Amino Acid 1- and 3-letter codes					
A	Ala	Alanine	M	Met	Methionine
C	Cys	Cysteine	N	Asn	Asparagine
D	Asp	Aspartate	P	Pro	Proline
E	Glu	Glutamate	Q	Gln	Glutamine
F	Phe	Phenylalanine	R	Arg	Arginine
G	Gly	Glycine	S	Ser	Serine
H	His	Histidine	T	Thr	Threonine
I	Ile	Isoleucine	V	Val	Valine
K	Lys	Lysine	W	Trp	Tryptophan
L	Leu	Leucine	Y	Tyr	Tyrosine

TABLE 4.4 The genetic code

First position (5′ end)	Second Position U	C	A	G	Third position (3′ end)
U	Phe	Ser	Tyr	Cys	U
	Phe	Ser	Tyr	Cys	C
	Leu	Ser	Stop	Stop	A
	Leu	Ser	Stop	Trp	G
C	Leu	Pro	His	Arg	U
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	U
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	U
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G

1. Sulfonamides are a class of antibiotic that inhibits translation in bacteria by preventing the formation of the initiation complex. ***True False***

2. Please choose the ***true*** statement:
   a. During replication, the DNA leading strand is **polymerized** in the 5' to 3' direction, but the lagging strand is **polymerized** in the 3' to 5' direction
   b. During replication, the DNA template is **read** in the 3' to 5' direction.
   c. During replication, both strands of DNA are **polymerized** in the 3' to 5' direction.
   d. Both b and c are true.
   e. None of these statements is true.

3. Please choose the ***true*** statement:
   a. PKU (phenylketonuria) results from a defect in the de novo synthesis of pyrimidines.
   b. Severe combined immunodeficiency results from a defect in tyrosine catabolism.
   c. Gout can result from a defect in the salvage pathway of purines.
   d. Huntingdon's disease results from a defect in the salvage pathway of purines.
   e. Both b and c are true.
   f. None of these statements is true.

4. Please choose the ***true*** statement:
   a. The pyrimidines found in nucleic acid are guanine, uracil, and cytosine.
   b. The pyrimidines found in nucleic acid are uracil, thymine, and cytosine.
   c. The purines found in nucleic acid are guanine and cytosine.
   d. The purines found in nucleic acid are glycine and alanine.

5. Please choose correct parings of enzyme and primary product:
   a. RNA Pol I: mRNA, RNA Pol II: rRNA, RNA Pol III: tRNA.
   b. RNA Pol I: rRNA, RNA Pol II: tRNA, RNA Pol III: mRNA.
   c. RNA Pol I: rRNA, RNA Pol II: mRNA, RNA Pol III: tRNA.
   d. RNA Pol I: tRNA, RNA Pol II: mRNA, RNA Pol III: rRNA.
   e. There are no correct statements.

6. Which enzyme polymerizes the primer during replication in eukaryotes?
   a. Pol α
   b. Pol δ
   c. Pol I
   d. Pol III
   e. Sigma factor

7. Which of the following intermediates can be used to make glucose in humans?
   a. Alanine
   b. Lysine
   c. Leucine
   d. All the above are glucogenic amino acids.

8. The CAC to CGC mutation is a point mutation called a transition mutation. ***True False***

9. Please select the ***true*** statement:
   a. The mRNA template is read in the 3' – 5'direction during translation.
   b. In bacteria and eukaryotes, mRNA is synthesized in the 3' – 5'direction.
   c. The DNA template is read in the 3' – 5' direction during transcription.
   d. All the above are true.
   e. There are no true answers here.

10. Lesch-Nhyan syndrome is a fatal disease caused by an inability to break down branched chain amino acids. ***True False***

11. Which intermediate is formed from the breakdown of argininosuccinate in the urea cycle, and links the urea cycle with the TCA cycle?
    a. Succinyl CoA
    b. Malate
    c. Fumarate
    d. Succinate

12. Please select the ***true*** statement:
    a. In the purine salvage pathway, the enzyme HGPRT transfers hypoxanthine and cytosine to PRPP.
    b. Alcaptonuria is caused by overabundance of homogentisate, which is released in the urine.
    c. The transamination of alanine, with alpha-ketoglutarate as an acceptor alpha-ketoacid, yields pyruvate and glutamate.
    d. All the above are true.
    e. Only b and c are true.

13. Please choose the ***true*** statement:
    a. The basal transcription factors in *E. coli* that are present at the initiation site of Pol II transcripts are: TFIIA, TFIIB, TFIID, TFIIE, TFIIF, and TFIIH.
    b. TFIID has the helicase and kinase activity necessary for promoter escape.
    c. The UP sequence is a bacterial DNA sequence found upstream of transcripts that are used frequently.
    d. Only b and c are true.
    e. There are no true statements here

14. *Trans* factors are proteins involved in the regulation of transcription, whereas *cis* factors are DNA sequences involved in the regulation of transcription. ***True False***

15. Please choose the ***true*** statement: (Note: inosinate is the same as inosine monophosphate, and IMP)
    a. Inosine monophosphate is a nucleoside monophosphate with hypoxanthine for its base.
    b. Inosine monophosphate is an intermediate in the de novo synthesis of purines.
    c. In the synthesis of adenosine monophosphate, ATP is used as a phosphate source.
    d. All the above are true
    e. Only a and b are true
    f. None of these statements is true.

16. Each bacterial genome has one chromosome with one origin of replication, while each eukaryotic genome has many chromosomes, each of which has more than one origin of replication per chromosome. ***True False***

17. Please choose the ***FALSE*** statement:
    a. The conformation of Z-DNA is a left-handed helix and is generated largely by runs of alternating purines and pyrimidines.
    b. The conformation of B-DNA is a right-handed helix and is the most common DNA conformation.
    c. U1, U2, U4, U5 and U6 snRNPs are comprised of protein and RNA and are components of the splicing machinery.
    d. 5S RNA is a component of DNA polymerase alpha and is used for sequence recognition.

18. In the *de novo* synthesis of pyrimidines, orotate is formed before uridylate (UMP). ***True False***

19. Please choose the ***true*** statement regarding Phenylketonuria:
    a. This condition is caused by an overabundance of active phenylalanine hydroxylase.
    b. This condition may be caused by a deficiency in the cofactor pyridoxal phosphate
    c. This condition is a result of a defect in phenylalanine catabolism.
    d. Only b and c are true.

20. During the *de* novo synthesis of purines, bases are formed first, then are attached to PRPP. ***True False***