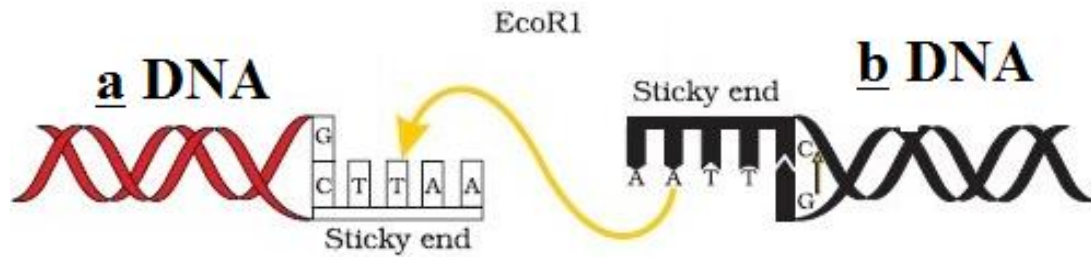
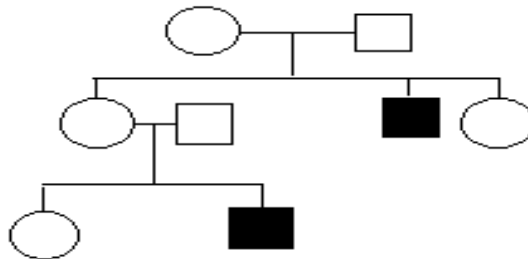


7. The following figure depicts the linking of DNA fragments to form a recombinant DNA:

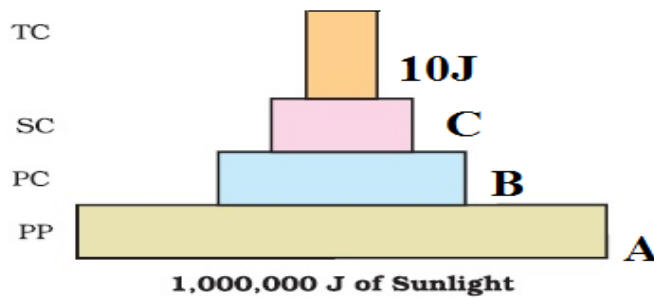


- a) Label 'a' and 'b' in the above figure.
- b) Name the enzyme that can recognize such a sequence and can link the two DNA fragments. 2

8. Study the given pedigree chart and answer the following questions:



- a) Identify whether the trait is autosomal dominant/ recessive or sex-linked. Give reason.
 - b) Give an example of a disease in human beings which show such a pattern of inheritance. 2
9. a) 'Biofortification of crops is the need of the hour'. Give two reasons. 2
- b) Give two examples of biofortified crops. 2
10. In our body, cell growth and differentiation is highly controlled and regulated. Explain two situations where there is breakdown of these regulatory mechanisms. 2
11. Study the given figure and answer the following:



- a) If 1,000,000 J of energy is available from the sun, what will be the amount of energy available at trophic level A and C?
 - b) Pyramid of energy is always upright. Give reason.
- OR**
- a) A population has certain attributes that an individual organism does not possess. Name them.
 - b) If in a pond there were 20 lotus plants last year and through reproduction 8 new plants are added taking the current population to 28. Calculate the birth rate. 2
12. Using a Punnett square, work out the distribution of phenotypic features in the first filial generation after a cross between a homozygous female and a heterozygous male for a single locus. Mention the phenotypic and genotypic ratio. 2

SECTION-C

13. Amazonian rainforest has the greatest biodiversity on earth. List three hypothesis that are proposed by biologists to account for the biological biodiversity in the tropic. 3
14. Recombinant DNA technology is of great importance in the field of medicine. With the help of a flow chart, show how this technology has been used in preparing genetically engineered human insulin. 3
15. AB and CD represents two strands of DNA molecule. When this molecule undergoes replication, it forms a replication fork between A and C.



- a) Using which strand as template, will there be continuous synthesis of the complementary strand.
- b) Name the enzymes that are required as catalysts, mention their role during DNA replication.
- c) There is a definite region in E.coli DNA where replication originates. Name the region and mention its role in recombinant DNA procedures. 3
16. Draw a neat diagram of the female reproductive system in humans and label the following:
(i) the primary female sex organs, (ii) the site of fertilisation,
(iii) the womb (iv) the birth canal. 3
17. Study the figure given below and answer the questions that follows:



- a) Recognize and explain the process by which Tasmanian wolf evolved.
b) Give two examples of animals that evolved along with Tasmanian wolf.

OR

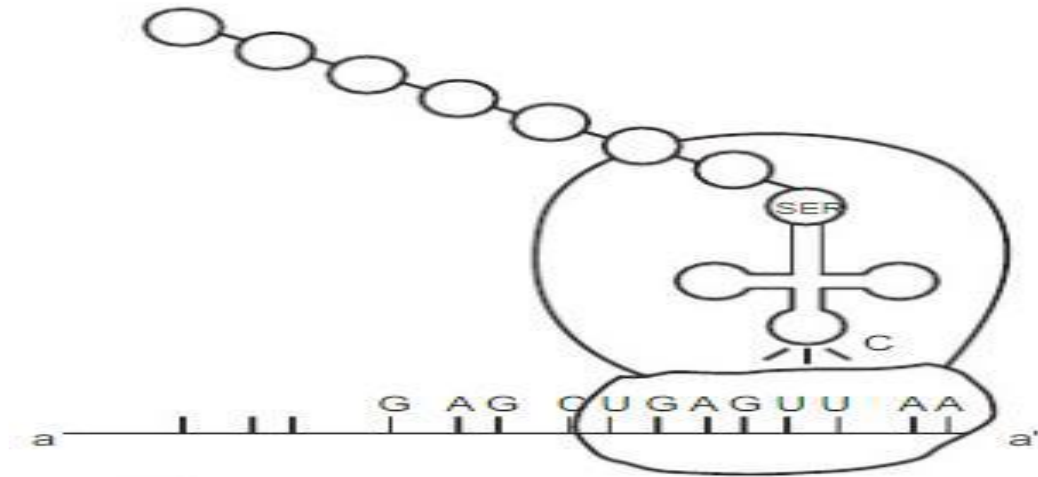
How is Sickle-cell anaemia caused? Work out a cross to show the genotypes and phenotypes of the parents who have produced a sickle-celled anaemia offspring. 3

