

name: _____

number : _____

BCH 2333A, BCH 2333B & BCH 2333C

FINAL EXAM

April 21, 2008

Professors: Bennett, Kleine, Mezl

Length : 3 hours

Material needed: This exam, 1 computer answer sheet

CLOSED BOOK EXAM.

NO MODELS ALLOWED

Faculty approved calculators are permitted

INSTRUCTIONS

Part I Chose the best answer for each of the 60 MCQ questions.
(60 % of grade)

Part II Answer FOUR of the 6 essay questions directly on the exam.
YOU MUST ANSWER ONE QUESTION FOR EACH
PROFESSOR
Extra questions will not be corrected.
(40% of grade)

AT THE END: - Check that your name and student number are **on the exam
and on the computer answer sheet.**

1. Penicillin inactivates the enzymes that
 - A) replicate DNA
 - B) translate mRNAs
 - C) cross link collagens
 - D) cross link the peptidoglycans of bacterial cell walls
 - E) cross link the lipid bilayer of the bacterial membrane

2. With a 3D visualization program like CHIME, to see how an atom is protected by a protein structure (like Fe in hemoglobin) you would ask for the display:
 - A) Wireframe
 - B) Strand
 - C) Spacefill
 - D) Ball & Stick
 - E) x,y,z coordinates

3. Coulomb's law gives :
 - A) the repulsion between two molecules as a function of their charge and the dielectric constant
 - B) the repulsion between two molecules as a function of their mass and their dipole moment
 - C) the attraction between two molecules as a function of their charge and the dielectric constant
 - D) the attraction between two molecules as a function of their mass and the dielectric constant
 - E) the attraction between two molecules as a function of their mass and their dipole moment

4. The length of a C-H bond is about :
 - A) 0.015 nm
 - B) 0.11 nm
 - C) 0.17 nm
 - D) 0.28 nm
 - E) 1.5 nm

5. The pH of 1 mL of 20 mM acetate buffer is 4. The pK of acetic acid is 4. When 5 microlitres of 1 N HCl are added to this solution, the pH will be about :
 - A) 3.9
 - B) 3.5
 - C) 3
 - D) 2.7
 - E) 2

6. A weak acid has a K_a of 2×10^{-5} . In water a solution of this acid will have a pH of about :
 - A) 3.2
 - B) 3.7
 - C) 4.7
 - D) 5.3
 - E) This can not be determined from this data

7. In pure water, about water molecules are ionized.
 - A) 0.01% of the
 - B) one in 10^6
 - C) one in 10^9
 - D) one in 10^{12}
 - E) one in 10^{14}

8. Estimate the total amount of hydrogen ions present in all the blood in your body:
 - A) about 0.5 millimoles
 - B) about 0.5 micromoles
 - C) about 0.5 nanomoles
 - D) about 50 nM
 - E) about 5×10^{-7} M

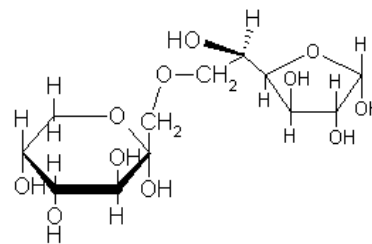
9. A chromosome contains 5×10^5 nucleosomes. This chromosome is about base pairs long.
 A) 2×10^5 B) 1×10^6 C) 5×10^6 D) 20×10^6 E) 100×10^6
10. The atom at position 5 of uracil is joined to
 A) a nitrogen, a carbon and a hydrogen
 B) a nitrogen, a carbon and two hydrogens
 C) a nitrogen, an oxygen and a hydrogen
 D) two carbons and a hydrogen
 E) two carbons and two hydrogens
11. The reaction that makes a bond between two nucleotides :
 A) an oxidation B) a reduction C) a hydrolysis
 D) a dehydration E) a tautomerisation
12. A nucleotide inside a DNA molecule has a free alcohol group :
 A) at the 5' position B) at the 2' position C) at the 3' position
 D) at the 2' and 3' position E) it does not have a free alcohol group
13. In DNA for the sugar, the ratio of β -anomer to α -anomer is about:
 A) 1 : 0 B) 3 : 1 C) 1 : 1 D) 1 : 3 E) 0 : 1
14. If you lined up all the DNA of a 2×10^5 base pair chromosome as a Watson-Crick helix, the length would be about
 A) 1.5 cm B) 3 mm C) 0.6 mm D) 1.5×10^{-6} m E) 0.03×10^{-6} m
15. Which of the following statements about tRNA in eukaryotes is FALSE?
 A) If it is heated one observes a phenomenon called hyperchromicity
 B) It is about 80% of the total cellular RNA
 C) The bases are joined together by 3'-5' phosphodiester bonds
 D) tRNA will be hydrolysed if it is in a basic solution
 E) tRNAs all have double stranded regions and single stranded regions
16. makes DNA shine orange in UV light.
 A) Cupric ion B) Ethidium bromide C) Ninhydrin
 D) Iodine E) Periodate

