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| **HY/BIQP/1222/C 12-SEP-2022** | | | | | | |
| **HALF YEARLY EXAMINATION - (2022-23)** | | | | | | |
| **Name:** | | **Section:** | | **Roll No:** | | |
| **Subject: Biology**  **Grade: XII** | | | Max. Marks:70Time: 3 Hrs | | | |
| **General Instructions: -**  i) All questions are compulsory.  ii) The question paper has five sections and 32 questions. All questions are compulsory.  iii) Section–A has 5 questions of 1 mark each; Section–B has 5 questions of 1 mark each; and Section–C has 10 questions of 2 marks each and Section D has five questions of 3 marks each and Section E has 2 case-based question of 5 marks each.  iv) There is no overall choice. However, internal choices have been provided in some questions. A student must attempt only one of the alternatives in such questions.  v) Wherever necessary, neat and properly labelled diagrams should be drawn. | | | | | | |
|  | **SECTION A** | | | |  |
| 1 | Gene of bacteria code for more than one polypeptide are called (a) overlapping gene (b) monocistronic gene (c) polycistronic gene (d) non-ambiguous gene | | | | 1 |
| 2 | During replication of DNA Okazaki fragments are formed in the direction- (a) 5’🡪3’ (b) 3’🡪 5’ (c) 3’🡪 3’ (d) 5’🡪 5’ | | | | 1 |
| 3 | The graphical representation to calculate the probability of all possible genotypes of offspring in a genetic cross, is called   1. pedigree analysis 2. karyotype 3. Punnet square 4. Chromosome map | | | | 1 |
| 4 | **Assertion :** The genetic complement of an organism is called genotype **Reason :**Genotype is the type of hereditary properties of an organism Mark the correct choice as: (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion. (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion. (c) If Assertion is true but Reason is false. (d) If both Assertion and Reason are false. | | | | 1 |
| 5 | **Assertion :**Mendel was successful in knowing the process of inheritance **Reason :**He considered a single character at a time Mark the correct choice as: (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion. (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion. (c) If Assertion is true but Reason is false. (d) If both Assertion and Reason are false. | | | | 1 |
|  | **SECTION B** | | | |  |
| 6 | What are autosomes? | | | | 1 |
| 7 | The gene I that controls ABO blood grouping in human beings has three alleles IA,IB and i.  (a)How many different genotypes are possible?  (b)How many phenotypes are possible? | | | | 1 |
| 8 | In the following pedigree chart, state whether the trait is autosomal dominant, autosomal recessive or sex linked. Give reason for your answer. | | | | 1 |
| 9 | List two essential roles of ribosome for translation. | | | | 1 |
| 10 | In medium where E coli was growing lactose was added, which induced the lac operon. But why does lac-operon shut down after some time after addition of lactose in the medium. | | | | 1 |
|  | **SECTION C** | | | |  |
| 11 | Name any one plant and its feature that shows the phenomenon of incomplete dominance. | | | | 2 |
| 12 | Study the following cross and answer the following questions.     1. Write the genotypes of father, mother and son. 2. What is the type of dominance in human ABO blood grouping? | | | | 2 |
| 13 | Write four symptoms of Turner’s syndrome. | | | | 2 |
| 14 | Distinguish between heterochromatin and euchromatin. | | | | 2 |
| 15 | Mention the polarity of the DNA strands a-b and c-d shown in the replicating fork given below. | | | | 2 |
| 16 | What will be the phenotypes of F1 generation when a normal vision man (XY) marries a color blind woman(XcXc)? | | | | 2 |
| 17 | Write a short note on Klinefelter’s syndrome.  **OR**  Give reason why human skin color is observed in different shades. | | | | 2 |
| 18 | Why hnRNA is required to undergo splicing? | | | | 2 |
| 19 | DNA is the more suitable genetic material over RNA. Why? | | | | 2 |
| 20 | Results of famous experiment is given in the figure.   1. Identify the experiment. 2. Which property of the DNA is proved by this experiment? | | | | 2 |
|  | **SECTION D** | | | |  |
| 21 | What is Pedigree analysis? Write its advantages. | | | | 3 |
| 22 | Study the table and answer the questions:    a) Name the dominant traits  b) What was the parent genotype if the table shows F2 generation?  c) What is the F2 phenotype ratio? Why did you get such type of ratio? | | | | 3 |
| 23 | In peas tallness is dominant over dwarfness, and red color of flowers is dominant over the white color. When a tall plant bearing red flowers was pollinated by a dwarf plant bearing white flowers, the different phenotypic groups were identified in the progeny in numbers mentioned against them.  Tall Red=138  Tall white=132  Dwarf Red=136  Dwarf white=128  Mention the genotypes of the two parents and of the types of four offspring. | | | | 3 |
| 24 | Read the sequence of the nucleotides in the given segment of mRNA and the respective amino acid sequence in the polypeptide chain.   1. Provide the triplet of bases for i) Valine and ii) Proline 2. Write the nucleotide sequence of the DNA strand from which this mRNA was transcribed 3. What does the last codon of this RNA stand for? | | | | 3 |
| 25 | Why is Human Genome Project called a mega project? | | | | 3 |
| 26 | It is said that the harmful alleles get eliminated from population over period of time, yet sickle cell anemia is persisting in human population. Why?  **OR**  In a Mendelian monohybrid cross, the F2 generation shows identical genotypic and phenotypic ratios. What does it tell us about the nature of alleles involved? Justify your answer. | | | | 3 |
| 27 | What is Down’s syndrome? Give its symptoms and cause. Why is that the chances of having a child with Down’s syndrome increases if the age of the mother exceeds forty years? | | | | 3 |
| 28 | With the help of a diagram describe the transcription unit of DNA. | | | | 3 |
| 29 | Who postulated an adapter molecule to link the genetic code and the amino acids? State its two functions.  **OR**   1. What are the four levels at which gene expression is regulated in eukaryotic cell ? 2. Name the regulatory gene of Lac –operon . | | | | 3 |
| 30 | Study the diagram given below.  Name the linkage X,Y,Z and the respective molecules formed by them. | | | | 3 |
|  | **SECTION E (Case Based)** | | | |  |
| 31 | Study the following crime case in which DNA finger print of two individual suspects A and B obtained from their DNA sample and DNA sample from the crime scene is given as DNA fingerprint C to answer the following questions:     1. Name the technique to obtain separate bands of DNA fragments. 2. Name the DNA in which the tandem repeats are found. 3. Write the steps followed to obtain a DNA finger print. 4. Is it right to compare the VNTR of chromosome no 16 of C with the chromosome no 7 of the suspects | | | | 5 |
| 32 | The chances of color blindness about 8 % of males and only about .4 % of females. This is because the genes that lead to red, green color blindness are on the X chromosome. Males have only one X chromosome and females have 2. Another sex-linked recessive disease, which shows its transmission from unaffected carrier female to some of the male progeny has been widely studied. In this disease a single protein that is a part of the cascade of proteins involved in the clotting of the blood is affected. Due to this in an affected individual a simple cut will result in nonstop bleeding. The heterozygous female (carrier) for hemophilia may transmit the disease to sons. The possibility of a female becoming a hemophilic is extremely rare because mother of such a female has to be at least carrier and the father should be hemophilic.    Note: - in each group bar 1 represent the individuals of less than 12 years of age. And bar 2 represent the individuals of more than 12 years of age.   1. Give any two reasons for low viability of human females with hemophilia 2. Males are mostly affected with both the disorders. Why? 3. How carrier mother may not inherit color blindness to her offspring 4. Which two colors cannot be identified in the color blindness condition? | | | | 5 |

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