Biochemistry 694:301 Name _____
Final Exam, Dr. Deis
Thu. Aug. 19, 2004 Row_____ Seat_____

This exam consists of two parts. Part I is multiple choice. Each of these 25 questions is worth two points. Answer the Part I questions on this sheet, below. Answer the Part II questions on the question pages.

Please use BLOCK CAPITAL letters like this --- A, B, C, D, E. Not lowercase!

1. _____	10. _____	18. _____
2. _____	11. _____	19. _____
3. _____	12. _____	20. _____
4. _____	13. _____	21. _____
5. _____	14. _____	22. _____
6. _____	15. _____	23. _____
7. _____	16. _____	24. _____
8. _____	17. _____	25. _____
9. _____		

GRADE:

Part I Total _____

Part II:

- II-1 _____
- II-2 _____
- II-3 _____
- II-4 _____
- II-5 _____

Part II Total _____

Total, I & II _____

1. You take a 6 carbon ketose (C6K) Fructose 6 Phosphate, and a 6 carbon aldose (C6A), Allose-6-P, and you react them with Transketolase and TPP. What do you get?
   A. C9A + C3K
   B. C8A + C4K
   C. C6A + C6K
   D. C4A + C8K
   E. C3A + C9K

2. Glucose-6-Phosphate DH uses which cofactor?
   A. PLP
   B. SAM
   C. TPP
   D. NADP+
   E. FMNH2

3. A lack of Glucose-6-Phosphate DH can cause
   A. Gout
   B. Wernicke-Korsakoff Syndrome
   C. Pamaquine Induced Hemolytic Anemia
   D. Rickets
   E. Dropsy

4. What is the main purpose of liver glycogen?
   A. stored fuel so you won't starve
   B. keeps blood sugar correct overnight
   C. forms a barrier between mitochondria and lysosomes
   D. mainly used to nourish liver tissues

5. Normal glycogen breaks down to yield approximately
   A. 95% Glu-1-P, 5% Glucose
   B. 90% Glu-1-P, 10% Glucose
   C. 80% Glu-1-P, 20% Glucose
   D. 50% Glu-1-P, 50% Glucose
   E. 10% Glu-1-P, 90% Glucose

6. In muscle cells, Glycogen Phosphorylase A is produced when
   A. Insulin stimulates Protein Kinase C
   B. Glucagon stimulates Protein Kinase A
   C. Calcium partially activates Phosphorylase Kinase
   D. A proton gradient catalyzes phosphate transfer onto Phosphorylase

7. The function of Carnitine is
   A. redox cofactor
   B. one carbon carrier
   C. help digest meat
   D. transport fatty acids
   E. cleave chymotrypsinogen

8. Which statement about the ketone bodies acetoacetate and 3-hydroxybutyrate is *false*?
   A. they are normal fuels for heart muscle
   B. they are synthesized in the liver
   C. they can give rise to acetone
   D. they contain four carbon atoms
   E. they are only made during starvation, diabetes, or dieting

9. Ubiquitinated proteins are broken down via
   A. Eco RI
   B. Gro EL
   C. the proteasome
   D. ubiquitase
   E. ubiquinone

10. High levels of GOT, or Aspartate Aminotransferase in the blood serum, indicates:
   A. brain damage
   B. torn tendons
   C. viral infection
   D. heart or liver damage
   E. PKU

11.* The compound shown below is
   A. N5 methyl THF
   B. N5 formyl THF
   C. N5 N10 methylene THF
   D. N5 N10 methenyl THF
   E. N10 formyl THF

12. Purine Salvage reacts various purines with
   A. each other
   B. NADPH
   C. PRPP
   D. Ribulose-6-P
   E. Adenylate

13. Which of the following sequences is likely to be a restriction cleavage site?
   A. GAGTCT
   B. GATCGC
   C. GACCTA
   D. GACGTC

14. You insert a gene of interest into the Sal-I site of pBR 322. This interrupts the Tet gene, destroying Tetracycline resistance. How do you obtain living cells, which you know can be killed by Tetracycline?
   A. kill them, then revive them
   B. only kill them a little
   C. use replica plating to make identical colonies
   D. treat with Ampicillin, not with Tetracycline

15. Taq DNA Pol is used in PCR because
   A. it is inexpensive
   B. it is not processive
   C. it doesn't require a primer
   D. it works at high temperatures
   E. none of the above

16. An Okazaki fragment has which structure?
   A. short DNA strand
   B. DNA at 5' end, RNA at 3'
   C. RNA at 5' end, DNA at 3'
   D. short RNA strand
   E. none of the above

17. A plasmid has 200 base pairs. It is in the B-form (assume 10 base pairs per twist), with 4 left-handed supercoils. What is the linking number of this plasmid?
   A. 204
   B. 24
   C. 20
   D. 16
   E. 4

