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| **PT1/BIQP/1222/A 09-MAY-2022** | | | | | | | |
| **PERIODIC TEST - I (2022-23)** | | | | | | | |
| **Subject: BIOLOGY**  **Grade: XII** | | | Max. Marks:35Time: 1 Hr 20 Mins | | | | |
| **Name:** | | | | | **Section:** | **Roll No:** | |
| ***General Instructions:***   * *This question paper consists of 4 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 33 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 |
|  | Select the odd one. Justify your answer: Adenosine, Guanosine, Cytosine, Thymidine. | | | | | | |
|  | **a.** | Adenosine. Because it is purine. Others are pyrimidines. | | **b.** | Guanosine. Because it is purine.  Others are pyrimidines. | | |
|  | **c.** | Cytosine. Because it is nitrogen base. Others are nucleosides. | | **d.** | Thymidine. Because it is pyrimidine. Others are purines. | | |
| **2.** | DNA of E. coli has | | | | | | |
|  | **a.** | 4.6x10^6 bp | | **b.** | 6.6x10^9 bp | | |
|  | **c.** | 5386 nucleotides | | **d.** | 48502 bp | | |
| **3.** | In a DNA segment, cytosine is 18%. Calculate the percentage of other nitrogen bases. | | | | | | |
|  | **a.** | Adenine= 36%, Guanine= 18%, Thymine= 36%. | | **b.** | Adenine= 18%, Guanine= 32%, Thymine= 32%. | | |
|  | **c.** | Adenine= 32%, Guanine= 18%, Thymine= 32%. | | **d.** | Adenine= 22%, Guanine= 38%, Thymine= 22%. | | |
| **4.** | Observe the given diagram below. (a) Identify it. (b) Label A, B & C  Captionless Image | | | | | | |
|  | **a.** | (a) Nucleosome. (b) A- DNA, B- H1 histone, C- Histone octamer | | **b.** | (a) Nucleosome. (b) A- DNA, B- Histone, C- H1 histone | | |
|  | **c.** | (a) Nucleoid. (b) A- DNA, B- Histone octamer, C- H1 histone | | **d.** | (a) Nucleoid. (b) A- DNA, B- H1 histone, C- Histone | | |
| **5.** | Analyze the given diagram. (a) What does it represent? (b) At which phase of the cell cycle this process takes place? (c) Name any two enzymes involved in this process.  Captionless Image | | | | | | |
|  | **a.** | (a) Replication fork. (b) S-phase. (c) DNA polymerase & DNA ligase. | | **b.** | (a) Replication fork. (b) G1-phase. (c) DNA polymerase & peptidyl transferase. | | |
|  | **c.** | (a) Transcription unit. (b) S-phase. (c) RNA polymerase & RNA primase. | | **d.** | (a) Transcription unit. (b) G1-phase. (c) RNA polymerase I & RNA polymerase II. | | |
|  | **SECTION B** | | | | | |  |
| **6.** | Carefully examine structures A and B of pentose sugar given below. Which one is more reactive? Give reasons. | | | | | | 2 |
| **7.** | Rahim said that all codons coding amino acids are degenerate codons. (a) Do you agree with him? Why? (b) What do you understand by the term degenerate codons? | | | | | | 2 |
| **8.** | Give reasons for the discontinuous synthesis of DNA on one of the parental strands?  OR  a) Name the component of a nucleotide responsible for giving 5’— 3′ polarity to a polynucleotide.  b) Where in a nucleotide is the glycosidic bond present? | | | | | | 2 |
| **9.** | What are the functions of the?   1. Methylated guanosine cap 2. Poly-A tail | | | | | | 2 |
| **10.** | The sequence of a DNA strand representing a gene is given below.  CACGTGGACTGAGGACTCCTC-5’  (a) Is it coding strand or template strand? Justify.  (b) Construct the base sequence of mRNA transcribed from this. 3’-CACGTGGACTGAGGACTCCTC-5’ | | | | | | 2 |
|  | **SECTION -C** | | | | | |  |
| **11.** | A transcriptional unit is given below. Observe it and answer the questions.    (a) How can you identify the coding strand?  (b) Write the sequence of RNA formed from this unit?  (c) What would happen if both strands of the DNA act as templates for transcription? | | | | | | 3 |
| **12.** | Given below is the diagrammatic representation of first stage of a process in bacteria.    (a) Identify the process.  (b) Name the enzyme catalyzes this process.  (c)What are the initiation and termination factors associated with RNA Polymerase in this transcription? | | | | | | 3 |
| **13.** | With the help of the Figure given, explain the processing of hnRNA to mRNA in eukaryotes. | | | | | | 3 |
| **14.** | “Prediction of the sequence of amino acids from the nucleotide sequence in mRNA is very easy, but the exact prediction of the nucleotide sequence in m RNA from the sequence of amino acids coded by mRNA is difficult”.  (a) Which properties of the genetic code is the reason for the above condition? Explain.  (b) Which are the stop codons in DNA replication? | | | | | | 3 |
| **15.** | You are repeating the Hershey-Chase experiment and are provided with two isotopes 32p and 15N (in place of 35S in the original experiment). How do you expect your results to be different? Name the 3 steps of this Experiment.  **OR**  What are the major enzymes of DNA replication? Give function of each. | | | | | | 3 |
|  | **SECTION -D** | | | | | |  |
| **16.** | Read the following and answer any four questions from (i) to (v) given below:  In prokaryotes, DNA is circular and present in the cytoplasm but in eukaryotes, DNA is linear and mainly confined to the nucleus. DNA or deoxyribonucleic acid is a long polymer of nucleotides. In 1953, the first correct double helical structure of DNA was worked out by Watson and Crick. Based on the X-ray diffraction data produced by Maurice Wilkins and Rosalind Franklin. It is composed of three components, i.e., A phosphate group, a deoxyribose sugar and a nitrogenous base. Different forms of DNA are B-DNA, Z-DNA, A-DNA, C-DNA and D-DNA.  (i) Name the linkage present between the nitrogen base and pentose sugar in DNA.  (a) Phosphodiester bond (b) Glycosidic bond (c) Hydrogen bond (d) None of these  (ii) The double helix structure of DNA was proposed by  (a) James Watson and Francis Crick (b) Erwin Chargaff (c) Frederick Griffith (d) Hershey and Chase  (iii) B-DNA which is right-handed double helix contains \_\_\_\_\_\_ base pairs per turn of the helix and each turn is \_\_\_\_\_\_\_ long.  (a) 10, 3.4 Å (b) 10, 34 Å (c) 11, 20 Å (d) 11, 34 Å  (iv) Assertion: The two strands of DNA helix have uniform distance between them.  Reason: A large sized purine always paired opposite to a small sized pyrimidine.  (a) Both assertion and reason are true and reason is the correct explanation of assertion.  (b) Both assertion and reason are true but reason is not the correct explanation of assertion.  (c) Assertion is true but reason is false.  (d) Both assertion and reason are false.  (v) Which of the following describes the structure of phosphodiester bond?  a) b)    c) d) | | | | | | 5 |

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