

BIOLOGY
UNIT-MOLECULAR BIOLOGY
PRACTICE QUESTIONS
VIKSANA PROGRAM-2012

Questions carrying One mark each

| Sl.No. | Questions and Answer |
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| 1 | Name the pentose sugar present in DNA. |
| Answer | Deoxyribose. |
| 2 | Name the pentose sugar present in RNA. |
| Answer | Ribose. |
| 3 | Mention the names of pyrimidines of DNA. |
| Answer | Cytosine and Thymine. |
| 4 | Mention the names of pyrimidines of RNA |
| Answer | Uracil and Cytosine. |
| 5 | Mention the names of purines of DNA |
| Answer | Adenine and Guanine. |
| 6 | Mention the names of purines of RNA |
| Answer | Adenine and Guanine. |
| 7 | What is a nucleoside? |
| Answer | It is a combination of nitrogenous base pentose sugar. |
| 8 | What is a nucleotide? |
| Answer | Nitrogenous base pentose sugar and phosphate. |
| 9 | Name the unstable RNA. |
| Answer | Messenger RNA /mRNA. |
| 10 | Name the least occurring type of RNA. |
| Answer | Messenger RNA / mRNA. |
| 11 | Name the smallest RNA. |
| Answer | Transfer RNA. |
| 12 | Name the RNA capable of carrying amino acids. |
| Answer | tRNA |
| 13 | Name the scientist who discovered mRNA |
| Answer | Volkin. |
| 14 | Name the most abundant RNA. |
| Answer | Ribosomal RNA. |

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| 15 | Name the largest RNA. |
| Answer | rRNA |
| 16 | Name the scientist who proposed the fine structure of gene. |
| Answer | Seymour Benzere. |
| 17 | Name the codon with double function. |
| Answer | AUG. |
| 18 | Why Chargaff's rule is not applicable for RNA? |
| Answer | Because RNA is single stranded. |
| 19 | Why the nucleotide ratio in RNA is not usually constant? |
| Answer | Due to the absence of complementary base pairing. RNA is single stranded. |
| 20 | Why is processed mRNA in eukaryotes is shorter than its gene? |
| Answer | Because the eukaryotic gene is split gene and the transcribed mRNA has intron portions. |
| 21 | Name the pentose sugar present in RNA |
| Answer | Ribose |
| 22 | Name the pyrimidine, present in DNA, but not in RNA |
| Answer | Thymine |
| 23 | Name the pyrimidine, present in RNA, but not in DNA |
| Answer | Uracil |
| 24 | Name the genetic material of Eukaryotes |
| Answer | DNA |
| 25 | Name the process of RNA directed DNA synthesis |
| Answer | Teminism |
| 26 | Name the enzyme, which directs DNA synthesis by RNA. |
| Answer | Reverse transcriptase |
| 27 | Why codons are redundant? |
| Answer | Codons are redundant because, single amino acid can be coded by two or three codons. |
| 28 | Why codons are sensible? |
| Answer | Codons codes for a specific amino acid. |
| 29 | Why redundancy concept of genetic code does not apply to all amino |

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| | acids? |
| Answer | Some amino acids like tryptophan and methionine have one codon each. |
| 30 | During translation, if the codon is AUG, then, a. What is the anti-codon present on the complimentary tRNA ? |
| Answer | UAC |
| 31 | During translation, if the codon is AUG, then, a. Name the amino acid carried by this tRNA ? |
| Answer | Methionine |
| 32 | How many amino acids are present in a nascent polypeptide decoded from mRNA with the reading frame having 1002 nucleotides? |
| Answer | 333 amino acids (Out of 334 amino acid, methionine being first amino acid, which will be removed off, when processing of polypeptide chain takes place) |
| 33 | Why DNA replication is called semi-conservative? |
| Answer | Parental strands are conserved in daughter DNA molecule Or Daughter molecule has one parental strand and one new strand |
| 34 | What are introns? |
| Answer | The nucleotide sequence is found between the exons and do not code for amino acids |
| 35 | Name the cell organelle where protein synthesis takes place. |
| Answer | Ribosome |
| 36 | Give reason – why DNA is acidic in nature |
| Answer | Due to the presence of phosphoric acid or phosphate group |
| 37 | Write the central dogma of life |
| Answer | <p>DNA $\xrightarrow{\text{Transcription}}$ RNA $\xrightarrow{\text{Translation}}$ PROTEIN</p> |
| 38 | Name the process by which RNA is synthesised from DNA. |
| Answer | Transcription |
| 39 | Name the process by which Protein is synthesised from mRNA |
| Answer | Translation |
| 40 | Why lac operon switches off in the absence of Lactose in E.coli? |
| Answer | The repressor binds to operator and prevents transcription. |