18. Which subunit of prokaryotic RNA Pol contains the polymerase site?
    A. α
    B. β
    C. β'
    D. δ
    E. ρ

19. Which RNA has introns removed, and gets a 5' cap and 3' poly-A tail?
    A. eukaryotic mRNA
    B. prokaryotic mRNA
    C. eukaryotic tRNA
    D. prokaryotic tRNA
    E. eukaryotic rRNA
    F. prokaryotic rRNA

20. Termination signals for prokaryotic transcription are
    A. recognized by RNA Pol, which stops synthesis
    B. implemented by the large ribosomal subunit
    C. dependent on conformational changes in the new RNA
    D. recognized by DNA Pol III

21. About how many high energy phosphate bonds are consumed in the construction of a protein of 100 amino acid residues?
    A. 50
    B. 100
    C. 200
    D. 400
    E. 800

22. The "Shine and Dalgarno" sequence attracts mRNA to which ribosomal RNA?
    A. 5S
    B. 16S
    C. 23S
    D. 50S
    E. 120S

23. The picture to the right illustrates a tRNA bound to an aa-tRNA synthetase enzyme. One oval is the activation site, what is the other?
    A. A site
    B. P site
    C. E site
    D. editing site
    E. DNA binding site

24. What specific process does Tetracycline block in procaryotes?
    A. Introduction
    B. Peptidyl Synthase
    C. Translocation
    D. Initiation of translation
    E. Termination

25. After this exam I will
    A. laugh
    B. cry
    C. drink
    D. spend a week on the beach
    E.cannot tell from data given

PART II Answer these questions here on the question pages.

1. a.* Label the diagram. What enzyme is shown?
Label each arrow.

(5)

b. Show the beta-oxidation of fatty acids -- fill in the details on the structures provided below. Don't forget to show cofactors!

(5)

CH_3 CH_2 CH_2 CH_2 CH_2 CO SCoA

C C C C C C SCoA

C C C C C C SCoA

C C C C C C SCoA

you draw next step:

2. a. Show the cyclic portion of the Urea Cycle. Draw all reactants and products and indicate all cofactors. Enzyme names are not required.

(7)

b. Show how Thymidylate (2'dTMP) is synthesized. Include the "complete" story with cofactors and enzyme names.

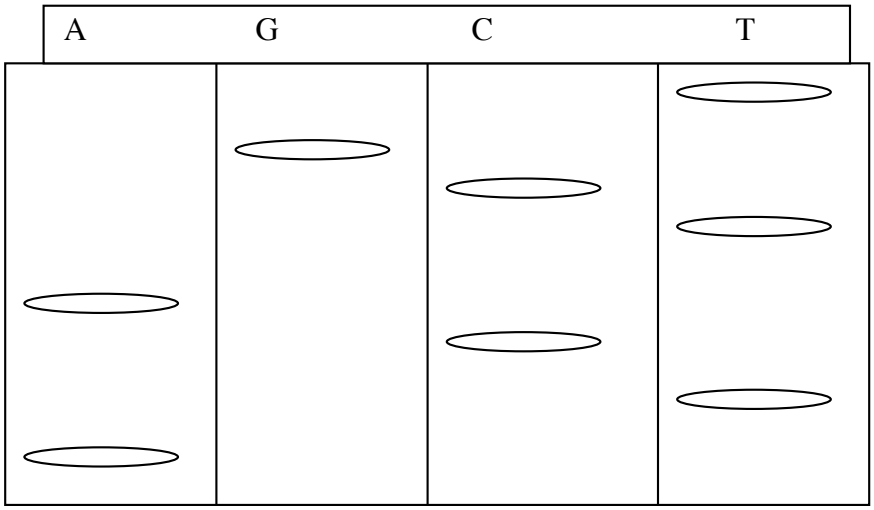
(3)

3. a. Name 5 proteins or enzymes required for replication in E. coli. Then briefly sketch and explain why the "trombone model" is a necessary part of genomic replication in E. coli.

(7)

* b. The diagram below represents DNA sequencing by the Sanger Dideoxy Method. Decode the sequence shown and write it below the diagram.

(3)



5'_____3'

4. a. Rifampicin and Actinomycin D are both inhibitors of prokaryotic transcription. Tell how each one works. Why does Rifampicin have powerful "side effects" in human patients?

(4)

b. Diagram the main features of a Promoter region as described in class.

(2)

c. Explain 2 ways that Transcription terminates in prokaryotes.

(4)

5. a. Diagram the Elongation process for procaryotic translation. Be sure to name all Factors and cofactors as well as showing the ribosomes etc. as done in class. Name each step of Elongation.

(7)

b. How is translation initiated? Show how a 30S complex is formed and converted into a 70S complex.

(3)