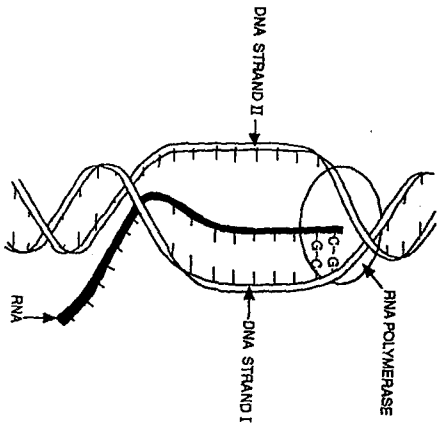


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Modern Genetics Review

Base your answers to questions 1 and 2 on the diagram below and on your knowledge of biology. The diagram represents a step in protein synthesis.

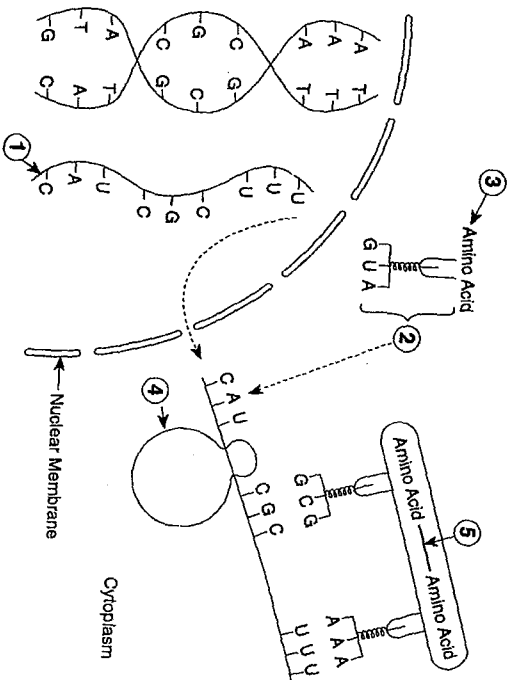


- During this step in the process of protein synthesis, information is passed from
 - RNA to DNA strand I
 - DNA strand II to RNA
 - RNA to DNA strand II
 - DNA strand I to RNA
- If a sequence of nitrogenous bases on DNA strand I is T-A-G-C-C-T-A, the corresponding sequence on the RNA will be

1) A-T-C-G-G-A-T	3) T-A-G-C-C-T-A
2) A-U-C-G-G-A-U	4) U-T-C-G-G-U-T

Base your answers to questions 3 through 5 on the diagram below, which represents some biochemical reactions involved in a cellular process.

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- The bond labeled 5, formed between two amino acids, is known as

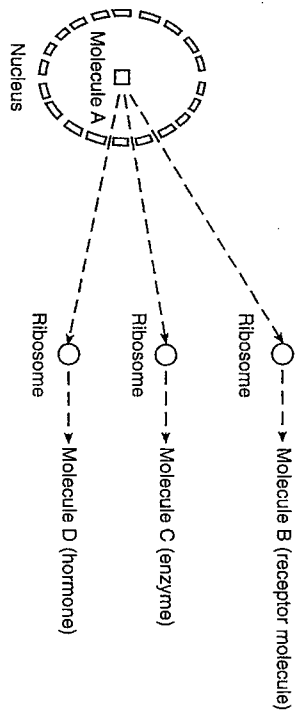
1) a peptide bond	2) a hydrogen bond	3) an ionic bond	4) a carboxyl bond
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- The molecule coded directly from DNA is represented by number

1) 1	2) 2	3) 3	4) 4
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- What is an example of a molecule produced by this type of process?

1) glucose	2) glycogen	3) a fatty acid	4) a protein
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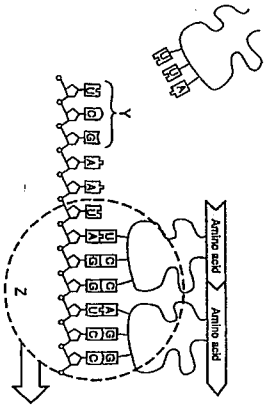
Base your answers to questions 6 and 7 on the diagram below, which represents a sequence of events in a biological process that occurs within human cells and on your knowledge of biology.



