BIOLOGY

BOOKS - PREMIERS PUBLISHERS

MOLECULAR GENETICS

Textbook Questions Answers

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

Answer: b

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2. DNA and RNA are similar with respect to

A. Thymine as a nitrogen base

B. A single-stranded helix shape

C. Nucleotide containing sugars, nitrogen bases and phosphates

D. The same sequence of nucleotides for the amino acid phenyl alanine

Answer: c

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3. A mRNA molecule is produced by

A. Replication

B. Transcription

C. Duplication

D. Translation

Answer: b

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4. 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

Answer: d

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5. E. coli cell grown on ^{15}N medium are transferred to ^{14}N medium and allowed to grow for two generations. DNA extracted from

these cells is ultracentrifuged in a cesium chloride ensity 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 high and one intermediate density band.

D. One low and one intermediate density band.

Answer: d

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6. 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' $\rightarrow$ 5' direction.

C. DNA polymerase can join new nucleotides only to the 3' end of the growing strand.

D. Helicases and single-strand binding proteins that work at the 5' end.

Answer: c

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7. 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

Answer: d

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8. 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.

Answer: b

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9. 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.

Answer: d

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10. The first codon to be deciphered was _____ which codes for _____.

A. AAA, proline

B. GGG, alanine

C. UUU, Phenylalanine

D. TTT, arginine

Answer: c

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11. Meselson and Stahl's experiment proved .....

A. Transduction

B. Transformation

C. DNA is the genetic material

D. Semi-conservative nature of DNA replication

Answer: d

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12. 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 .....

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13. 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

Answer: c

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14. 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 blind to the operator.

D. Both (a) and (b) are correct.

Answer: d

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15. Give reasons: Genetic code is 'universal'.

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16. Name the parts marked 'A' and 'B' in the given transcription unit.

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17. Differentiate - Leading strand and lagging strand.

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18. Differentiate between Template Strand and Coding Strand.

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19. Mention any two ways in which single nucleotide polymorphism (SNPs) identified in human genome can bring revolutionary change in biological and medical science.

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20. State any three goals of the human genome project.

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21. In E.coli, there enzymes galactosidase, permease and transacetylase are produced in the presence of lactose. Explain why the enzymes are not synthesized in the absence of lactose.

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22. Distinguish between structural gene, regulatory gene and operator gene.

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23. A low level of expression of lac operon occurs at all the time in E.coli Justify the statement .

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24. Why is the Human Genome Project called a mega project?

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25. 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?

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26. Why tRNA is called as adapter molecule?

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27. What are the three structural differences between RNA and DNA?

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28. Name the anticodon required to recognize the following codons: AAU, CGA, UAU, and GCA.

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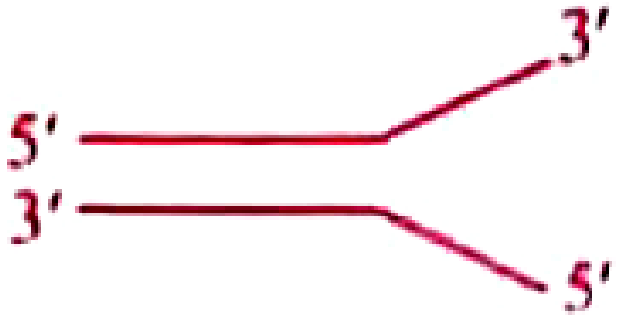

29.

Identify the figures given below.

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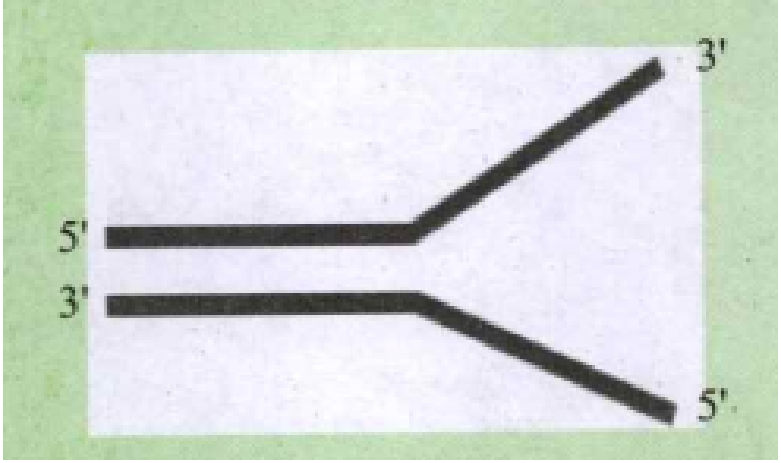
30. Redraw the structure as a replicating fork and label the parts.



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31. Write the source of energy for this replication and name the enzyme involoved in this process.

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32. Mention the differences in the synthesis of protein , based on the polarity of the two template strands.

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33. If the coding sequence in a transcription unit is written as follows:

5'TGCATGCATGCATGCATGCATGCATGC 3'

Write down the sequence of mRNA.

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34. How is the two stage process of protein synthesis advantageous?

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35. Why did Hershey and Chase use radioactively labelled phosphorous and sulphur only? Would they have got the same result if they use radiolabelled carobon and nitrogen?

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36. Explain the formation of a nucleosome.

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37. It is established that RNA is the first genetic material. Justify by giving reasons.

