

# SAMPLE PAPER-1

Time: 3 Hours

Maximum Marks: 70

## General Instructions:

- (i) There are total 26 questions and five sections in the question paper. All questions are compulsory.
- (ii) Section A contains question number 1 to 5, Very Short Answer Type Questions of 1 mark each.
- (iii) Section B contains question number 6 to 10, Short Answer Type Questions of 2 marks each.
- (iv) Section C contains question number 11 to 22, Short Answer Type Questions of 3 marks each.
- (v) Section D contains question number 23, Value Based Question of 4 marks.
- (vi) Section E contains question number 24 to 26, Long Answer Type Questions of 5 marks each.
- (vii) There is no overall choice in the question paper, however, an internal choice is provided in one question of 2 marks, one question of 3 marks and all the three questions of 5 marks. In these questions, an examinee is to attempt any one of the two given alternatives.

## SECTION-A

- Q1. How does a macrophage play in providing immunity to human body? 1
- Q2. What is the cause of snow blindness? 1
- Q3. How an apple can be considered as a false fruit? 1
- Q4. In a poly nucleotide chain in a nucleic acid chain, the back bone is formed of two components. Name these. 1
- Q5. Give the economic importance of Spirulina. 1

## SECTION-B

- Q6. How a farmer is benefitted if he uses apomictic seeds instead of hybrid seeds in his farm? 2
- Q7. What is exine made up of? What is the significance of this material? 2
- Q8. *Thermus aquaticus* is generally found in very hot springs. How it survives there? 2
- Q9. Along with an example name the type of interaction in which one interacting organism is benefitted and the other is neither benefitted nor harmed. 2
- Q10. In Bt cotton, what does Bt stands for? What is the benefit derived by the plant from Bt? 2

## SECTION-C

- Q11. Explain with examples, the three methods by which natural selection operates in nature. 3
- Q12. What is Ramsar convention? What were three main objectives of this convention? Name any two Ramsar sites in India? 3
- Q13. Explain how fishery is important for the economy of India? Give the term which is used for enhanced production in fisheries. 3

Q14. What is essential?

Q15. What is inheritance?

Q16. What is the function of the brain?

Q17. What is the function of the heart?

Q18. How is the eye adapted for vision?

Q19. Explain the process of photosynthesis.

Q20. What is the role of the placenta?

Q21. What is the role of the testes?

Q22. Describe the structure of the human eye.

Q23. Population growth is a major concern. (a) Why? (b) How can it be controlled? (c) What are the consequences of population growth?

Q24. What is the difference between a population and a community? (a) Population (b) Community (c) Ecosystem (d) Biome (e) Biosphere (f) Landscape (g) Biome

Differentiate between a population and a community. Q25. How is the environment affected by population growth? to the environment are affected.

Q26. Describe the structure of the human eye.



- Q14. What is xenogamy? How it is different from gietonogamy? Name a flower where there is essentially autogamy in clietogamous flowers.
- Q15. What is inbreeding depression? Explain how outcross and outbreeding can help in overcoming inbreeding depression? 3
- Q16. What is BOD? Explain this in relation to sewage water discharge in appearance or disappearance of fishes in river water. 3
- Q17. What is algal bloom? How it is harmful to water bodies. Explain. 3
- Q18. How a ragpicker of Banglore Ahmed Khan became a national hero in terms of environment? Explain. 3
- Q19. Explain how industrial melanism is proving the theory of natural selection? 3
- Q20. What is bee pollen? Why are they considered as important for human consumption? How a pollen grain can be preserved for long so that they do not lose their viability? 3
- Q21. What do you understand by the GM? How they proved to be useful? 3
- Q22. Describe the structure of nucleosome. 3

#### SECTION-D

- Q23. Population of India has alarming growth rate. It is estimated that it will surpass China's Population in next few years. 4
- (a) What are the main causes of population growth rate in our country?
- (b) Suggest at least 2 measures to overcome this problem.
- (c) What will be the consequences if such increase keeps on going?

#### SECTION-E

- Q24. While studying transcription we use many terms. Explain the following. 5
- (a) Introns and exons (b) Promoter
- (c) Transcription unit (d) Splisosomes
- (e) Upstream (f) Structural gene
- (g) Terminator

Differentiate between template and coding strand.

