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| **PT1/BI-O/1220/B 02-May-2021** | | | | | | | | | | | | | | | | |
| **PERIODIC TEST I- ONSITE EXAMINATION (2020-21)** | | | | | | | | | | | | | | | | |
| **Subject: BIOLOGY**  **Grade: XII** | | | | | | Max. Marks:35Time: 70 Mins | | | | | | | | | | |
| **Name:** | | | | | | | | | | | **Section:** | | **Roll No:** | | | |
| ***General Instructions:***   * *This question paper consists of 6 printed pages.* * *All answers to be written in the answer sheet provided.* | | | | | | | | | | | | | | | | |
|  | | **SECTION A** | | | | | | | | | | | | 20 | | |
|  | | Both husband and wife have normal vision though their fathers were colour blind. The probability of their daughter becoming colour blind is | | | | | | | | | | | | | | |
|  | | **a.** | | | 0% | | | **b.** | | | 25% | | | | | |
|  | | **c.** | | | 75% | | | **d.** | | | 50% | | | | | |
| **2.** | | In human beings 45 chromosomes/single X/XO abnormality causes | | | | | | | | | | | | | | |
|  | | **a.** | | | Down’s syndrome | | | **b.** | | | Klinefelter’s syndrome | | | | | |
|  | | **c.** | | | Turner’s syndrome | | | **d.** | | | Edward’s syndrome. | | | | | |
| **3.** | | Of a normal couple, half the sons are hemophilic while half the daughters are carriers. The gene is located on. | | | | | | | | | | | | | | |
|  | | **a.** | | | X-chromosome of father | | | **b.** | | | Y-chromosome of father | | | | | |
|  | | **c.** | | | one X-chromosome of mother | | | **d.** | | | both the X-chromosomes of mother. | | | | | |
| **4.** | | Which one of the following conditions though harmful is also a potential savior from a mosquito borne infectious disease? | | | | | | | | | | | | | | |
|  | **a.** | | Thalassemia | | | | **b.** | | | Sickle cell anemia | | | | | |
|  | | **c.** | | | Pernicious anemia | | | **d.** | | | Leukemia | | | | | |
| **5.** | | Study the pedigree chart given below. What does it show? | | | | | | | | | | | | | | |
|  | | **a.** | | | Inheritance of a condition like phenylketonuria as an autosomal recessive trait. | | | **b.** | | | The pedigree chart is wrong as this is not possible. | | | | | |
|  | | **c.** | | | Inheritance of a recessive sex-linked disease like haemophilia | | | **d.** | | | Inheritance of a sex-linked inborn error of metabolism like phenylketonuria. | | | | | |
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| **6.** | | Study the pedigree chart of a certain family given below and select the correct conclusion which can be drawn for the character. | | | | | | | | | | | | | | |
|  | | **a.** | | | The female parent is heterozygous. | | | **b.** | | | The parents could not have had a normal daughter for this character. | | | | | |
| **c.** | | | The trait under study could not be colour blindness. | | | **d.** | | | The male parent is homozygous dominant. | | | | | |
| **7.** | | Represented here is the inheritance pattern of a certain type of trait in humans. Which one of the following conditions could be an example of this pattern? | | | | | | | | | | | | | | |
|  | | **a.** | | | Phenylketonuria | | | **b.** | | | Sickle cell anemia | | | | | |
| **c.** | | | Hemophilia | | | **d.** | | | Thalassemia | | | | | |
| **8.** | | Which one is the incorrect statement about the importance of pedigree analysis? | | | | | | | | | | | | | | |
|  | | **a.** | | | It confirms that DNA is the carrier of genetic information. | | | **b.** | | | It helps to understand whether the trait in question is dominant or recessive. | | | | | |
| **c.** | | | It confirms that the trait is linked to one of the autosomes. | | | **d.** | | | It helps to trace the inheritance of a specific trait. | | | | | |
| **9.** | | The most striking example of point mutation is found in a disease called: | | | | | | | | | | | | | | |
|  | | **a.** | | | Down’s syndrome | | | **b.** | | | sickle cell anemia | | | | | |
| **c.** | | | thalassemia | | | **d.** | | | night blindness. | | | | | |
