

**LOOK FOR 14 PAGES IN TWO STACKS:
Section A pp. 1 to 4 and Sections B through F pp. 5 to 14**

BIO 1110 - INTRODUCTION TO CELL BIOLOGY

FINAL EXAMINATION - APRIL 14, 2003

NO BOOKS, NOTES OR CALCULATORS PERMITTED

3 HOURS

Professor James C. Fenwick

GENERAL INSTRUCTIONS

There are **SIX SECTIONS (A TO F)** to this exam. **SECTION A** is to be answered using the multiple choice score sheets. **Sections B, C, D, E, and F** are to be answered within the space provided on the question sheets. Be absolutely certain that your name AND student number are **PRINTED** on every page of SECTION B - F. **PRINT YOUR LAST NAME FIRST**, then your first name!

DO NOT OPEN THE EXAM UNTIL TOLD TO DO SO

SECTION A

(20 MARKS) 20 QUESTIONS: ANSWER THE MULTIPLE CHOICE QUESTIONS ON THE COMPUTER SHEET USING AN HB PENCIL AND FILL IN THE APPROPRIATE SPACES FULLY AND CAREFULLY. INDICATE THE **MOST COMPLETE** ANSWER. IF YOU ERASE, ERASE COMPLETELY! INDICATE ONLY ONE ANSWER FOR EACH QUESTION! MARKS WILL NOT BE DEDUCTED FOR INCORRECT ANSWERS UNLESS YOU GIVE MORE THAN ONE ANSWER FOR A QUESTION. **DO NOT FOLD OR PUT ANY EXTRA MARKS ON THE COMPUTER SHEET. BE CERTAIN TO FILL IN YOUR NAME AND STUDENT NUMBER ON THE COMPUTER SHEET, BOTH IN PRINTING AND BY FILLING IN THE SPACES.** IF YOU HAVE A SIX DIGIT STUDENT NUMBER YOU MUST PUT A 0 (ZERO) IN FRONT OF YOUR NUMBER ON YOUR ANSWER SHEET. **YOU MAY TAKE THE QUESTION SHEETS FOR SECTION A HOME.**

1. Which of the following is much smaller than the others?
 - a. mitochondria
 - b. ribosomes
 - c. chloroplasts
 - d. archaeobacteria
 - e. eubacteria

2. Which of the following does not follow the normal correct sequence of events. (Note that all events may not be shown.) **Think!**
 - a. DNA replication → crossing over → metaphase I → telophase I → cytokinesis
 - b. fertilization → prophase → prometaphase → anaphase → telophase
 - c. S → G₁ → G₀ → prometaphase → metaphase →
 - d. diplotene → anaphase I → S → telophase II → cytokinesis
 - e. leptotene → zygotene → pachytene → diplotene → diakinesis

3. Which of the following is, as a percentage, the largest compartment of a cell's interior?
 - a. prokaryotic cytosol
 - b. prokaryotic cytoplasm
 - c. eukaryotic protoplasm
 - d. both 'a' and 'b'
 - e. all of 'a', 'b' and 'c'

4. If the gametes of a species contain 3 chromosomes, how many chromatids will be present in a cell in metaphase II?
 - a. 3
 - b. 6
 - c. 12
 - d. 24
 - e. 48

5. Which of the following proteins performs a direct role in anaphase B movement?
 - a. kinesin
 - b. dynein
 - c. cyclin
 - d. Cdks
 - e. actin

- 6.. Which of the following is never part of a deoxyribonucleoside?
 - a. a purine
 - b. a phosphate group
 - c. uracil (e. originally said both 'c' and 'd')
 - d. a pentose sugar
 - e. both 'b' and 'c'

7. Which of the following is most commonly associated with transcription of rRNAs in a eukaryote?
 - a. RNA primase
 - b. RNA polymerase I
 - c. RNA polymerase II
 - d. RNA polymerase III
 - e. DNA polymerase

8. Which of the following protein(s) moves towards the minus end of a microtubule?
 - a. conventional kinesin
 - b. dynein
 - c. myosin II
 - d. 'a' & 'c'
 - e. 'b' & 'c'

9. Which of the following is a stop codon in eukaryotes?
a. UAG b. UGA c. UCG d. both 'a' & 'b' e. all of 'a', 'b' and 'c'
10. A cell at the end of meiosis I:
a. has the 1N number of chromosomes d. can divide into two haploid cells
b. has a 2N amount of DNA e. all of 'a', 'b', 'c' and 'd'
c. is haploid
11. During which of the following stages do you find the 2N number of chromosomes. (originally read 2N amount of DNA)? **Question not marked!**
a. prometaphase d. metaphase I
b. metaphase e. all of 'a', 'b', 'c' and 'd'
c. prophase I
12. On which of the following do you find the anticodon?
a. DNA d. mRNA
b. rRNA e. the large ribosomal subunit
c. tRNA
13. A structural unit in a protein that exhibits a particular three-dimensional architecture and functions in a semi-independent manner is most properly referred to as a:
a. cofactor b. receptor c. domain d. motif e. quaternary structure
14. If CAU is the anticodon for *dumprotein*, its codon would be
a. GTA b. AUG c. 3'AUG5' d. GGT e. both 'b' and 'c'
15. Which of the following is correct with regards to an RNA molecule?
a. [A] = [T] d. both 'b' and 'c'
b. [C] = [G] e. None of the above are correct
c. [A] = [U]
16. Professor Fenwick is a better dancer than Shania Twain.
a. True

