotides in the given segment of mRNA and the respective amino acid sequence in the polypeptide chain.



Polypeptide : met-phe-met-proline-valine-serine

(i) Provide the triplet of bases (codon) for (a) valine (b) proline

(ii) Write the nucleotide sequence of the DNA strand from which this mRNA was transcribed 2

(iii) What does the last codon of this RNA stand for?

OR

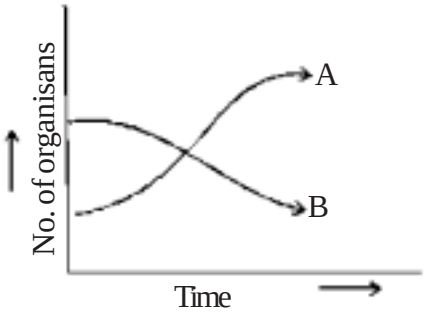
11. The following table shows the genotypes for ABO blood grouping and their phenotypes. Fill in the gaps left in the table :

S.No.	Genotype	Blood Group
1	$I^A I^A$	A
2		A
3	$I^B I^B$	B
4		B
5	$I^A I^B$	
6		O

2

12. (a) The graph below represents the growth patterns of two types of aquatic organisms over a brief period of time in a water body surrounded by an agricultural land extensively supplied with fertilisers. Identify the organisms that would represent (i) A and (ii) B.

(b) State the reason for such a change in the water body and also write the term given to it.



13. Sex determination is based on particular chromosomes in both birds and humans. State two points of difference between their mechanisms of sex determination. 2

14. Following are the steps in MOET programmme for herd improvement in which a cow has been administered hormones with FSH like activity. Arrange steps A to D in their correct sequence.
A - Transferred to a surrogate mother.
B - It is either mated with an elite bull or artificially inseminated.
C - Fertilised eggs at 32 cell stage are recovered non surgically.
D - It produces 6-8 eggs instead of one egg which they normally yield per cycle. 2

15. (i) In which disease is there an uncontrolled division of cells resulting in formation of tumours? How is this disease detected?

(ii) How do interferons help in controlling the disease?

16. State the principle underlying 'gel electrophoresis' and menttion two applications of this technique in biotechnology. 2

17. You have developed a GM organism. Which government organisation will you approach to obtain clearance for its mass production? Why is such a body necessary? Give two reasons. 2

18. How has *Agrobacterium tumifaciens* been suitably modified to act as a cloning vector? 2

SECTION C

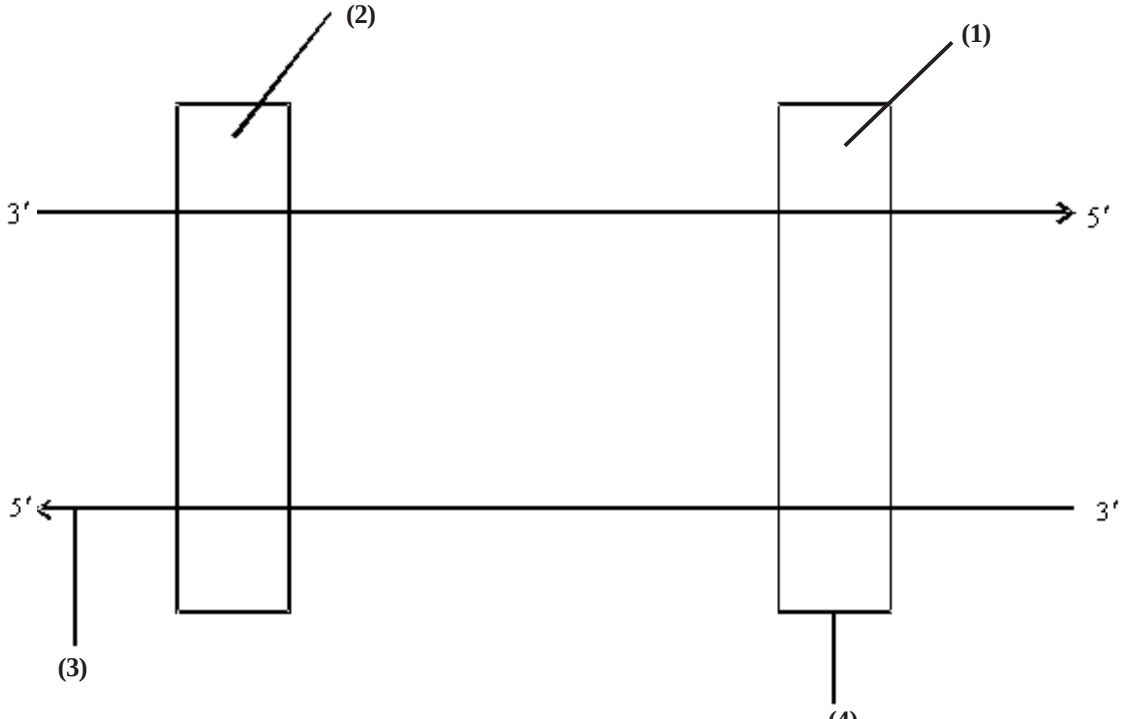
19. Amazonian rain forest has the greatest biodiversity on earth. List any two hypotheses that are proposed by the biologists to account for the greater biological diversity. 3