6. Molecules B, C, and D are similar in that they are usually
- involved in the diffusion of oxygen into the cell
 - composed of genetic information
 - involved in the synthesis of antibiotics
 - composed of amino acids

7. Molecule A contains the
- directions for the synthesis of molecules B, C, and D
 - starch necessary for ribosome synthesis in the cytoplasm
 - organic substance that is broken down into molecules B, C, and D
 - proteins that form the ribosome in the cytoplasm

8. Base your answer to the following question on the diagram below which represents a biochemical process that occurs in a cell and on your knowledge of biology.

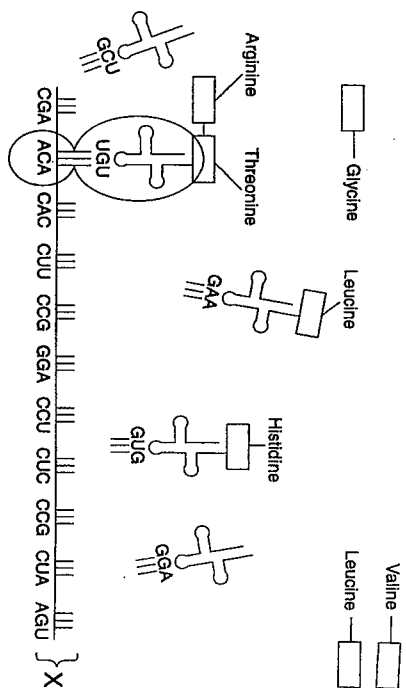


- A change in the region labeled Y from U-C-G to U-C-C would most likely cause
- the synthesis of a different polypeptide
 - polyplidy
 - the formation of recombinant DNA
 - crossing-over

9. If a set of instructions that determines all of the characteristics of an organism is compared to a book, and a chromosome is compared to a chapter in the book, then what might be compared to a paragraph in the book?
- an amino acid
 - a DNA molecule
 - a starch molecule
 - an egg

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Base your answers to questions 10 through 12 on the diagram below of a biochemical process and on your knowledge of biology.

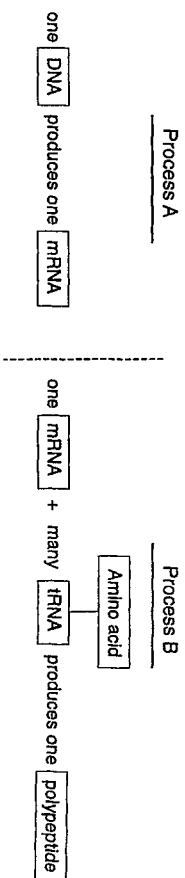


10. The biochemical process represented in the diagram is most closely associated with the cell organelle known as the
- mitochondrion
 - chloroplast
 - ribosome
 - nucleolus

11. Which amino acid would be transferred to the position of codon CAC?
- glycine
 - leucine
 - valine
 - histidine

12. The synthesis of structure X occurred in the
- cytoplasm
 - vacuole
 - lysosome
 - nucleus

Base your answers to questions 13 and 14 on the diagram below of two processes in the synthesis of proteins and on your knowledge of biology.

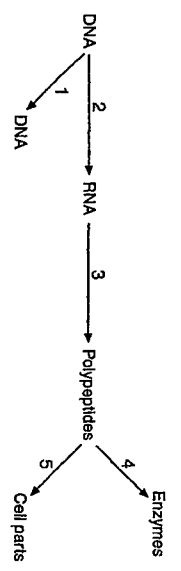


13. Process B involves the pairing of a codon with a triplet code on a transfer RNA molecule. A correct pairing would be
- GUG and UCU
 - CAT and GTA
 - CAG and GUA
 - AAU and UUA

14. Process A occurs within the
- mitochondrion
 - ribosome
 - nucleus
 - nucleolus

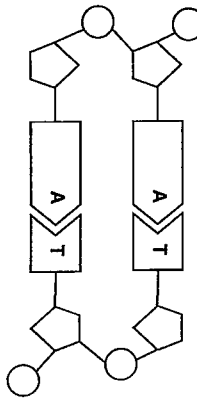
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Base your answers to questions 15 through 17 on the diagram below, which contains arrows representing different processes occurring in a cell.



