

GUJCET 2024 Biology Question Paper with Solution Mar 31

Ques 1. Which of the following sexually transmitted infections are spread by other means besides sexual intercourse?

Ans. Hepatitis - B

Solu. Hepatitis B can be spread through various means besides sexual intercourse. It is primarily transmitted through contact with infected blood, semen, and other body fluids. Other modes of transmission include sharing needles or syringes with an infected person, from mother to baby during childbirth, and through contaminated medical equipment. Therefore, hepatitis B can be classified as a sexually transmitted infection (STI) as well as an infection spread by other means.

Ques 2. What does the pointed 'X' in the figure below represent?

Ans. Tumbaika

Ques 3. On which chromosome of each parent is the gene controlling β - thalassemia located?

Ans. 11th

Solu. The gene controlling β -thalassemia is located on chromosome 11. Specifically, it is located on the short arm of chromosome 11, at position 15.5 (11p15.5). Mutations in this gene can lead to β -thalassemia, a genetic disorder affecting the production of hemoglobin.

Ques 4. In in vitro fertilization, the process in which more than 8-celled embryos are transferred to the uterus to complete further development is called what?

Ans. IUT

Solu. The process described is called "embryo transfer" in the context of in vitro fertilization (IVF). During embryo transfer, embryos that have developed beyond the 8-cell stage are transferred into the uterus of the woman to allow further development and, hopefully, implantation. "IUT" does not appear to be a commonly used abbreviation for this process.

Ques 5. If the mother's blood group is 'A' and father's blood group is 'O', then what can be the blood group of their child?

Ans. A or O

Solu. If the mother's blood group is 'A' and the father's blood group is 'O', their child can inherit either the 'A' blood group from the mother or the 'O' blood group from the father. Therefore, the possible blood groups for their child are 'A' or 'O'.

Ques 6. "The fetus never passes through the adult stages of other animals" said? Who said this statement?

Ans. Carl Ernst von Bayer

Solu. The statement "The fetus never passes through the adult stages of other animals" was said by Carl Ernst von Baer, a renowned Estonian biologist and embryologist. He made significant contributions to the field of embryology, including the formulation of what is now known as von Baer's laws of embryology.

Ques 7. Which of the following is an example of function membership?

Ans. Sweet potatoes and potatoes

Solu. Function membership refers to the classification of items based on their similar or identical functions or uses. In the case of sweet potatoes and potatoes, they both belong to the category of root vegetables and are commonly used as sources of carbohydrates in cooking. Therefore, they

are examples of function membership as they share similar functions or uses in culinary practices.

Ques 8. Which of the following does not affect the Hardy-Weinberg equilibrium?

Ans. Adaptive diffusion

Solu. Adaptive diffusion is not a factor that affects the Hardy-Weinberg equilibrium. The Hardy-Weinberg equilibrium describes the conditions under which the genetic variation in a population remains constant from one generation to the next in the absence of evolutionary influences. Factors that do not affect the Hardy-Weinberg equilibrium include random mating, large population size, no migration, no mutation, and no natural selection. Adaptive diffusion, on the other hand, refers to the spread of advantageous traits from one population to another, which can be a result of natural selection and would therefore disrupt the Hardy-Weinberg equilibrium.

Ques 9. How many types of receptors are present in a cell?

Ans. 61

Ques 10. If a double-stranded DNA contains 30% adenine, state the percentage of cytosine in the same DNA.

Ans. 20%

Solu. In double-stranded DNA, the amount of adenine (A) is equal to the amount of thymine (T), and the amount of guanine (G) is equal to the amount of cytosine (C). This is known as Chargaff's rule.

Given that the DNA contains 30% adenine (A), it also contains 30% thymine (T) because of base pairing. Therefore, the total percentage of adenine and thymine together is $30\% + 30\% = 60\%$.

Since the total percentage of all nucleotides in DNA must add up to 100%, the percentage of cytosine (C) must be the remaining percentage after accounting for adenine and thymine. Thus, it is $100\% - 60\% = 40\%$.

However, since cytosine (C) pairs with guanine (G), and $G=C$ according to Chargaff's rule, the percentage of cytosine in the DNA is half of the total percentage of G and C. Therefore, the percentage of cytosine is $40\% / 2 = 20\%$.

Ques 11. Based on which of the following symptoms, doctor 'X' will diagnose the patient with pneumonia.

Ans. Lips and fingernails have turned gray and blue.

Solu. Doctor 'X' will diagnose pneumonia based on the symptom of lips and fingernails turning gray and blue, which indicates cyanosis, a sign of low oxygen levels in the blood often associated with pneumonia.

Ques 12. Which of the following groups is included in the secondary lymphatic organs?

Ans. Segments of duodenum, tonsils, small intestine pairs

Solu. Secondary lymphatic organs, such as tonsils and segments of the duodenum, play a crucial role in the immune system by helping to filter lymph and trapping pathogens for destruction by immune cells.

Ques 13. What is cirrhosis?

Ans. Liver disease caused by excessive alcohol addiction.

Solu. Cirrhosis is a progressive liver disease caused by excessive alcohol consumption, leading to scarring of the liver tissue and impaired liver function.

Ques 14. Which of the following statements is correct?

(i) Baculoviruses are considered best members for species-specific, short-spectrum insecticide applications.

(ii) Bacillus thuringiensis is used to control butterfly caterpillars.

(iii) Use of ladybirds is very beneficial in getting rid of mosquitoes.
(iv) Trichoderma fungi are used in the treatment of diseased animals under biocontrol.

Ans. Both (i) and (ii)

Solu. Baculoviruses and Bacillus thuringiensis are used as biocontrol agents in insect pest management due to their specificity and effectiveness against target insect species.

Ques 15. DNA polymerase isolated from which of the following bacteria is used in PCR method.

Ans. Thermos aquaticus

Solu. Thermus aquaticus DNA polymerase, commonly known as Taq polymerase, is isolated from Thermus aquaticus bacteria and is used in the polymerase chain reaction (PCR) method for amplifying DNA fragments.

Ques 16. ELISA method works on which of the following principles?

Ans. Antigen-antibody interactions

Solu. The enzyme-linked immunosorbent assay (ELISA) method relies on the principle of antigen-antibody interactions to detect and quantify the presence of specific proteins, such as antigens or antibodies, in a sample.

Ques 17. α - 1 antitrypsin is used to treat which disease?

Ans. emphysema

Solu. α - 1 antitrypsin is a protein that helps protect lung tissue from damage caused by enzymes released by inflammatory cells. It is used to treat emphysema, a condition characterized by the destruction of lung tissue and loss of lung function.

Ques 18. In which mechanism specific mRNA is inactivated after binding to complementary dsRNA?

Ans. RNAi

Solu. RNA interference (RNAi) is a biological process in which specific mRNA molecules are inactivated after binding to complementary double-stranded RNA, leading to the degradation of the targeted mRNA and a decrease in the expression of the corresponding gene.

Ques 19. Which naturalist gives an explanation of species-territory relationships?

Ans. Alexander von Humboldt

Solu. Alexander von Humboldt was a renowned naturalist who made significant contributions to the study of species-territory relationships, emphasizing the interconnectedness of species distribution and environmental factors.

Ques 20. What interaction occurs between oceanic and cloven fish?

Ans. Cohabitation

Solu. Cohabitation refers to the interaction between oceanic and cloven fish species, where they live together in the same habitat or environment, often exhibiting symbiotic or mutualistic relationships for survival.