|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | |
|  | | | | | | | |
| **PERIODIC TEST I (2022-23)**  **SET-2** | | | | | | | |
| **Subject: BIOLOGY**  **Grade: XII** | | | Max. Marks:35Time: 1.5 Hrs | | | | |
| **Name:** | | | | | **Section:** | **Roll No:** | |
| ***General Instructions:***   * *This question paper consists of 2 printed pages.* * *All answers to be written in the answer sheet provided.* * *All questions are compulsory.* * *The question paper has four sections: Section A, Section B, Section C and Section D. There are 16 questions in the question paper.* * *Section–A has 5 questions of 1 mark each.* * *Section–B has 5 questions of 2 marks each.* * *Section–C has 5 questions of 3 marks each.* * *Section D has 1 question of 5 marks.* * *Wherever necessary, neat and properly labeled diagrams should be drawn.* | | | | | | | |
|  | **SECTION A** | | | | | | 5 |
|  | Which of the following is initiation codon? | | | | | | |
|  | **a.** | UAG | | **b.** | AUC | | |
|  | **c.** | AUG | | **d.** | GUA | | |
| **2.** | Identify the correct order of organization of genetic material from largest to smallest. | | | | | | |
|  | **a.** | Genome, chromosome, gene, nucleotide | | **b.** | Chromosome, genome, nucleotide, gene | | |
|  | **c.** | Chromosome, gene, genome, nucleotide | | **d.** | Genome, chromosome, nucleotide, gene | | |
| **3.** | In the genetic code dictionary, how many codons do not code for any essential amino acids ? | | | | | | |
|  | **a.** | 0 | | **b.** | 1 | | |
|  | **c.** | 2 | | **d.** | 3 | | |
| **4.** | Find the correct statement from below | | | | | | |
|  | **a.** | In prokaryotes, DNA being positively charged is held by some negatively charged proteins to form nucleoid | | **b.** | 1. in eukaryotes, there is a set of negatively charged proteins called histones | | |
|  | **c.** | 1. Histones are rich in lysine and Arginine residues | | **d.** | 1. 6 molecules of histones with DNA forms nucleosome | | |
| **5.** | Discontinuous synthesis of DNA occurs on one strand because | | | | | | |
|  | **a.** | DNA molecule being synthesized is very long | | **b.** | DNA dependent DNA polymerase catalyses polymerisation only in one direction (5-3‘) | | |
|  | **c.** | It is a more efficient process | | **d.** | 1. DNA ligase has to have some role | | |
|  | **SECTION B** | | | | | |  |
| **6.** | a. What are the components of a nucleoside ?  b. Who experimentally proved the semiconservative nature of DNA replication? | | | | | | 2 |
| **7.** | How are the exons different from introns? Give two points of difference . | | | | | | 2 |
| **8.** | Which strand of DNA is transcribed and Why ? | | | | | | 2 |
| **9.** | A hypothetical mRNA with 12 codons is shown above. (a) How many amino acids will be coded by this? Justify your answer. (b) Mention the dual functions of the codon, AUG.  **OR**  If the sequence of one strand of DNA is written as follows:  5'-ATGCATGCATGCATGCATGCATGCATGC-3'  Write down the sequence of complementary strand in 5' → 3' direction | | | | | | 2 |
| **10.** | a) What was the objective of the following experiment?  b) Who performed it?  c) How was the DNA separated into different layers?  d) Name any other scientist who had performed experiment to prove the same. | | | | | | 2 |
|  | **SECTION -C** | | | | | |  |
| **11.** | a.Describe the structure of a transcription unit with the help of a diagram.  b.Which strand of DNA acts as a template for transcription? | | | | | | 3 |
| **12.** | If a double stranded DNA has 30 per cent of cytosine, calculate the per cent of adenine in the DNA.Explain the rule that helps in this calculation. | | | | | | 3 |
| **13.** | How did Hershey and Chase differentiate between DNA and protein in their experiment while proving that DNA is the genetic material? | | | | | | 3 |
| **14.** | In bacteria, since the mRNA does not require any processing to become  active, and also since transcription and translation take place in the same  compartment (there is no separation of cytosol and nucleus in bacteria),  many times the translation can begin much before the mRNA is fully  transcribed. Consequently, the transcription and translation can be coupled  in bacteria.  In eukaryotes, there are two additional complexities. What are they? Explain in detail. | | | | | | 3 |
| **15.** | What was the objective of the following experiment? What was the conclusion after this experiment? Write the results of the experiment A-D.    **OR**  Diagrammatically explain the process of prokaryotic transcription. | | | | | | 3 |
|  | **SECTION -D** | | | | | |  |
| **16.** | Read the following and answer the questions given below:  The process of translation requires transfer of genetic information from a polymer of nucleotides to synthesise a polymer of amino acids. The relationship between the sequence of amino acids in a polypeptide and nucleotide sequence of DNA or mRNA is called genetic code. George Gamow suggested that in order to code for all the 20 amino acids, code should be made up of three nucleotides.  Listed below are some amino acids and their corresponding mRNA triplets.     1. What is a codon? 2. Three consecutive bases in the DNA molecule provide the code for each amino acid in a protein molecule. What is the maximum number of different triplets that could occurs ? 3. Which DNA sequence would be needed to produce the following polypeptide sequence? Alanine- Arginine- Lysine- Phenylalanine 4. A polypeptide is made using synthetic mRNA molecules as shown.     What are the DNA codes for the amino acids phenylalanine and lysine?   1. Write any two features of Genetic code. | | | | | | 5 |