- Q25. How stenohalines are different from euryhalines? What will happen if stenohalines are shifted to the conditions which support euryhalines? Give reason. What are the other factors which are important for any aquatic organism to survive? 5

- Q26. Describe the events in the development of humans starting from fertilization till implantation. 5

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# SAMPLE PAPER-2

Maximum Marks: 70

Time: 3 Hours

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- (vi) Section E contains question number 24 to 26, Long Answer Type Questions of 5 marks each.
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## SECTION-A

- Q1. How a symbiotic organism can act as bio-fertilizer? 1
- Q2. Three alleles of gene 'I' are responsible for the expression of various types of genotypes and phenotypes in ABO blood grouping. Give the number of phenotypes and genotypes. 1
- Q3. Honey bee is a parthenogenetic organism. How can you say so? 1
- Q4. What was the cranial capacity of human which walked erect for the first time? Give the scientific name of such human. 1
- Q5. Expand UTR. What is its role in translation? 1

## SECTION-B

- Q6. Expand GIFT. How is it different from ZIFT? 2
- Q7. When a cross is done between red and white flower of Anthirrinum, the phenotypic ratio obtained is different from Mendelian ratio in F2 generation. Why? 2
- Q8. How is DNA isolated and purified from a fungal cell? 2
- Q9. Name the gene which is responsible for killing bollworms. How a plant with this gene kills the insect pest? 2
- Q10. If detritus is lignin rich, what will happen to decomposition process? What will you observe if the detritus is cellulose rich? 2

## SECTION-C

- Q11. What are wetlands? Name the international agenda to protect important wetlands of the world? What are the main objectives of this agenda? 3

Q12. Give any two types of flowers which are self-pollinated.

Q13. Describe any two types of pollination.

Q14. What is meant by seasonal depression?

Q15. How is a-thalassemia inherited?

Q16. What is sickle cell anemia?

Q17. One of the genes is responsible for sickle cell anemia. How is it inherited from such a carrier?

Q18. What accounts for the sickle cell anemia?

Q19. How is human hemoglobin different from C-peptide?

Q20. Explain any two types of hemoglobin.

Q21. Name the two types of sickle cell anemia.

Q22. How many genes are responsible for sickle cell anemia?

Q23. Anjni was asked to write a report on sickle cell anemia.

For this she asked her friend to help her.

(a) What is sickle cell anemia?

(b) How is it inherited?

(c) Which type of hemoglobin is present in sickle cell anemia?

(d) When does sickle cell anemia occur?

Q24. What is the major cause of sickle cell anemia?

Q25. Write down the name of the enzyme called sickle cell anemia.

Q26. What do you mean by sickle cell anemia?



- Q12. Give any four features of insect pollinated flowers? Name any two aquatic plants which are pollinated by insects. 3
- Q13. Describe oogenesis in human females. 3
- Q14. What is inbreeding depression? Write two advantages and two disadvantages of inbreeding depression. 3
- Q15. How  $\alpha$ -thalassaemia,  $\beta$ -thalassaemia and  $\delta$ -thalassaemia differ from each other? 3
- Q16. What is SCP? How it proves to be beneficial? 3
- Q17. One of the components of solid waste is e-waste. How it is disposed off? Which countries are responsible for producing large amount of e-waste? Name the metals which are recovered from such waste. How is e-waste posing a threat to environment and to workers? 3
- Q18. What according to Hugo deVries is saltation? How the theory put forward by him was different from that of Darwin? 3
- Q19. How is human insulin obtained without using pancreas of slaughtered cattle? What is the role of C peptide? 3
- Q20. Explain any three methods of ART by which a couple can get the happiness of their child. 3
- Q21. Name the causal organism of ascariasis. How a person gets infected? Write any four symptoms of this disease. 3
- Q22. How many pairs of chromosomes does a drosophila have? Which one of these will carry the gene for wing size? To which phenotypic feature this gene is linked to? 3

#### SECTION-D

- Q23. Anjni wanted to keep gap between her children and also was concerned about her health too. For this she went to doctor to enquire about contraceptive pills. Answer the question which she asked from doctor: 4
- (a) What are contraceptive pills made of?
- (b) How do they function?
- (c) Which is the safest and non-steroidal contraceptive pill?
- (d) When should one take contraceptive pill?

