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| **PT1/BIQP/1223/A 25-APR-2023** | | | | | | | |
| **PERIODIC TEST - I (2023-24)** | | | | | | | |
| **Subject: BIOLOGY**  **Grade: XII** | | | Max. Marks:35Time: 1.5 Hrs | | | | |
| **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 five sections: Section A, Section B, Section C, Section D and Section E. There are 18 questions in the question paper. * Section–A has 10 questions of 1 mark each. * Section–B has 2 questions of 2 marks each. * Section–C has 4 questions of 3 marks each. * Section D has 1 case study question of 4 marks. * Section E has 1 Question of 5 marks. * Wherever necessary, neat and properly labeled diagrams should be drawn. | | | | | | | |
|  | **SECTION A** | | | | | | 1\*10 |
|  | The nucleic acid synthesis takes place in | | | | | | |
|  | **a.** | 3’-5’ direction | | **b.** | 1. 5’-3’ direction | | |
|  | **c.** | Both ways | | **d.** | Any direction | | |
| **2.** | The primer in DNA replication is | | | | | | |
|  | **a.** | Small ribonucleotide polymer | | **b.** | Helix destabilizing protein | | |
|  | **c.** | Small deoxyribonucleotide polymer | | **d.** | Enzyme joining nucleotides of new strands | | |
| **3.** | The flow of genetic information is shown below    Identify the process .. | | | | | | |
|  | **a.** | a-Replication, b-Transcription, c-Translation, d-Reverse Transcription | | **b.** | a-Transcription, b-Replication, c-Translation, d-Reverse-Transcription | | |
|  | **c.** | a-Duplication, b-Transcription, c-Replication, d- Translation | | **d.** | a-Replication, b-Transcription, c-Duplication, d-Translation | | |
| **4.** | Goals of human genome project are | | | | | | |
|  | **a.** | Store information in database | | **b.** | improve tools for data analysis. | | |
|  | **c.** | address the legal, ethical band social issues | | **d.** | all the above | | |
| **5.** | The commonly used hosts were used in human genome project | | | | | | |
|  | **a.** | bacteria and fungi | | **b.** | bacteria and yeasts | | |
|  | **c.** | fungi and viruses | | **d.** | plasmodium and viruses | | |
| 6. |  | 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%. | | |
| 7 | Observe the given diagram below. (a) Identify it. (b) Label A, B & C. | | | | | | |
|  | **a.** | (a) Nucleosome. (b) A- DNA, B- H1 histone, C- Histone octamer | | **b.** | Nucleosome. (b) A- DNA, B- Histone, C- H1 histone | | |
|  | **c.** | Nucleoid. (b) A- DNA, B- Histone octamer, C- H1 histone | | **d.** | Nucleoid. (b) A- DNA, B- H1 histone, C- Histone | | |
| 8 | Observe the given figure. (a) Who conducted this experiment? (b) Mention its aim. | | | | | | |
|  | **a.** | (a) Hershey and Chase. (b) To prove DNA is the genetic material. | | **b.** | (a) Meselson and Stahl. (b) To prove Central dogma of molecular biology. | | |
|  | **c.** | (a) Hershey and Chase. (b) To prove Semi-conservative model of DNA replication. | | **d.** | (a) Meselson and Stahl. (b) To prove Semi-conservative model of DNA replication. | | |
|  | Question No. 9 to 10 consists of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:  a) Both A and R are true, and R is the correct explanation of A.  b) Both A and R are true, and R is not the correct explanation of  A.  c) A is true but R is false.  d) A is false but R is true. | | | | | |  |
| **9** | Assertion: In a DNA molecule, A–T rich parts melt before G–C rich parts.  Reason: In between A and T there are three H–bond, whereas in between G and C there are two H-bonds. | | | | | |  |
| **10** | Assertion (A): Human Genome project (HGP) was called a mega project.  Reason (R): The Human Genome project was co-ordinated by the U.S. Department of Energy and the National Institute of Health. | | | | | |  |
|  | **SECTION B** | | | | | | 2\*2 |
| **11.** | The sequence of the coding strand of DNA in a transcription unit is mentioned below. 3′ AATGCAGCTATTAGG 5′ Write the sequence for:  1. Its complementary strand 2. Its mRNA  **OR**  Give a reason for the discontinuous synthesis of DNA on one of the parental strands? | | | | | | 2 |
| **12.** | Give two reasons why both the strands of DNA are not copied during transcription. | | | | | | 2 |
|  | **SECTION -C** | | | | | | 4\*3 |
| **13.** | Observe the representation of genes involved in the lac operon given below.  C:\fake\image11.png  (a) Identify the region where the repressor protein will attach normally.  (b) Under certain conditions the repressor is unable to attach at this site. Explain.  (c) If repressor fails to attach to the said site what products will be formed by z, y and a?  **OR**  Describe the steps involved in the sequencing of genome of an organism. | | | | | | 3 |
| **14.** | What are the functions of the:  1. Methylated guanosine cap 2. Poly-A tail  **OR**  Enumerate the post-transcriptional modifications in a eukaryotic mRNA. | | | | | | 3 |
| **15.** | If you repeat Hershey chase experiment with two isotopes P32 and N15 in place of S35 in the original experiment, what results you can expect? | | | | | | 3 |
| **16.** | Explain the functions of the following  a) Ligase b) DNA polymerase c) DNA dependent RNA polymerase | | | | | | 3 |
|  | **SECTION -D** | | | | | | 1\*4 |
|  | Q. No. 17 is case-based question which has 3 subparts with internal choice in one subpart. | | | | | |  |
| 17. | Read the following and answer any four questions from (i) to (iv) given below:  The discovery of nuclein by Meischer and the proposition for principles of inheritance by Mendel were almost at the same time, but that the DNA acts as a genetic material took long to be discovered and proven. By 1926, the quest to determine the mechanism for genetic inheritance had reached the molecular level. Previous discoveries by Gregor Mendel, Walter Sutton, Thomas Hunt Morgan and numerous other scientists had narrowed the search to the chromosomes located in the nucleus of most cells. But the question of what molecule was actually the genetic material, had not been answered.  Oswald Avery, Colin MacLeod and Maclyn McCarty (1933-44) Worked to determine the biochemical nature of ‘transforming principle’ in Griffith’s experiment. The diagram given below is depicting the experiment done by these 3 scientists to establish the biochemical nature of the transforming principle.    (i)The first significant effort to identify the genetic material was done by:  (ii)The biochemical nature of the transforming principle was established by:  (iii)What is the role of RNAase in the experiment given above?  (iv)Which among the following cases is causing the transformation of R-strain bacteria into S-strain bacteria?  **OR**  Give the salient features of DNA double helical structure. How does this structure contribute to the stability and complementarity of DNA? | | | | | |  |
|  | **SECTION -E** | | | | | | 1\*5 |
| **18** | Diagrammatically explain the experiments which helped prove-  a) Transforming principle is DNA  b) DNA replicates semi conservatively. Also name the scientists involved.  **OR**  9. (a) How did Griffith explain the transformation of R strain (non-virulent) bacterial into S strain (virulent)?  (b) Explain how MacLeod, McCarty and Avery determined the biochemical nature of the molecule responsible for transforming R strain bacteria into S strain bacteria. | | | | | |  |

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