20. (a) In which part of the human female reproductive system do the following events take place?
I - Release of 1st polar body.
II - Release of 2nd polar body.
III - Fertilisation
IV - Implantation

(b) From where do signals for parturition originate and what does maternal pituitary release for stimulating uterine contractions for child birth? 3

21. A true breeding tall plant is crossed with a true breeding dwarf plant. F_1 progeny is 100% tall and F_2 has tall : dwarf in the ratio 3:1 (i) Explain why F_1 shows only one tpye of parental phenotype; (ii) Name the patterns of inheritance in which the ratio deviates from above. Also mention the deviated phenotypic ratio. 3

22. In the following diagram the two DNA strands represented are ready for transcription



3

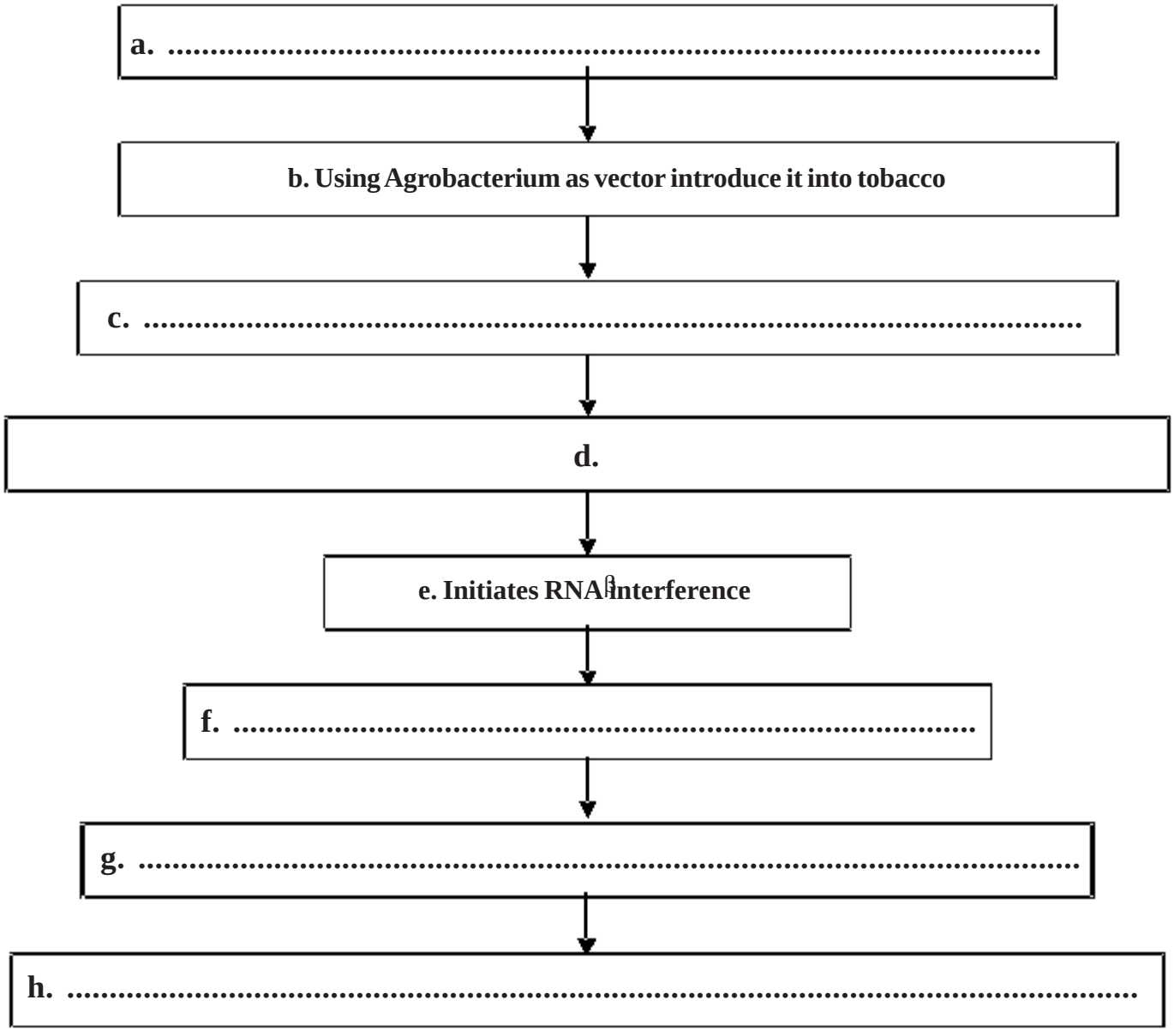
(i) Label the parts marked 1 to 4 and state their functions in transcription.
(ii) Which one of the two strands of DNA has nucleotide sequence similar to the mRNA that will be transcribed and why?