#### SECTION-E

- Q24. What is primary and secondary host? Name primary and secondary host of liver fluke. Write the major adaptation of an organism which lives as an endoparasite. 5
- Q25. Write down the contributions of George Gamow. Explain the role of servo ocha enzyme in deciphering the role of genetic code. Which among 64 codes are stop codons? Why are they called so? 5
- Q26. What do you understand by pollen pistil interaction? Draw longitudinal section of pistil showing growth of pollen tube and delivery of male gametes into ovule. 5

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# SAMPLE PAPER-3

Time: 3 Hours

Maximum Marks: 70

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## SECTION-A

- Q1. What is the role of 'ori' and 'rop' in PBR322? 1
- Q2. When is oogenesis initiated and when is it completed? 1
- Q3. Mention two roles of LAB other than making of curd. 1
- Q4. State the use of Nucleopolyhedrovirus with respect to pest management. 1
- Q5. Give an example of an ecosystem in which inverted pyramid is obtained. 1

## SECTION-B

- Q6. What is the principle laying behind using gel electrophoresis to separate the DNA fragments? How DNA can be visualized? 2
- Q7. TtYy was crossed with ttyy. What would be the phenotypic ratio of the progeny? Mention the term used to denote this kind of cross. 2
- Q8. Differentiate between parasitism and predation. 2
- Q9. What is the fate of ovary, ovary wall, zygote and ovules after fertilization? 2
- Q10. How transgenic cow proved to be useful for human welfare? Name any other product obtained from transgenic animals other than cow. 2

## SECTION-C

- Q11. Define biopiracy. Give the details of controversy arose about basmati rice in India. 3
- Q12. Write name and location of the following. 3
- (a) Cells which provide nutrition to developing sperms
  - (b) Secrete androgens in males

- (c) Cells which...
- Q13. Describe...
- Q14. Draw the diagram showing the function of...
- Q15. What do you mean by... Explain...
- Q16. What do you mean by... conditions...
- Q17. Some crops are grown under the following conditions:  
(a) Pusa semi dwarf  
(c) Okra (Bitter melon)
- Name two semi dwarf...
- Q18. What is animal husbandry? Name one beneficial...
- Q19. Will you recommend any two measures to help farmers in your area?
- Q20. Give differences between...
- Q21. How you can control...
- Q22. What is ADP? Give one solution to...

- Q23. Even after the use of insecticides, many of them suffer from hunger.  
(a) What do you mean by...  
(b) How can you control...  
(c) Name any...

- Q24. By giving an example, explain the term... also called...

- Q25. Identify the...



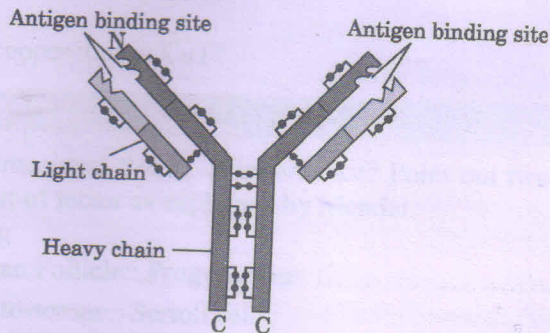
- (c) Cells which give rise to primary spermatogonia
- Q13.** Describe spermatogenesis in human males. 3
- Q14.** Draw the detailed transverse section of mature anther. Label endothecium and tapetum. Mention function of each. 3
- Q15.** What do you understand by radioactive waste? How it can be disastrous in environment. Explain giving example. 3
- Q16.** What do you understand by founder's effect? How is genetic drift related to it? If both these conditions are present, will the Hardy Weinberg equilibrium stay relevant? Give reason. 3
- Q17.** Some crop varieties were developed for resistance against insect pests. Accordingly complete the following by giving the name of the pest the crop is resistant for 3
- (a) Pusa sem (b) Pusa shubhra  
(c) Okra (Bhindi) (d) Pusa swarnim
- Name two semi dwarf varieties each of wheat and rice which were developed in India.
- Q18.** What is amniocentesis? Why govt of India put statutory ban on the use of this technique? Write one beneficial use of the technique. 3
- Q19.** Will you recommend the use of bio-fertilizers rather than using chemical fertilizers to the farmers in your village? Give reasons for your answer. 3
- Q20.** Give differences between convergent and divergent evolution along with one example each. 3
- Q21.** How you can say that DNA is a better genetic material than RNA. 3
- Q22.** What is ADA deficiency? What is the impact of this on human body? How gene therapy is a solution to this problem? 3