17. Thymine has a chiral atom at position :
- A) 1', 2', 3', 4' B) 2 et 4 C) 5 D) 6 E) Thymine does not contain a chiral atom
18. When one considers the diameter of possible DNA structures, going from the thinnest DNA to the thickest the order is:
- A) A, B, Z B) A, Z, B C) B, A, Z D) Z, B, A E) Z, A, B
19. Which is the biggest molecule among the following?
- A) cytosine B) guanosine C) adenine D) thymine E) uracil
20. This element gives a negative charge to some mucopolysacharides :
- A) Ca B) Cl C) I D) N E) S

21. Use this structure, a sugar called testose, to answer the following questions:

The sugar on the left side of testose is :

- A) D-glucose
- B) D-fructose
- C) L-mannose
- D) an L-sugar but not one of the ones to know by heart
- E) a D-sugar but not one of the ones to know by heart



22. The sugar on the left of testose has a prochiral atom at position :

- A) 1
- B) 6
- C) 1 and 6
- D) 1, 2 and 6
- E) It does not have a prochiral atom

23. The sugar on the left of testose has a deoxy group at position:

- A) 1
- B) 6
- C) 1 and 6
- D) 1, 2 and 6
- E) It does not have a deoxy group

24. The sugar on the right of testose is a :

- A) D-aldose
- B) D-ketose
- C) L-aldose
- D) L-ketose
- E) D-lactone

25. The sugar on the right of testose is a/an :

- A) hemi-acetal
- B) acetal
- C) hemiketal
- D) ketal
- E) lactone

26. The sugar on the right of testose is :

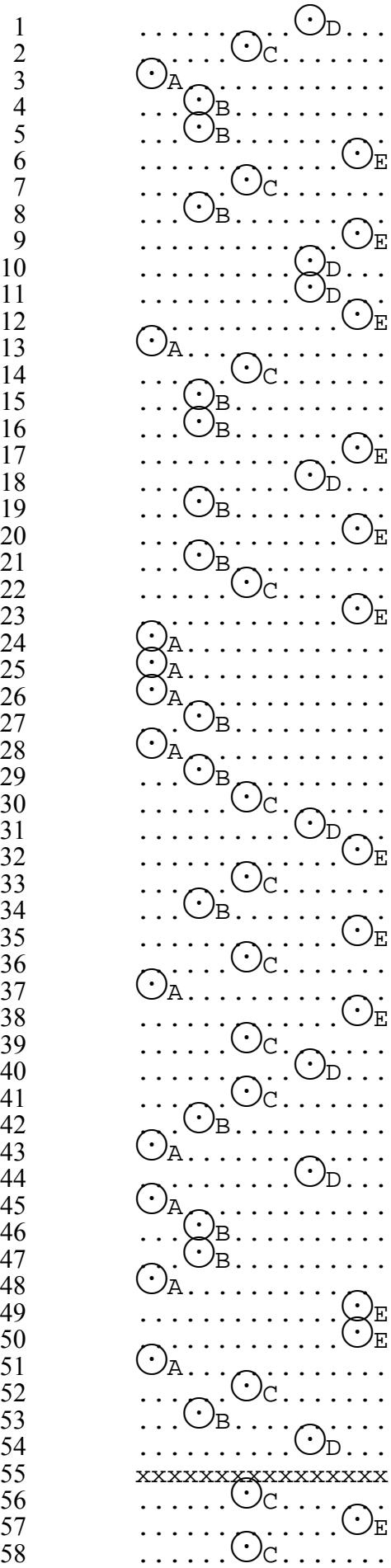
- A) D-glucose
- B) D-fructose
- C) L-mannose
- D) an L-sugar but not one of the ones to know by heart
- E) a D-sugar but not one of the ones to know by heart

27. The bond between the two sugars is a bond.

- A) β 1, β 1
- B) 1,6
- C) β 1, α 6
- D) α 6, 6
- E) β 6,6

28. The sugar on the right side is the isomer and the sugar on the left side is the isomer.

- A) α , α
- B) α , β
- C) β , α
- D) β , β
- E) lactone, α



59 ○A.....○D.....
 60○D.....
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 <48 e to A
 38 b to e
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