ANSWERS ARE ON THE END

name (family name IN CAPITALS, first name) : ..... , ...

student number : _____

BCH 2333A, B and C

MID TERM EXAM

March 2, 2013 1- 4 pm

Professors: Figeys, Mezl

Length : 3 hours (You are given 3 hrs to do this 2 hour exam)

Material needed: A computer answer sheet
This exam

CLOSED BOOK EXAM

Two carbons and faculty approved calculators are permitted

INSTRUCTIONS

Part I (60 % of grade)

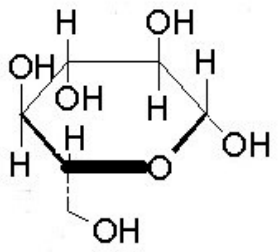
Choose the **BEST** answer for each of the **42 multiple choice questions** and fill it in on the computer answer sheet

Part II (40 % of the grade)

Answer THREE of these **four** questions directly on the exam

AT THE END: - Check that your name and student number are on the computer sheet **AND ON THE EXAM.**

Call this sugar Testose
and use it for the following questions.



1. Testose is :

A) Fructose B) Glucose
C) Mannose D) Galactose
E) a sugar that you do not have to know by heart

2. Testose is a:

A) D-furanose B) L-furanose
C) D-pyranose D) L-pyranose
E) D-pentanose

3. To turn Testose into Testitol, one would :

A) oxidize C1 B) oxidize C2 C) oxidize C6
D) reduce C1 E) reduce C2

4. Testose has a deoxy carbon at position:

A) 1 and 2 B) 2 C) 5 D) 6 E) it does not have a deoxy carbon

5. In terms of anomers, Testose is a:

A) α-pentose B) β-pentose
C) α-hexose D) β-hexose
E) sugar that does not have an anomeric group

6. Testose contains:

A) an acetal B) a hemiketal C) a hidden aldehyde
D) a blocked anomeric group E) a carbon at the carboxyl oxidation level

7. Testose has a prochiral carbon at position:

A) 1 B) 2 C) 5 D) 6 E) It does not have a prochiral carbon

8. Reading: The diameter of the nucleus of a eukaryotic cell is about

A) 100 nm B) 1-2 μm C) 5-10 μm D) 10-20 μm E) 50-100 μm

9. Plants use water to produce O_2. This reaction is an/a :

A) oxidation B) reduction C) dehydration
D) hydrolysis E) rearrangement

10. In pure water about ..... 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}

11. According to Coulomb's law, the force of repulsion is proportional to :

A) $(q_1+q_2)\ D/\ r^2$ B) $(q_1q_2)\ D/\ r^2$ C) $(q_1+q_2)/D\ r^2$
D) $(q_1q_2)/D\ r^2$ E) $D/\ (q_1+q_2)\ r^2$

12. At around this air pressure (air pressure, Not O_2 pressure!), human functions start being impaired.

A) 50 mm Hg B) 100 mm Hg C) 200 mm Hg D) 400 mm Hg E) 600 mm Hg

13. When you have a hydrogen bond in water, the distance between the hydrogen and the oxygen that it is hydrogen bonded to is about :

A) 0.13 nm B) 0.27 nm C) 0.33 nm D) 0.45 nm E) 3.5 Å

14. To make 10 mL of a 1 mM protein solution with a protein that has 100 amino acids you will put ..... of protein into the solution.

A) 10 mg B) 100 mg C) 1 g D) 10 g E) 100g

15. Which of these solutions gives the osmotic pressure in your cells?

A) 30 mM KCl B) 60 mM KCl C) 100 mM KCl D) 150 mM KCl E) 300 mM KCl

16. The osmotic pressure created by a 4 mM protein solution is equal to about :

A) 0.25 m H_2O B) 1 m H_2O C) 2.5 m H_2O
D) 10 m H_2O E) 300 mm Hg

17. If you put 1 g of a sugar into your blood, which of the following would contribute the LEAST to the osmotic pressure?