### SECTION-D

- Q23.** Even after green revolution, many people in our country are still getting under nutrition. Many of them suffer from diseases caused due to malnutrition. It is said that they suffer from hidden hunger. 4
- (a) What do you understand by the term hidden hunger?  
(b) How can we eliminate this type of hidden hunger?  
(c) Name any two food crops which are providing increased nutrition under this programme.

### SECTION-E

- Q24.** By giving an example of skin colour in human beings, explain why polygenic inheritance is also called as quantitative inheritance? 5



- Q25.** Identify the given figure and answer the following questions 5



# SAMPLE PAPER-4

Time: 3 Hours

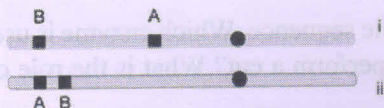
Maximum Marks: 70

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## SECTION-A

- Q1. What is Dobson unit? 1
- Q2. State a method of cellular defence which works in all eukaryotic organisms. 1
- Q3. If the sperm mobility of a person is less than 40% and donor is also not available, suggest the ART for a couple to have a child. 1
- Q4. On a chromosome, gene A and Gene B are located as given in figures 'i' and 'ii' below. What will be the chances of parental combination to pass to next generation in both the cases? 1



- Q5. What is the role of copper ions in CuT? 1

## SECTION-B

- Q6. Who proposed chromosomal theory of inheritance? Point out two similarities between the chromosome and that of factor as explained by Mendel. 2
- Q7. Complete the pairing 2
- (a) Estrogen: Graffian Follicle:: Progesterone: .....
- (b) Leydig cells: testosterone:: Sertoli cells: .....
- Q8. How the better variety of sugarcane for North India was developed? 2



- Q9. What are conformers? How do they survive in severe cold climatic conditions? 2  
 Q10. What are the major steps to obtain a foreign gene product? 2

### SECTION-C

- Q11. Enlist the features of the wind pollinated flowers. 3  
 Q12. Some enzymes are used During DNA replication, name them? Why there is the formation of discontinuous replication in one the DNA strand? 3  
 Q13. Why are Three Mile Island and Chernobyl famous? Enlist the hazardous consequences of radioactive waste. How radioactive waste should be disposed off? 3  
 Q14. During course of evolution we have seen many organisms originating and getting extinct. Name any animal which was earlier thought to be extinct but was rediscovered. Name a limbless fish. What was the reason behind the survival of pouched animals in Australian continent? 3  
 Q15. Skin colour in human beings show a range of shades across a gradient. 3  
 (a) Which type of inheritance is responsible for such distribution of phenotypic gradient?  
 (b) Why we get an inverted bell shaped graph as a result?  
 (c) What will be the ratio of parental types in F2 generation?  
 Q16. Draw sectional view of seminiferous tubule and label 3  
 (a) Sertoli cells (b) Spermatogonia (c) Spermatozoa  
 (d) Spermatid (e) Primary spermatocyte (f) Leydig cells  
 Q17. Explain the following terms 3  
 (a) Pleiotropy (b) Female heterogamety (c) Klinefelter's syndrome  
 Q18. In certain areas, one has to apply integrated pest management. What are such areas? How do lady bird beetles and dragon flies acts as biocontrol agents? Why nucleopolyhedro virus is preferred for the use as insecticide? 3  
 Q19. Why Mendel chose pea plant for his experiments? Which laws were established on the basis of monohybrid cross? 3  
 Q20. AATCGTGAATTCAA  
 TTAGCACTTAAGTT 3  
 In the given segment of DNA, find out the palindromic sequence. Which enzyme is used to cut such sequence? At which position the enzyme will perform a cut? What is the role of sticky ends formed after cut?  
 Q21. How Delhi government was able to reduce pollution caused due to vehicles? What are the recommendations of Bharat III norms? Why we should always use unleaded petrol in cars fitted with catalytic convertors 3  
 Q22. How cliestogamous flowers ensure seed formation? Are such plants ecologically stable? Why? 3

