



Padalsalai's Telegram Groups!

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- **Padalsalai's NEWS - Group**
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- **Padalsalai's Channel - Group**
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- **12th Standard - Group**
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- **6th to 8th Standard - Group**
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- **1st to 5th Standard - Group**
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- **TNPSC - Group**
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**PREPARED BY MR. R. AYYANAR MSC BED
PRESIDENCY HR. SEC SCHOOL PUDUCHERRY**

Date : 07-Mar-20

12th Standard

ZOOLOGY

Reg.No. :

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UNIT :5 MOLECULAR GENETICS

Exam Time : 02:40:00 Hrs

Total Marks : 100

24 x 1 = 24

- | | |
|-----------------------------|-----------------------------------|
| 1) PCR | (1) Jacob and Monod |
| 2) SNPs | (2) Polycistronic gene |
| 3) Lac Operon | (3) Peptidyl transferase |
| 4) VNTR | (4) Synthesize DNA |
| 5) Initiation complex | (5) Meselson and Stahl |
| 6) Start Codon | (6) adapter molecule |
| 7) Termination | (7) AUG |
| 8) tRNA | (8) Point mutation |
| 9) Ochoa | (9) Snips |
| 10) tRNA | (10) Genetic markers |
| 11) AUG | (11) UAA |
| 12) Sickle cell anemia | (12) Charging of tRNA |
| 13) Semi-conservative model | (13) DNA amplification |
| 14) Transformation | (14) Unwinds DNA strand |
| 15) Clover leaf model | (15) Joins DNA fragments |
| 16) Lac operon model | (16) Methionine |
| 17) DNA Polymerase | (17) Polynucleotide phosphorylase |
| 18) Aminoacyl synthetase | (18) Phenylalanine |
| 19) DNA helicase | (19) Glycine |
| 20) DNA ligase | (20) Tyrosine |
| 21) AUG | (21) Griffith |
| 22) UGA | (22) GTP |
| 23) UUU | (23) R. Holley |
| 24) GGG | (24) Methionine |

12 x 1 = 12

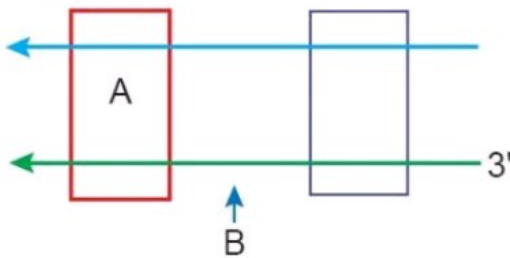
- 25) RNA viruses can mutate faster.
- 26) In bacteria, transcription and translation occur simultaneously.
- 27) Abnormality in haemoglobin leading to sickle cell anaemia is considered to be point mutation.
- 28) tRNA is called adapter module.
- 29) There are no tRNA for stop codons.
- 30) Human Genome Project can aim at a 'Perfect Race'.
- 31) VNTR can serve as genetic markers.
- 32) PCR is an important part of DNA finger printing technique.
- 33) AUG has dual functions.
- 34) HGT could have played a major role in. evolution of life on earth.

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- 35) The genetic code is said to be Non-ambiguous.
 36) The triplet codon is described as 'degenerate code'.

62 x 2 = 124

- 37) Give reasons: Genetic code is 'universal'.
 38) Name the parts marked 'A' and 'B' in the given transcription unit:



- 39) Differentiate - Leading strand and lagging strand
 40) Differentiate - Template strand and coding strand.
 41) Mention any two ways in which single nucleotide polymorphism (SNPs) identified in human genome can bring revolutionary change in biological and medical science
 42) State any three goals of the human genome project.
 43) In E.coli, three enzymes β -galactosidase, permease and transacetylase are produced in the presence of lactose. Explain why the enzymes are not synthesized in the absence of lactose.
 44) Differentiate between purines and pyrimidines.
 45) Why is the term nucleic acid used for DNA and RNA?
 46) What are nucleotides?
 47) What is base pair rule?
 48) What does 'RNA world' refer to?
 49) What is genophore?
 50) What is a nucleosome?
 51) Distinguish heterochromatin and euchromatin.
 52) Differentiate nucleoside from nucleotide.
 53) Point out the nitrogenous bases of RNA
 54) What makes the DNA and RNA as acidic molecules?
 55) Which type of bond is formed
 (a) between a purine and pyrimidine base?
 (b) between the pentose sugar and adjacent nucleotide?
 56) DNA acts as genetic material for the majority of living organisms and not the RNA. Give reasons to support the statement.
 57) Name any two viruses whose genetic material is RNA.
 58) What are the properties that a molecule must possess to act as genetic material?
 59) How many base pairs are present in one complete turn of DNA helix? What is the distance between two consecutive base pairs?
 60) What is nucleosome? How many base pairs are there in a typical nucleosome?
 61) Expand and define NHC
 62) Which is the widely accepted model of DNA replication? Who has proved it?
 63) Name the chemical substance which is called by the name
 (a) Kornberg Enzyme (b) Ochoa's enzyme