| **10.** | | A cross in which an organism showing a dominant phenotype is crossed with the recessive parent to know its genotype is called | | | | | | | | | | | | | | |
|  | | **a.** | | | monohybrid cross | | | **b.** | | | back cross | | | | | |
| **c.** | | | test cross | | | **d.** | | | dihybrid cross. | | | | | |
| **11.** | | In hybridization, Tt × tt gives rise to the progeny of ratio | | | | | | | | | | | | | | |
|  | | **a.** | | | 2: 1 | | | **b.** | | | 1: 2: 1 | | | | | |
| **c.** | | | 1: 1 | | | **d.** | | | 1: 2 | | | | | |
| **12.** | | A child with blood group O cannot have parents with blood groups: | | | | | | | | | | | | | | |
|  | | **a.** | | | A and B | | | **b.** | | | A and A | | | | | |
| **c.** | | | AB and O | | | **d.** | | | B and O. | | | | | |
| **13.** | | In pea plants, yellow seeds are dominant to green. If a heterozygous yellow seeded plant is crossed with a green seeded plant, what ratio of yellow and green seeded plants would you expect in F1 generation? (a (b(c) (d | | | | | | | | | | | | | | |
|  | | **a.** | | | 9: 1 | | | **b.** | | | 1: 3 | | | | | |
| **c.** | | | 3: 1 | | | **d.** | | | 50: 50 | | | | | |
| **14.** | | The frequency of recombination between gene present on the same chromosome as a measure of the distance between genes was explained by | | | | | | | | | | | | | | |
|  | | **a.** | | | Sutton Boveri | | | **b.** | | | T.H. Morgan | | | | | |
| **c.** | | | Gregor Mendel | | | **d.** | | | Alfred Sturtevant | | | | | |
| **15.** | | Which of the following statements is not true of two genes that show 50% recombinationfrequency? | | | | | | | | | | | | | | |
|  | | **a.** | | | The gene show independent assortment. | | | **b.** | | | If the genes are present on the same chromo- some, they undergo more than one cross-overs in every meiosis. | | | | | |
| **c.** | | | The genes may be on different chromosomes. | | | **d.** | | | The genes are tightly linked | | | | | |
| **16.** | | Which of the following characteristics represent ‘inheritance of blood groups’ in humans?   1. Dominance   (ii) Co-dominance  (iii) Multiple allele  (iv) Incomplete dominance  (v) Polygenic inheritance | | | | | | | | | | | | | | |
|  | | **a.** | | (ii), (iii) and (v) | | | | | **b.** | | | (i), (ii) and (iii) | | | | |
| **c.** | | (ii), (iv) and (v) | | | | | **d.** | | | (i), (iii) and (v) | | | | |
| **17.** | | Inheritance of skin color in humans is an example of | | | | | | | | | | | | | | |
|  | | **a.** | | | point mutation | | | **b.** | | | polygenic inheritance | | | | | |
| **c.** | | | Codominance | | | **d.** | | | chromosomal aberration. | | | | | |
| **18.** | | In a test cross involving F1 dihybrid flies, more parental-type offspring were produced than the recombinant-type offspring. This indicates. | | | | | | | | | | | | | | |
|  | | **a.** | | | the two genes are linked and present on the same chromosome | | | **b.** | | | both characters are controlled by more than one gene | | | | | |
| **c.** | | | the two genes are located on two different chromosomes | | | **d.** | | | chromosomes failed to separate during meiosis. | | | | | |
|  | | **Question no 19 and 20 is Assertion Reason Type. These questions consist of two statements each, printed as Assertion and Reason. While answering these questions you are required to choose any one of the following four responses.**  **A. If both Assertion and Reason are true and the Reason is correct explanation of the Assertion.**  **B.** B**oth Assertion and Reason are true, but the Reason is not a correct explanation of the Assertion.**  **C. Assertion is true, but the Reason is false.**  **D.** B**oth Assertion and Reason are false** | | | | | | | | | | | | | | |
| **19.** | | **Assertion**: It is possible for human parents heterozygous for skin color to have children darker or lighter than themselves.  **Reason**: In a polygenic trait the phenotype reflects the contribution of each allele. | | | | | | | | | | | | | | |
| **20.** | | **Assertion**: The progeny in F2-generation traits were identical to their parental type.  **Reason:** The progeny shows no blending of traits. | | | | | | | | | | | | | | |
