THIS IS FORM A.

Please do not open exam until asked to do so. Thank you.

LOGARITHMS THAT MIGHT BE USEFUL

log 0.01 = -2	log 7 = 0.84
log 0.1 = -1	log 8 = 0.90
log 1 = 0	log 9 = 0.95
log 2 = 0.30	log 10 = 1.0
log 3 = 0.48	log 100 = 2.0
log 4 = 0.60	
log 5 = 0.70	
log 6 = 0.78	

ANTILOGS THAT MAY BE USEFUL

anti log 1	= 10
anti log 2	= 100
anti log 3	= 1000
anti log -1	= 1/10
anti log -2	= 1/100
anti log -3	= 1/ 1000

pKas of Amino Acid Functional Groups

Ionizable Group	pKa
α-COOH of any aa	3
β-COOH of Asp	4
γ-COOH of Glu	4
imidazole of His	6
SH of Cys	8
α-NH_2 of any aa	8
phenolic OH of Tyr	10
ϵ-NH_2 of Lys	10
guanidino of Arg	12

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				
G	Gly				
H	His				
I	Ile				
K	Lys				
L	Leu				

nM =

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. Please select the ***False*** statement:
    a. Nitrogen from amino acids is excreted as urea by humans.
    b. All of the reactions of urea formation are energetically downhill and do not require ATP.
    c. Carbon dioxide (bicarbonate) is the carbon source for urea production.
    d. Aspartate provides one of the amino groups for urea production.

2. In an experiment, the tRNA that carries cysteine was correctly charged with cysteine. This cysteine was then chemically altered to serine. So now the tRNA that normally carries cysteine is now carrying serine. This tRNA will preferentially bind to a codon that encodes which of the following:
    a. Both serine and cysteine equally
    b. Cysteine
    c. Serine
    d. It will not bind to either of these codons because of the change from cysteine to serine.

3. The urea cycle pathway utilizes both cytoplasmic and mitochondrial enzymes. ***True False***.

4. The enzyme that catalyzes the committed step in cholesterol synthesis directly synthesizes which of these molecules:
    a. HMG CoA
    b. Squalene
    c. Isopentenyl pyrophosphate
    d. Mevalonate

5. Please select the ***true*** statement:
    a. The main function of histone acetyl transferase (HAT) is adding an acetyl group to phosphate groups in the DNA backbone.
    b. Acetylation by HAT increases the accessibility of DNA to transcriptional machinery.
    c. Deacetylation of 30 nm fiber structure, causes it to become loosened to form the 10nm fiber.
    d. None of the above is true.

6. During the *de novo* synthesis of adenylate, the base is formed first, and then this base is attached to the activated ribose platform. ***True False***

7. Identify the nucleotides that are found in RNA:
    a. Adenine, guanine, cysteine and thiamine.
    b. Adenine, guanine, thymine and cytosine.
    c. Adenine, uracil, cytosine and guanine.
    d. Adenine, uracil, thymine and cytosine.

8. Please select the ***true*** statement:
    a. Intermediates resulting from catabolism of leucine can be used in gluconeogenesis.
    b. In the synthesis of guanine, GTP is used to activate intermediates.
    c. Intermediates resulting from catabolism of histidine cannot be used in gluconeogenesis.
    d. Intermediates resulting from catabolism of tyrosine can be used in ketone body synthesis.

9. Please select the ***true*** statement:
    a. Acetyl CoA Carboxylase makes malonyl CoA in the first committed step of fatty acid synthesis.
    b. Fatty acid beta-oxidation occurs in the cytoplasm.
    c. Glycolysis occurs in the mitochondrion.

d. Cholesterol synthesis occurs in the mitochondrion.

10. Please select the ***true*** statement:
    a. PCNA is a clamp that holds DNA Polymerase on the leading and lagging DNA strands in *E. coli*.
    b. DNA polymerase III has both 3'-5' and 5'to 3' exonuclease activity.
    c. Telomerase uses its RNA template and reverse transcriptase to synthesize telomeric DNA.
    d. During replication the leading strand and lagging strands are synthesized in the 3'to 5' direction.

11. Please choose the correct pairing of pathologic condition and defect:
    a. Lesch–Nyhan syndrome: Defect in the salvage pathway of purines.
    b. Severe combined immunodeficiency: Defect in pyrimidine synthesis
    c. Gout: Defect in pyrimidine catabolism.
    d. Huntingdon's disease: incorrect splice site formed in the mRNA of the Huntingdon protein.

12. Please select the ***true*** statement:
    a. Phenylalanine and tryptophan can be used to produce both glucose and ketone bodies.
    b. U1, U2, U4, U5 and U6 snRNPs, which are comprised of protein and RNA, are replication factors.
    c. The enzyme glutamate dehydrogenase forms L-glutamate with oxaloacetate as the carbon source.
    d. Tryptophan is a direct degradation product of phenyalanine.

13. Please select the ***true*** statement:
    a. Urate is produced during amino acid catabolism, and is eliminated in the urine.
    b. Urate is a potent antioxidant.
    c. Lack of sufficient urate in the blood, caused by a deficiency in xanthine oxidase, causes gout.
    d. Humans and other primates eliminate nitrogenous waste as allantoin.

14. Please select the ***FALSE*** statement regarding PKU:
    a. Persons with PKU must reduce their intake of tyrosine throughout their life compared to persons without PKU.
    b. Phenylketonuria generally results from a dysfunction in the enzyme phenylalanine hydroxylase or a deficit in the cofactor tetrahydrobiopterin.
    c. Phenylketonuria can cause profound cognitive impairment if not treated within the first year of life.
    d. Phenylketonuria is caused by a recessive autosomal mutation.

15. *Cis* factors include silencers, which are DNA sequences to which repressors bind. ***True False***

16. Which intermediate is **not** one of the seven common metabolites of protein degradation?
    a. Pyruvate
    b. Acetyl CoA
    c. Oxaloacetate
    d. Nicotinamide

17. Which of the following functions during **transcription** in prokaryotes:
    a. alpha, beta, and beta prime
    b. TFIID
    c. Sigma factor
    d. Rec A

18. The first committed step of glycolysis is:
    a. Down-regulated (inhibited) by glucose 6-P