23. State in what ways Stanley Miller simulated the conditions of :
(i) Primitive atmosphere on earth.
(ii) Energy source at the time of origin of life, and
(iii) Formation of organic molecules of life to prove the theory of chemical evolution. 3

24. Draw a flow chart to depict the multiplication of an HIV virus in a host cell. 3

25. What are "flocs"? State their role in effluent treatment and their ultimate fate in sewage treatment tank. 3

26. Two of the steps involved in producing nematode resistant tobacco plants based on the process of RNAi are mentioned below. Write the missing steps in its proper sequence. 3



3

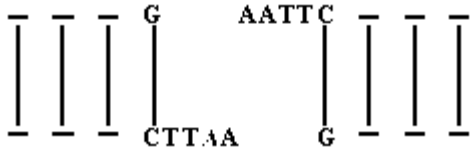
OR

In a bacterial culture some of the colonies produced blue colour in the presence of a chromogenic substrate and some did not due to the presence or absence of an insert (rDNA) in the coding sequence of -galactosidase.

(a) Mention the mechanism and the steps involved in the above experiment.
(b) How is it advantageous over simultaneous plating on two plates having different antibiotics? 3

27. An interesting property of restriction enzymes is molecular cutting and pasting. Restriction enzymes typically recognize a symmetrical sequence of DNA.

Notice that the top strand is the same as the bottom strand, but reads backward. When the enzyme cuts the strand between G and A, it leaves overhanging chains:



A. What is this symmetrical sequence of DNA known as?
B. What is the significance of thsese overhanging chains?
C. Name the restriction enzyme that cuts the strand between G and A. 3

SECTION D

28. (i) A decade back, the enormous vehicular traffic in Delhi had made Delhi rank 4th among polluted cities of the world. Two measures taken by the Delhi Government brought marked improvement in air quality by 2005. What were these two measures and how did they reduce air pollution? 3

(ii) What is the norm set by Euro II for petrol and diesel vehicles?

OR

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.

29. (a) Draw the embroyo sac of a flowering plant and label (i) central cell (ii) Chalazal end of the embryo sac (iii) synergids.

(b) Name the cell that develops into the embryo sac and explain how this cell leads to the formation of Embryo sac . Also mention the role played by the various cells of the embryo sac. 5

OR

Show diagrammatically the stages of embryonic development from zygote upto implantation in humans. 5

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

OR

With the advent of rDNA technology a powerful tool is available to identify a criminal or to the real parents. Name this technique. Write the missing steps in the procedure given below. There of three steps are mentioned in the flow chart: Extraction of DNA from the cells - (ii) .....→(iii) DNA is cut into fragments by restriction enzymes → (iv) .....→ (v).....→ (vi).....→ (vii) Autoradiography. →(viii) 5