| **21.** | | **Read the following and answer any 3 questions from i to iv given below:**  Sickle cell anemia is a genetic disorder where the body produces abnormal hemoglobin called hemoglobin S. Red blood cells are normally flexible and round, but when the hemoglobin is defective, blood cells take on a “sickle” or crescent shape. Sickle cell anemia is caused by mutations in a gene called HBB.  It is an inherited blood disorder that occurs if both the maternal and paternal copies of the HBB gene are defective. In other words, if an individual receives just one copy of the defective HBB gene, either from mother or father, then the individual has no sickle cell anemia but has what is called “sickle cell trait”. People with sickle cell trait usually do not have any symptoms or problems but they can pass the mutated gene onto their children.  There are three inheritance scenarios that can lead to a child having sickle cell anemia:  - Both parents have sickle cell trait  - One parent has sickle cell anemia and the other has sickle cell trait  - Both parents have sickle cell anemia | | | | | | | | | | | | | **3\*1** | |
| **i.** | | If one parent has sickle cell trait, then there is\_\_..............\_\_ of the child having sickle cell anemia. | | | | | | | | | | | | | | |
|  | | **a.** | | | 25 % risk | | | **b.** | | | 50 % risk | | | | | |
| **c.** | | | 75% risk | | | **d.** | | | No risk | | | | | |
| **ii.** | | **3**. If both parents have sickle cell trait, then there is…….of the child having sickle cell trait. | | | | | | | | | | | | | | |
|  | | **a.** | | | 25 % risk | | | **b.** | | | 50 % risk | | | | | |
| **c.** | | | 75% risk | | | **d.** | | | No risk | | | | | |
| **iii.** | | The following statements are drawn as conclusions from the above data (Kenya).  I. Patients with SCD (Sickle Cell Disease) are less likely to be infected with malaria.  II. Patients with SCD (Sickle Cell Disease) are more likely to be infected with malaria.  III. Over the years the percentage of people infected with malaria has been decreasing.  IV. Year 2000 saw the largest percentage difference between malaria patients with and without SCD. Choose from below the correct alternative. | | | | | | | | | | | | | | |
|  | | **a.** | | | only I is true | | | **b.** | | | I and IV are true | | | | | |
| **c.** | | | III and II are true | | | **d**. | | | I and III are true | | | | | |
| **iv.** | | If one parent has sickle cell anemia and the other has sickle cell trait, there is ……. that their children will have sickle cell anemia and ……that their children will have sickle cell trait. | | | | | | | | | | | | | | |
|  | | **a.** | | | 25 % risk, 75% risk | | | **b.** | | | 50 % risk, 100% risk | | | | | |
| **c.** | | | 75% risk, 25% risk | | | **d.** | | | No risk | | | | | |
|  | | **SECTION B** | | | | | | | | | | | |  | | |
| **22.** | | Identify the sex of organism as male or female in which the sex chromosome are found as  (i) ZW in bird (ii) XY in Drosophila (iii) ZZ in birds. (iv) XO in grasshopper. | | | | | | | | | | | | 2 | | |
| **23.** | | Mention four reasons why Drosophila was chosen by Morgan for his experiments in genetics. | | | | | | | | | | | | 2 | | |
|  | |  | | | | | | | | | | | |  | | |
|  | | **SECTION -C** | | | | | | | | | | | |  | | |
| **24.** | | In Antirrhinum majus a plant with red flowers was crossed with a plant with white flowers. Work out all the possible genotypes & phenotypes of F1 & F2 generations comment on the pattern of inheritance in this case? | | | | | | | | | | | | 3 | | |
|  | | **SECTION -D** | | | | | | | | | | | |  | | |
| **25.** | | A dihybrid heterozygous round, yellow seeded garden pea (Pisum sativum) was crossed with a double recessive plant.  (i) What type of cross is this?  (ii) Work out the genotype and phenotype of the progeny.  (iii) What principle of Mendel is illustrated through the result of this cross? | | | | | | | | | | | | 5 | | |

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