- 18 a) The organic farmer works to create a system where insect pests are kept at a manageable levels. How does the organic farmer control pests? Give two examples.
b) How is the use of biocontrol measures more beneficial than the conventional farming practices? 3
19. How did the process of RNAi help to control the nematode from infecting the roots of the tobacco plants? Explain.

OR

The cutting of DNA by restriction endonucleases results in fragments of DNA. How are these fragments separated? 3

20. Study the figure given below and answer the following:



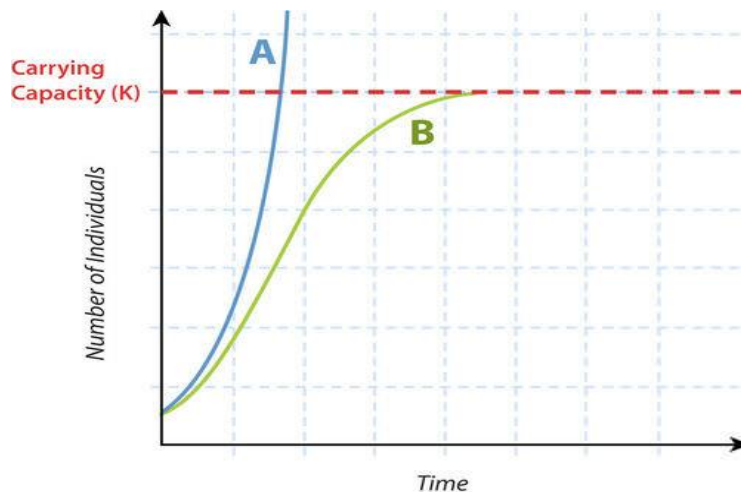
- a) Identify the polarity from a to a' in the above diagram. How are the amino acids linked to form a polypeptide chain?
- b) If the DNA sequence coding for serine and tyrosine are AGU and UAC, give the anticodon of tRNA for the same amino acids.
- c) Why are some untranslated sequence of bases seen in mRNA coding for a polypeptide? Where exactly are they present on the mRNA?

3

21. The graph below shows the population growth curve.

- a) Identify the growth curves 'A' and 'B' and write the status of food and space in them.
- b) What does the dotted line parallel to the 'X' axis signify?
- c) Which one of the curve is considered realistic and why?

3



SECTION-D

22. The "record-high" air pollution in New Delhi is a "wake-up call" for the world, saying that unless decisive actions are taken to reduce air pollution, the smog in India's capital and its adverse impact on the daily lives of its citizens will become a common phenomenon.

- a) Name the most widely used device and the principle used in it for removing particulate pollutants in air.
- b) As responsible citizens, enumerate the steps that can be taken to reduce vehicular air pollution in metro cities. (4 points)

3

23. Adolescence means a period between 12-18 years of age during which a child matures in terms of his/her attitudes and beliefs for effective participation in society. It is a bridge linking childhood and adulthood. It is accompanied by several biological and behavioral changes and is a vulnerable phase.
- a) What are the two main causes which motivate youngsters towards drug and alcohol abuse?
 b) List four measures useful for prevention and control of drugs and alcohol abuse among adolescents. 3
24. In the last century an all-round development in various fields significantly improved the quality of life of the people. However, increased health facilities along with better living conditions had an explosive impact on the growth of population. The world population had reached from 2 million in 1900 to about 6 million in 2000.
- a) Suggest any two reasons for such population explosion.
 b) Mention the steps taken by the government to overcome this problem. (Any two)
 c) Write any two effects of population explosion in India? 3

SECTION-E

25. Trace the events that occur during pollination and promotes post-pollination events that leads to fertilisation which is unique in plants.

OR

Fertilisation can only occur if the ovum and sperm are transported to the ampullary isthmic junction. Enumerate the events that occur after fertilisation till implantation in a human female. 5

26. a) How does the Hardy-Weinberg principle explain genetic equilibrium? List four factors that are known to affect Hardy-Weinberg equilibrium.
 b) Describe how this equilibrium gets disturbed which may lead to founder effect.

OR

- a) How did Hershey and Chase provide the unequivocal proof that DNA is the genetic material?
 b) Among the two nucleic acids which one is more stable and why? 5

27. The biological wealth of our planet has been declining rapidly and the accusing finger is clearly pointing to human activities.

- a) Explain briefly the four major causes of biodiversity losses citing an example.
 b) Hot-spots occupy less than 2% of earth's land surface. Yet, they are given priority. Give reasons. Name two hot-spots in India.

OR

- a) Ecological succession tends to progress from unstable biotic community to stable biotic community. Trace the succession of plants in a water body.
 b) What are the factors that affect secondary succession? 5