A) deoxyribose B) glucuronic acid C) glucose D) lactose E) mannitol

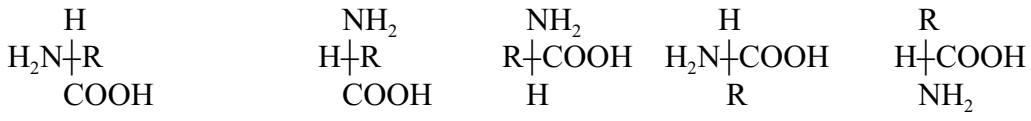
18. Estimate the <u>total amount</u> of hydrogen ions present in all the blood in your body:

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

19. Acetic acid (K_a = 1.75 10^{-5}) and sodium acetate are added to a solution to give final concentrations of 0.01 M acetic acid and 0.1 M sodium acetate. The pH will be:

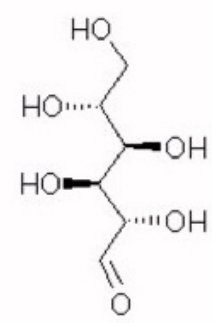
A) 1.75 B) 2.75 C) 3.75 D) 4.75 E) 5.75

20. Which of these is an L-amino acid?



(A) (B) (C) (D (E)

21. This structure is:



A) D-Glucose
B) D-Mannose
C) L-Mannose
D) An L sugar but not one to know by heart
E) A D sugar but not one to know by heart

22. Lactose :

A) is a reducing sugar
B) contains an α glycosidic bond
C) contains a β glycosidic bond
D) A and B
E) A and C

23. The conversion of sucrose to glucose and to fructose is :

A) an oxidation
B) a reduction
C) a hydrolysis
D) a dehydration
E) a rearrangement

24. When you see the group -$NHCOCH_3$ on a sugar, you will call it a ..... group.

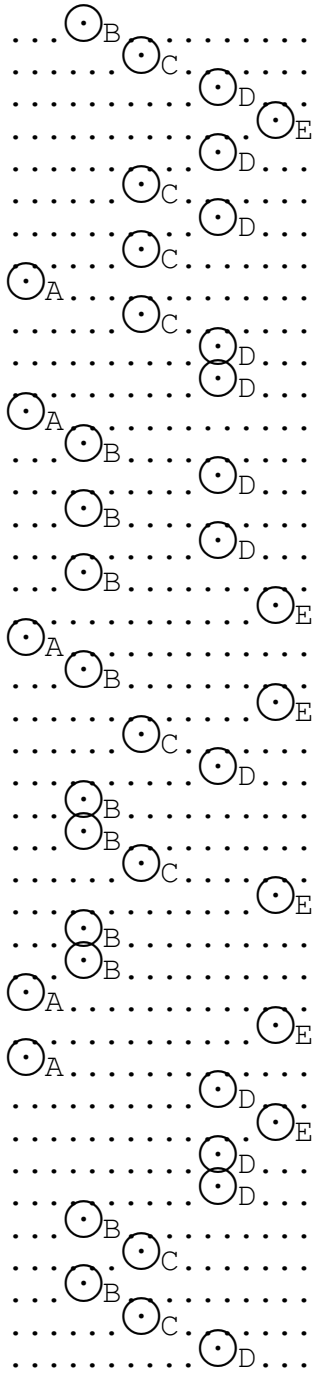
A) amino-methanol
B) amino methyl ether
C) amido methyl ether
D) N-acetyl
E) N-acetyl anhydride

25. The glycosidic bond found in glycogen makes the sugar

A) a hemiacetal
B) an acetal
C) a hemiketal
D) a ketal
E) a linear ester

26. In a normal person glucose is ..... % of blood.

A) 0.5 % B) 0.1 % C) 0.05 % D) 0.01 % E) 0.005 %



testose= β-D-glucose from cellulose

10^{-7} M / 55 M 55=~100

0.5 Atm, 1Atm= 760 mm Hg

shorter than C-C

100 aa x 100g aa= 10,000 MW-> 10g/L=1 mM-> 0.1 g/10mL

0.004 x 0.08 x 300 = .1 Atm = 1 m H2O

pH7= 10-7 M= 0.1uM x 5L= 0.5uM

pK_a = 4.75 1.75 =~2

5mM x 200mg/mMol= 1g/L

3meAnsShtAll
30219__ans_