17. Which is not true concerning prokaryotes?
- a. no endocytosis
 - b. no chromosomes
 - c. naked DNA
 - d. no ribosomes
 - e. no actin filaments
18. Which of the following is not true concerning intermediate fibres?
- a. They are often directly associated with movement.
 - b. Phosphorylation causes disassembly
 - c. They are non-polar
 - d. They consist of antiparallel tetrameres.
 - e. They are unbranched.
19. Movement across an epithelial sheet that occurs between cells is called _____ movement.
- a. transmembrane
 - b. intracellular
 - c. transepithelial
 - d. paracellular
 - e. both 'c' and 'd'
20. Of the following membranes, the membrane that would be the least liquid would be:
- a. one with lots of long-chain saturated fatty acids
 - b. one with lots of short-chain saturated fatty acids
 - c. one with lots of long-chain unsaturated fatty acids
 - d. one with lots of short-chain unsaturated fatty acids
 - e. one with an equal mix of long-chain unsaturated and long-chain saturated fatty acids

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LAST NAME (PRINT!)

FIRST NAME

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SECTIONS B TO F

PLEASE DO NOT WRITE BELOW THIS LINE

MARKS:

PART B = /20

PART C = /20

PART D = /20

PART E = /10

PART F = /10

TOTAL = /80

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BIO 1110. SECTION B (20 MARKS). One mark for each correctly completed sentence except for #19 which is worth two marks. YOU MUST USE BLACK OR BLUE INK. NO PENCIL!

A complete answer consists of filling in all the blanks in a statement. **One mark** for each complete answer. (note: a complete answer may require more than one word)

1. Nuclear division is called _____; the division of the cytoplasm to produce two daughter cells is termed _____.
2. Meiosis ensures the production of a _____ stage in the life cycle; fertilization ensures a _____ stage.
3. In most plants meiosis occurs at a stage that is unrelated to gamete formation or fertilization and is referred to as _____ meiosis.
4. Prokaryotes divide by a process called _____.
5. Secretory proteins leave the tER in vesicles coated with _____.
6. The principle bond associated with the secondary structure of protein is a _____ bond.
7. Microtubules are constructed from the protein _____.
8. The three principal types of membrane proteins, based on the way they are attached to the membrane, are peripheral, integral and _____ proteins.
9. Most of the DNA in prokaryotes is contained in a single circular _____ rather than in what we normally call chromosomes.
10. The movement apart of the spindle poles during mitosis is called _____ movement.
11. The _____ is a specialized substructure of the nucleus wherein much of rRNA transcription occurs.
12. The basic subunit of the microtubule protofilament is the _____.
13. The fast-growing plus end of microtubules is ringed with _____.
14. The vesicle-forming protein associated with the formation of receptor-mediated endocytotic vesicles is called _____.

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15. The principal motor protein associated with flagella is _____.
16. RNA with catalytic activity is called a _____.
17. _____ is a poison that is useful in the study of microtubules.
18. The acronym **NLS** stands for _____.
19. **(2 MARKS)** Draw a generic figure of the **completely ionized** form of amino acids. Label all **five** major components. The drawing must be perfect; that is you will receive two marks or zero marks.

completely ionized

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3. (FOUR MARKS) Indicate what each of the following abbreviations stand for and very briefly list a function for each.

a. M6P

b. ERGIC

c. snRNPs

d. MPF 😊 😊 😊 😊 😊

4. (FOUR MARKS) Very briefly describe the process of *bulk-phase endocytosis*. (What is it? What are its general characteristics; what happens to the things which participate in this event?)

5. Describe a replicon as it appears in a eukaryote.

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SECTION E: (10 MARKS) Tell me what you know about anchoring (adhesive) junctions.

if they do not list all four they cannot be given full

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SECTION F: (10 MARKS). Describe the process of elongation in translation. (Start with an aminoacyl tRNA^{met}_i already in place within a complete initiation complex. You may use a diagram if you wish but you must also describe in words what is happening.)

A large rectangular area enclosed by a dashed border, intended for the student's response. The top portion of this area contains horizontal dashed lines for writing, while the bottom portion is a solid white space.