15. Process 1 is known as
- 1) translocation
 - 2) replication
 - 3) mutation
 - 4) nondisjunction
16. What is the product of process 3?
- 1) a chain of amino acid
 - 2) a strand of DNA
 - 3) a strand of RNA
 - 4) two complementary strands of DNA

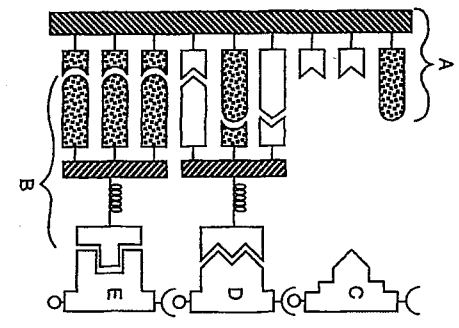
17. Which processes occur in the nucleus?
- 1) 1 and 2
 - 2) 2 and 3
 - 3) 3 and 4
 - 4) 4 and 5
20. A portion of a molecule is shown in the diagram below.



Which statement best describes the main function of this type of molecule?

- 1) It determines what traits may be inherited.
- 2) It transports materials across the cell membrane.
- 3) It stores energy for metabolic processes.
- 4) It is a structural part of the cell wall.

18. Which "applicant" would qualify for Job A?
- 1) recombinant DNA
 - 2) messenger RNA
 - 3) transfer RNA
 - 4) DNA
19. Which "applicant" would qualify for Job B?
- 1) DNA
 - 2) transfer RNA
 - 3) messenger RNA
 - 4) ADP



Base your answers to questions 23 through 26 on the diagram below, which represents some components involved in cellular protein synthesis, and on your knowledge of biology.

22. Which is a major difference between messenger RNA molecule and transfer RNA molecules?
- 1) Messenger RNA molecules contain thymine, and transfer RNA molecules contain uracil.
 - 2) Messenger RNA molecules function in carrying coded information to the ribosomes, and transfer RNA molecules function in carrying amino acids to the ribosomes.
 - 3) Messenger RNA molecules function when they are double-stranded, and transfer RNA molecules function when they are single-stranded.
 - 4) Messenger RNA molecules contain ribose, and transfer RNA molecules contain deoxyribose.

23. How many codons are located on the messenger RNA molecule in the diagram?
- 1) 1
 - 2) 6
 - 3) 3
 - 4) 9

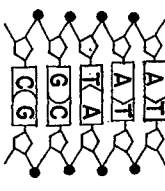
24. The type of molecule represented at A is synthesized according to a template found in
- 1) amino acids
 - 2) dipptides
 - 3) DNA
 - 4) RNA

25. Molecules C, D, and E will combine to form part of
- 1) a polysaccharide
 - 2) DNA
 - 3) RNA
 - 4) a polypeptide

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26. Structure B represents a molecule of
- 1) ribosomal RNA
 - 2) nuclear DNA
 - 3) transfer RNA
 - 4) cytoplasmic DNA

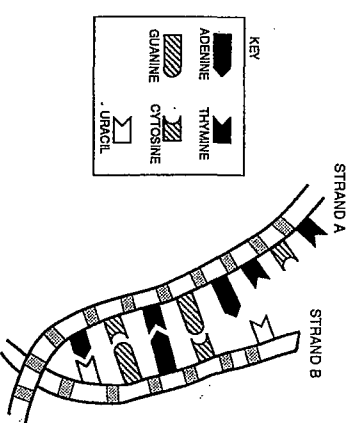
27. Base your answer to the following question on the diagram below which represents a segment of a DNA molecule and on your knowledge of biology.