- 64) Name the various types of prokaryotic DNA polymerase. State their role in replication process.
- 65) What is the function of Deoxy nucleotide triphosphate in replication?
- 66) Given below are some events of eukaryotic replication. Name the enzymes involved in the process.
 - (a) Unwinding of DNA (b) Joining of Okazaki fragments
 - (c) Addition of nucleotides to new strand (d) Correcting the repair
- 67) What is a replication fork?
- 68) Apart from DNA polymerase, name any other four enzymes which were involved in DNA replication of eukaryotic cell.
- 69) Who proposed the central dogma? Write its concept.
- 70) Define transcription and name the enzyme involved in this process.
- 71) What is TATA box? State its function
- 72) Structural gene of eukaryotes differ from prokaryotes. How?
- 73) What are the two major components of prokaryotic RNA polymerase? How do they act?
- 74) Distinguish between exons and introns
- 75) Define splicing
- 76) What is capping and tailing?
- 77) If a double-stranded DNA has 20% of cytosine, calculate the percentage of adenine in DNA.
- 78) Mention the dual functions of AUG.
- 79) How many codons are involved in termination of translation? Name them.
- 80) Degeneracy of codon - comment.
- 81) Point out the exceptional categories to universality of genetic code.
- 82) What are non-sense codons?
- 83) Name the triplet codons that code for (a) Tyrosine (b) Histidine
- 84) Why hnRNA has to undergo splicing?
- 85) State the role of following codons in translation process: (a) AUG (b) UAA
- 86) Given below is mRNA sequence. Mention the amino acids sequence that is formed after its translation.
- 87) Name the four codons that codes valine.
- 88) The base sequence in one of the DNA strand is TAGCATGAT. Mention the base sequence in its complementary strand.
- 89) What do you mean by charging of tRNA? Name the enzyme involved in this process.
- 90) What are UTR's?
- 91) Define translation unit.
- 92) Mention the inhibitory role of tetracycline and streptomycin in bacterial translation
- 93) At what stage, does the gene expression is regulated?
- 94) Considering the lac operon of E.coli, name the products of the following genes. a) i gene (b) lac Z gene (c) lac Y gene (d) lac a gene
- 95) Expand (a) ETS and (b) YAC.
- 96) Name the human chromosome that has
 - (a) most number of genes (b) least number of genes
- 97) What are SNPs? Mention its uses.
- 98) Mention any four areas where DNA fingerprinting can be used.
- 99) Mention any 3 rules as defined by classical concept of gene

38 x 3 = 114

- 100) State one gene one enzyme hypothesis
- 101) Differentiate DNA and RNA.
- 102) Distinguish replication and transcription.
- 103) What is initiation complex in transcription?
- 104) Why did the use of RNase not affect transformation in the experiment conducted by Avery et al.
- 105) Define a operon.
- 106) What are okazaki fragments?
- 107) What is reverse transcription?
- 108) Distinguish monocistronic and polycistronic gene.
- 109) What is a genetic code?
- 110) What is a anticodon?
- 111) What is 'Wobbling' in tRNA?
- 112) What is open reading frame?
- 113) What is S-D Sequence?
- 114) Define termination in protein synthesis.
- 115) What is reverse pharmacogenomicst?
- 116) List any two applications of DNA finger printing.
- 117) Classify nucleic acid based on sugar molecules.
- 118) Both purines and pyrimidines are nitrogen bases yet they differ. How?
- 119) How 5' of DNA differ from its 3'?
- 120) State Chargaff's rule.
- 121) Chemically DNA is more stable than RNA. Justify.
- 122) Write in simple about semi-conservative mode of DNA replication.
- 123) Draw a simplified diagram of nucleosome and label it.
- 124) What is a primer?
- 125) Both strands of DNA are not copied during transcription. Give reason.
- 126) Name the factors that are responsible for initiation and termination of transcription in prokaryotes
- 127) Name the major RNA types of prokaryotes and mention their role.
- 128) Explain Wobble hypothesis.
- 129) Explain the nature of eukaryotic ribosome.
- 130) What are the components of initiation complex of prokaryotic translation?
- 131) Explain the components of operon.
- 132) A mRNA strand has a series of triplet codons of which the first three codons are given below
(a) AUG (b) UUU (c) UGC
(i) Name the amino acid encoded by these triplet codons.
(ii) Mention the DNA sequence from which these triplet codons would have transcribed?
- 133) Given below are the structures of tRNA molecules which are involved in translation process. In one tRNA, codon is mentioned but not the amino acid. In another tRNA molecule, amino acid is named and not the codon. Complete the figure by mentioning the respective amino acids and codons.
- 134) A DNA fragment possesses 32 adenine bases and 32 cytosine bases. How many total number of nucleotides does that DNA fragment contains? Explain.
- 135) Following is a DNA sequence representing a part of gene
TAC TCG CCC TAT UAA CCC AAA ACC TCT

using this derive

- (a) The RNA transcript
- (b) The spliced mRNA (consider all the codons with two Adenine bases are introns)
- (c) The total number of amino acids coded by the mRNA

136) Complete the molecular processes by naming them

- (a) DNA → DNA (b) mRNA → Protein (c) RNA transcript → mRNA

19 x 5 = 95

137) List the salient features of classical concept of gene.

138) Explain the properties of genetic material.

139) Explain the process of DNA replication in eukaryotes.

140) List the salient features of genetic code.

141) Explain how mutation can impact genetic code with an example

142) Describe the structure of tRNA with a diagram.

143) Explain the negative control of transcription initiation as described by Jacob and Monod.

144) Describe the steps involved in DNA fingerprinting.

145) Describe Hershey and Chase experiment. What is concluded by their experiment?

146) Explain the properties of DNA that makes it an ideal genetic material.

147) How the DNA is packed in an eukaryotic cell?

148) Meselson and Stahl's experiment proved the semi-conservative mode of DNA replication. Explain.

149) Give a detailed account of a transcription unit.

150) Explain the transcription process in prokaryotes with needed diagram.

151) Mutations on genetic code affects the phenotype. Describe with example.

152) Explain the mechanism of lac-operon of the E-coli.

153) Write the salient features of Human Genome Project.

154) Describe the principle involved in DNA fingerprinting technique.

155) Draw a flow chart depicting the steps of DNA fingerprinting technique.

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