Questions carrying Two mark each

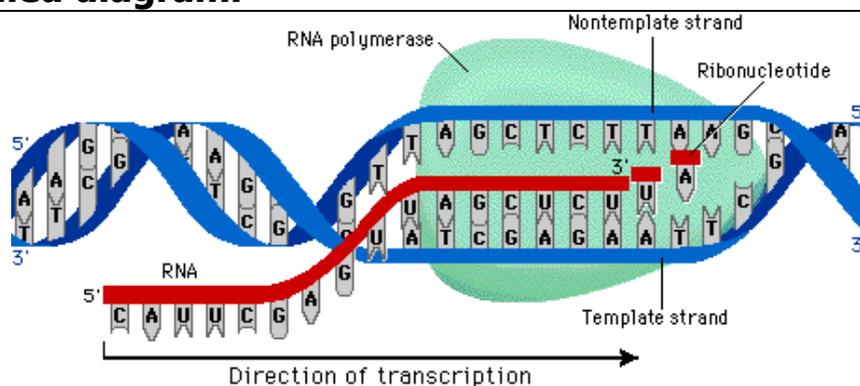
| Sl.No. | Questions and Answer |
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| 1 | Mention the types of nucleotides in DNA. |
| Answer | Deoxy adenosine monophosphate/dAMP/d-Adenylic acid. Deoxy guanosine monophosphate/dGMP/d-Guanylic acid. Deoxy Cytidine monophosphate/dCMP/dCytidylic acid. Deoxy thymidine mono phosphate/dTMP/d-Thymidylic acid. |
| 2 | Mention the types of nucleotides in RNA. |
| Answer | Adenylic acid/AMP/Adenosine mono phosphate. Guanosine mono phosphate/GMP/Guanylic acid. Cytidine mono phosphate/CMP/Cytidylic acid. Uridine mono phosphate/UMP/Uridylic acid. |
| 3 | What are non-sense codons? Mention 2 of them. |
| Answer | These codons do not code for any amino acids. When these codons appear on mRNA termination of polypeptide chain takes place. UAA,UGA,UAG |
| 4 | List the different kinds of nucleotides in RNA |
| Answer | Adenylic acid, Guanylic acid, Cytidylic acid, Uridilic acid |
| 5 | Where are the codons and anticodons |
| Answer | Codons are present in mRNA and code for Amino acids during protein synthesis, Anticodons are present in tRNA and recognise codons on mRNA. |

Questions carrying Five mark each

Sl.No. Questions and Answer

1 Explain the process of Transcription with the help of a labelled diagram.

Answer



- Genetic DNA is confined to the nucleus. Since it is a macro molecule the nucleus membrane is impermeable. Hence DNA acts as the template for the synthesis of mRNA chain.
- Unwinding of the chain takes place by the enzyme unwindase. One of the chains becomes template for the synthesis of mRNA chain.
- This strand is called anti-sense strand.
- The strand complementary to this strand is called sense strand.
- mRNA synthesis takes place on the sense strand .
- The nucleotide sequences of DNA are coded on the m RNA is called transcription.
- mRNA synthesised is complimentary to DNA transcribed.
- Enzyme RNA polymerase polymerises RNA nucleotides.
- Rewinding of DNA strands takes place by windase.

2 Explain the Characteristics of genetic code.

Answer

- Triplet code; the genetic code is a triplet code. It means that three nucleotides of DNA code for one amino acid.
 - eg : AUG.
- The genetic code is universal; It means that a particular mRNA codon codes for the specific amino acid in all living organisms.
- Genetic code is degenerate or redundant; some of the amino acids are coded by two or more codons. These redundant codons codes for the same amino acids are called degenerate codons.
 - eg : Valine has four codons GUG, GUU, GUC, GUA
- Genetic code is non over lapping; In this property the base of the one codon is not shared by the neighbouring codon.
- Genetic code is comma less; Genetic code has no punctuation mark inside the message.
- AUG is the initiator codon.
- UAA UGA UAG is terminator codons.

| 3 | List five differences between DNA and RNA | | | | | | | | | | | | | | | | | | | | | |
|---|--|--|-----|-----|------------------------|---|----------------------|----------------------|-------------------------------|-------------------------|---|----------------------------------|---|--|---------------------------|--|------------------------|-------------------------------------|------------------------------|---------------------------------|--------------------|-----------------------------------|
| Answer | <table border="1"> <thead> <tr> <th data-bbox="341 282 874 322">DNA</th> <th data-bbox="879 282 1407 322">RNA</th> </tr> </thead> <tbody> <tr> <td data-bbox="341 329 874 400">Mostly double stranded</td> <td data-bbox="879 329 1407 400">Single stranded, except in some viruses</td> </tr> <tr> <td data-bbox="341 407 874 443">Nucleotides are AGCT</td> <td data-bbox="879 407 1407 443">Nucleotides are AGCU</td> </tr> <tr> <td data-bbox="341 450 874 486">Pentose sugar is deoxy ribose</td> <td data-bbox="879 450 1407 486">Pentose sugar is ribose</td> </tr> <tr> <td data-bbox="341 492 874 564">It acts as the template for transcription</td> <td data-bbox="879 492 1407 564">It involves in protein synthesis</td> </tr> <tr> <td data-bbox="341 571 874 642">Types of DNA co-exist in a DNA molecule</td> <td data-bbox="879 571 1407 642">There are three types mRNA, tRNA, rRNA</td> </tr> <tr> <td data-bbox="341 649 874 721">It is hereditary material</td> <td data-bbox="879 649 1407 721">Only in RNA viruses it is genetic material</td> </tr> <tr> <td data-bbox="341 728 874 799">It is self-replicating</td> <td data-bbox="879 728 1407 799">RNA synthesis takes on DNA template</td> </tr> <tr> <td data-bbox="341 806 874 842">It directs protein synthesis</td> <td data-bbox="879 806 1407 842">It assists in protein synthesis</td> </tr> <tr> <td data-bbox="341 848 874 884">It can produce RNA</td> <td data-bbox="879 848 1407 884">It generally does not produce DNA</td> </tr> </tbody> </table> | | DNA | RNA | Mostly double stranded | Single stranded, except in some viruses | Nucleotides are AGCT | Nucleotides are AGCU | Pentose sugar is deoxy ribose | Pentose sugar is ribose | It acts as the template for transcription | It involves in protein synthesis | Types of DNA co-exist in a DNA molecule | There are three types mRNA, tRNA, rRNA | It is hereditary material | Only in RNA viruses it is genetic material | It is self-replicating | RNA synthesis takes on DNA template | It directs protein synthesis | It assists in protein synthesis | It can produce RNA | It generally does not produce DNA |
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