- If the segment of DNA represented by the diagram was used as a template in the synthesis of messenger RNA, which sequence represents the order of bases found in the messenger RNA molecule?
- 1) A-A-T-C-G
 - 2) T-T-U-C-C
 - 3) T-T-A-C-C
 - 4) U-U-A-C-G

28. The weakest bonds in a double-stranded molecule of deoxyribonucleic acid exist between the
- 1) deoxyribose sugars
 - 2) 5-carbon sugars
 - 3) phosphate groups
 - 4) nitrogenous bases

29. Base your answer to the following question on the diagram below and on your knowledge of biology.



- If strand A represents a portion of a DNA molecule, its complementary sequence of nitrogenous bases on messenger RNA would normally be
- 1) U-G-U-A-G-U-C-U
 - 2) A-G-A-T-C-A-G-T
 - 3) T-C-T-A-G-T-C-T
 - 4) A-G-A-U-C-A-G-U

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30. The diagram below represents the chemical pathway of a process in a human liver cell.



A particular liver cell is unable to make substance C. One possible explanation for the inability of this cell to make substance C is that

- 1) a mutation occurred causing a change in the ability of the cell to use substance C
- 2) nuclear DNA was altered resulting in the cell being unable to make enzyme Y
- 3) excess energy for step 2 prevented the conversion of substance B to substance C
- 4) an excess of enzyme X was present, resulting in a decrease in the production of substance B

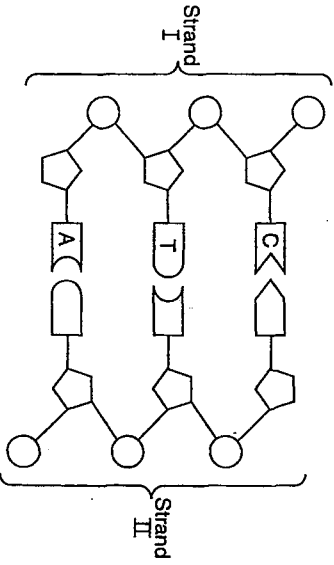
31. Four stages in the production of protein molecules in a cell are listed below.

- A - Transfer RNA molecules bring amino acids to the ribosome
- B - DNA molecules serve as templates for messenger RNA molecules.
- C - Messenger RNA molecules move to ribosomes.
- D - Polypeptides are formed on ribosomes.

Which sequence best represents the correct order of these stages?

- 1) A → B → C → D
- 2) B → C → A → D
- 3) C → B → A → D
- 4) D → B → A → C

32. In the diagram below, strands I and II represent portions of a DNA molecule.



Strand II would normally include

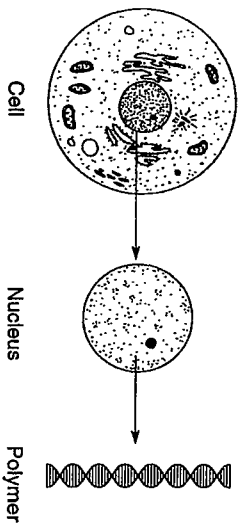
- 1) TCC
- 2) TAC

- 3) GAT

- 4) AGC

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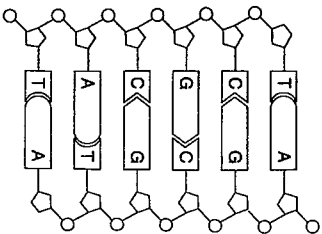
33. The structure and location of a cellular component is represented in the diagram below.



The polymer in the diagram most likely contains

- 1) genes
- 2) hydrolytic enzymes
- 3) lipids

- 4) adenosine triphosphate



This molecule controls cellular activity by directing the synthesis of

- 1) fats
- 2) minerals
- 3) carbohydrates
- 4) proteins

4	46	2	51
1	33	4	41
3	23	4	31
2	13	4	21
2	03	4	11
4	29	3	01
4	28	2	6
4	27	1	8
4	26	1	7
3	25	4	9
3	24	1	5
3	23	1	4
2	22	1	3
3	21	2	2
3	20	1	1
1	19	4	1
1	18	1	3
1	17	2	2
1	16	4	1