RAVI MATHS TUITION CENTER, NEAR VILLIVAKKAM RLY STATION, CHENNAI – 82.
WHATSAPP - 8056206308

Zoology - Molecular Genetics

12th Standard

Biology

Exam Time : 02:30:00 Hrs | Total Marks : 100

25 x 1 = 25

1) Hershey and Chase experiment with bacteriophage showed that
(a) Protein gets into the bacterial cells (b) DNA is the genetic material (c) DNA contains radioactive sulphur (d) Viruses undergo transformation

2) A mRNA molecule is produced by
(a) Replication (b) Transcription (c) Duplication (d) Translation

3) The total number of nitrogenous bases in human genome is estimated to be about
(a) 3.5 million (b) 35000 (c) 35 million (d) 3.1 billion

4) E. coli cell grown on ^{15}N medium are transferred to 14N medium and allowed to grow for two generations. DNA extracted from these cells is ultracentrifuged in a cesium chloride density gradient. What density distribution of DNA would you expect in this experiment?
(a) One high and one low density band (b) One intermediate density band. (c) One intermediate density band. (d) One low and one intermediate density band

5) What is the basis for the difference in the synthesis of the leading and lagging strand of DNA molecules?
(a) Origin of replication occurs only at the 5' end of the molecules (b) DNA ligase works only in the 3' → 5' direction (c) DNA polymerase can join new nucleotides only to the 3' end of the growing stand. (d) Helicases and single-strand binding proteins that work at the 5' end

6) Which of the following is the correct sequence of event with reference to the central dogma?
(a) Transcription, Translation, Replication (b) Transcription, Replication, Translation (c) Duplication, Translation, Transcription (d) Replication, Transcription, Translation

7) Which of the following statements about DNA replication is not correct?
(a) Unwinding of DNA molecule occurs as hydrogen bonds break. (b) Replication occurs as each base is paired with another exactly like it (c) Process is known as semi conservative replication because one old strand is conserved in the new molecule. (d) Complementary base pairs are held together with hydrogen bonds

8) Which of the following statements is not true about DNA replication in eukaryotes?
(a) Replication begins at a single origin of replication. (b) Replication is bidirectional from the origins. (c) Replication occurs at about 1 million base pairs per minute (d) There are numerous different bacterial chromosomes, with replication ocurring in each at the same time.

9) The first codon to be deciphered was _____ which codes for _____.
(a) AAA, proline (b) GGG, alanine (c) UUU, Phenylalanine (d) TTT, arginine

10) Meselson and Stahl's experiment proved
(a) (b) (c) DNA is the (d) Semi-conservative nature of

Transduction Transformationgenetic material DNA replication

11) An operon is a:

(a) Protein that suppresses gene expression	(b) Protein that accelerates gene expression	(c) Cluster of structural genes with related function	(d) Gene that switched other genes on or off

12) When lactose is present in the culture medium:

(a) Transcription of lac y, lac z, lac a genes occurs.	(b) Repressor is unable to bind to the operator.	(c) Repressor is able to bind to the operator.	(d) Both (a) and (b) are correct.

Fill in the blanks

13) Ribosomes are composed of two subunits; the smaller subunit of a ribosome has a binding site for _____ and the larger subunit has two binding sites for two _____

14) Kornberg enzyme is called as _____

15) Retroviruses possess _____ as genetic material.

16) Goldberg - Hogness box of eukaryotes is equivalent to_____ of prokaryotes.

17) Okazaki fragments are joined by the enzyme _____ during DNA replication.

18) _____ number of codons, codes for cystine

19) Lac operon model was proposed by _____

20) Approximate count of base pair in human genome is _____

21) Specific sequences of mRNA that are not translated are _____

22) _____ is the monomer of DNA.

Assertion and reason

23) Assertion: the tRNA decodes the information on mRNA.
Reason: It has an extra arm.
A. A and Rare true, Ris the correct explanation of A
B. A and R are true, R is not the correct explanation of A
C. A is true, R is false
D. Both A and R are false

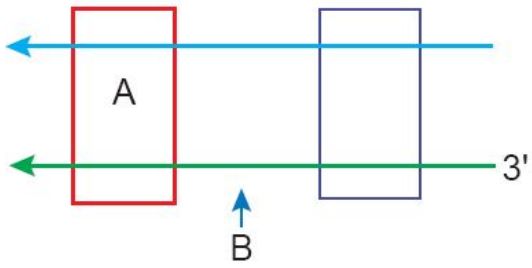
24) Assertion:Repressor proteins prevents the translation in lac operon
Reason: The Lac operon will be functional only when glucose is available for the bacteria.
A. A and Rare true, Ris the correct explanation of A
B. A and R are true, R is not the correct explanation of A
C. A is true, R is false
D. Both A and R are false

25) Assertion: Both the strands of DNA can be copied during transcription.
Reason: This will help to produce more RNA with different sequences
A. A and Rare true, Ris the correct explanation of A
B. A and R are true, R is not the correct explanation of A
C. A is true, R is false
D. Both A and R are false

8 x 2 = 16

26) Give reasons: Genetic code is ‘universal’.

27) Name the parts marked ‘A’ and ‘B’ in the given transcription unit:



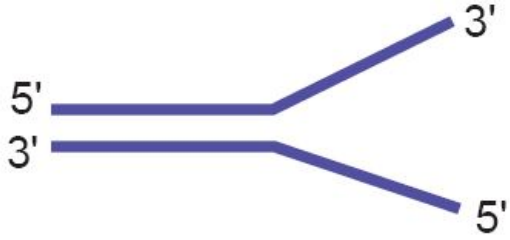
28) Differentiate - Leading stand and lagging strand
29) Differentiate - Template strand and coding strand.
30) Mention any two ways in which single nucleotide polymorphism (SNPs) identified in human genome can bring revolutionary change in biological and medical science
31) State any three goals of the human genome project.
32) 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.
33) What is TATA box? State its function

7 x 3 = 21

34) Distinguish between structural gene, regulatory gene and operator gene
35) A low level of expression of lac operon occurs at all the windows for treatment of various genetic disorders. Justify the statement
36) Why the human genome project is called a mega project?
37) From their examination of the structure of DNA, What did Watson and Crick infer about the probable mechanism of DNA replication, coding capability and mutation?
38) Why tRNA is called an adapter molecule?
39) What are the three structural differences between RNA and DNA?
40) Name the anticodon required to recognize the following codons: AAU, CGA, UAU, and GCA.

7 x 5 = 35

41) a) Identify the figure given below
b) Redraw the structure as a replicating fork and label the parts
c) Write the source of energy for this replication and name the enzyme involved in this process.
d) Mention the differences in the synthesis of protein, based on the polarity of the two template strands.



42) If the coding sequence in a transcription unit is written as follows:
5' TGCATGCATGCATGCATGCATGCATGC 3' Write down the sequence of mRNA
43) How is the two stage process of protein synthesis advantageous?
44) Why did Hershey and Chase use radioactively labelled phosphorous and sulphur only? Would they have got the same result if they use radiolabelled carbon and nitrogen?
45) Explain the formation of a nucleosome.

46) It is established that RNA is the first genetic material. Justify giving reasons.
47) Give a detailed account of a transcription unit.