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Other Important Questions Answers Choose The Correct Answers

1. Gene is the functional unit of :

A. Inheritance

B. Human genome

C. Human history

D. DNA

Answer: a

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2. Several biochemical reactions are catalyzed by RNA and such RNA is known as:

A. Ribosome

B. RNA ase

C. Ribozyme

D. RNA Hydrogenase

Answer: c

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3. The functional phosphate group (PO_4) gives DNA and RNA the property of acid by releasig:

A. a neutron in solution

B. $H.^+$ ion in solution

C. OH^- ion in solution

D. an electron in solution

Answer: b

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4. Human genome project was completed in the year.

A. 1969

B. 1978

C. 1992

D. 19990

Answer: d

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5. Choose the odd man out:

A. β-Galactosidase

B. Permease

C. DNA polymerase

D. Transacetylase

Answer: c

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6. Find out the odd one:

A. Replication

B. Transcription

C. Translation

D. Termination

Answer: a

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7. Indicate the odd one:

A. Adenine

B. Guanine

C. Uracil

D. Thymine

Answer: c

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8. Choose the odd man out:

A. Rosalind Franklin

B. James Watson

C. Maurice Wilkins

D. Waler Gilbert

Answer: d

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9. Choose the correct pair:

Column - I	Column - II
(a) Adenine	Thymine
(b) Guanine	Thymine
(c) Adenine	Guanine
(d) Adenine	Uracil

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10. Assertion : In lac operon, a polycistronic structural gene is regulated by a common promoter and regulater.

Reason: It is an example of negative cotrol of transcription initiation.

A. Both Asseration and Reason are true , reason is the correct explanation of assertion

B. Both Assertion and Reason are true, Reason is not the correct explanation of assertion.

C. Assertion is true , Reason is false .

D. Both Assertion and Reason are false.

Answer: b

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11. Assertion : Hershye and chase in their experiments , allowed the phages to infect bacteria in culture medium which contains the radioactive isotopes ^{35}S or ^{32}P.

Reason: The bacteriophage that grew in the presence of ^{35}S had labelled proteins and bacteriophages grown in presence of ^{32}P had labeled DNA.

A. Both Assertion and reason are true, reason is the correct explanation of

assertion

B. Both Assertion and Reason are true Reason is not the correct explanation of assertion.

C. Assertion is true , Reason is false.

D. Both Assertion and Reason are false.

Answer: a

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12. Assertion : The bases of nitrogen containing molecules having the chemical properties of a base are the nitrogenous bases of DNA.

Reason: Because they release H^+ ions or protons in solution.

A. Both Assertion and reason are true, reason is the correct explanation of assertion

B. Both Assertion and Reason are true Reason is not the correct explanation of assertion.

C. Assertion is true , Reason is false.

D. Both Assertion and Reason are false.

Answer: c

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13. Assertion: The mode of DNA repication was first demonstrated in 1956 by Meselson and sthal.

Reason : They designed and experiment to distinguish between DNA and protein as genetic material.

A. Both Assertion and reason are true, reason is the correct explanation of assertion

B. Both Assertion and Reason are true Reason is not the correct explanation of assertion.

C. Assertion is true , Reason is false.

D. Both Assertion and Reason are false.

Answer: d

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14. Which of the following statement is true ?

A. Watson and Crick proposed semi conservative repication hypothesis.

B. Watson and Crick proposed conservative replication hypothesis.

C. Watson and Crick proposed disperative replication hypothesis.

D. None of the above.

Answer: a

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15. Indicate the incorrect statement:

A. A transcriptional unit in DNA is defined by three regions namely a promoter, a structural gene and a terminator.

B. The promoter is located at the 3' end.

C. The presence of promoter in a transcription unit defines the template and coding strands.

D. Besides promoter Eukaryotes need an enhancer for transcription.

Answer: b

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16. Choose the correct statement:

A. The genetic codon is a quadruplicate code.

B. The genetic code is not universal.

C. The genetic code is a triplet code.

D. In Non-ambiguous code, more than one codon is needed for one amino acid.

Answer: c

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17. Which of the following statement is not correct ?

A. Human genome contains 3 billion nucleotide bases.

B. Averages human gene consists of 3000 bases.

C. In human , the chromosome 19 has the highest gene density.

D. All the above statements are not correct.

Answer: d

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Other Important Questions Answers Answer The Following

1. Define the following terms :

Gene

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2. What is the main aim of Hershey and Chase experiment on T_2 bacteriophage ?

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3. What are the components of a nucleotide?

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4. Define Genophore.

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5. Explain histone octamer.

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6. List the enzymes involved in replication of DNA.

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7. Transcription

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8. What is a promoter unit ?

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9. Define genetic codon

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10. What are non-sense codons?

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11. Define translation unit.

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12. What is meant by reading frame ?

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13. Write short notes on the sturcture of operon.

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14. Mention any two enzymes involved in the metabolism of lactose in E.Coli.

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15. Define pharmacogenomics and give its importance.

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16. Distinguish between one game - one enzyme hypothesis and one gene - one polypeptide hypothesis.

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17. Mention any three properties of mendelian rules of inheritance.

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18. Distinguish between nucleosides and nucleotides.

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19. Differentiate DNA and RNA

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20. Differentiate monocistronic mRNA from polycistronic mRNA.

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21. Distinguish between promoters and operators.

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22. What are genes present in lac operon ? Mention their function.

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23. Explain negative control of transcription initiation.

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24. Write the salient features of Human Genome Project.

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25. Explain Wobble hypothesis.

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26. Give the diagrammatic representation of semi conservation mode of DNA replication based on Meselson and Stahi experiments.

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27. Draw the schematic representation of lac operon model.

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28. List out any five application of human genome project.

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29. Give the sequential steps involved in DNA finger printing.

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