### SECTION-D

- Q23. Ashok worked in a office located at first floor and was famous as a chain smoker. One day he fainted while climbing stairs of his office. Doctor diagnosed him with high blood pressure and his body was oxygen deficient. He advised him to immdeatly in his body. 4

- Q24. How many plants? How in an aquatic  
 Q25. Study the given

- (a) Is the trait  
 (b) Is the trait  
 (c) Name a trait

- Q26. Write down the



# SAMPLE PAPER-5

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## SECTION-A

- Q1. Expand ELISA. 1
- Q2. How is presence of cyanobacteria in paddy fields providing benefit to rice farmers? 1
- Q3. How DNA is visualized in gel electrophoresis? 1
- Q4. What do you understand by broadly utilitarian of bio-resources? 1
- Q5. What is the relationship between eye of an octopus and eye of a bird? 1

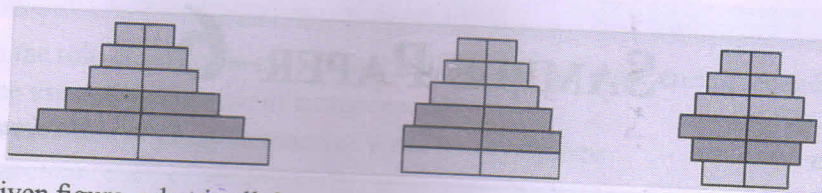
## SECTION-B

- Q6. Mention four reasons which make evil quartet for biodiversity. 2
- Q7. Which of the following are important for Indian economy, livestock or fisheries? Give reason. 2
- Q8. If ringworms are not worms then why they are called so. Name the causal organism of this disease. 2
- Q9. What are SNPs? How are they useful? 2
- Q10. Differentiate between spermiation and spermiogenesis. 2

## SECTION-C

- Q11. Highly resistant substance is present on pollen grains but is absent at certain points. Name the substance and the points. What is the role of such locations? 3





Q12. In the given figure, what are all three structures depicting?

As a part of policy maker, if you have to plan for India in year 2025, what do you think will be the ideal one, why?

What will be the strategies you can plan for?

Q13. Draw a well labeled diagram of human sperm. 3

Q14. Describe the steps to amplify a gene of interest. 3

Q15. Where is morula formed in humans? Explain the process of its development from the zygote. How is morula different from blastula? 3

Q16. How human activities are responsible for accelerated eutrophication? Explain giving an example. 3

Q17. Name any one selectable marker in the vector pBR322. How is the marker  $\beta$ -galactosidase better than that of one in the above vector? 3

Q18. Describe the life cycle of Plasmodium after it forms gametes. 3

Q19. Explain the process of amino-acylation of tRNA. Mention its role in translation. 3

Q20. 'Predators play significant role in maintaining ecological balance'. Justify the statement. 3

Q21. When a plant with tall plants and terminal flowers are self pollinated, some plants in next generation are dwarf and flowers having axillary position. How is this possible? Explain by drawing a Punnett square. Give phenotypic ratio obtained after self pollination. 3

Q22. Explain the process of secondary treatment of sewage. 3

### SECTION-D

Q23. Rakesh visited a nearby lake along with his friend Aakash. Aakash was very excited to see beautiful mauve coloured flowers of some plants which were floating in that lake. He expressed his desire to collect some of the plants and introduce into lake of his farmhouse. Rakesh is against this view and advised him not to do so. 4

(a) Mention any two reasons, why was Rakesh is against Aakash's idea?

(b) What are the values shown by Rakesh?

### SECTION-E

Q24. In a race of finding genetic material, who finally proved that DNA not protein is genetic material and how. Explain. 5

Q25. Explain how our nature self sustains itself and helps in continuity of life on earth. 5

Q26. Describe the events of menstrual cycle in human female. Mention the term used for presence of LH at its peak. 5

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