1> Which of the following occurs in meiosis **but not** in mitosis?   
A) chromosome replication B) synapsis of chromosomes   
C) production of daughter cells D) alignment of chromosomes at the equator   
E) condensation of chromatin

2> Why do **neurons** and some other specialized cells divide **infrequently**?   
A) They no longer have active nuclei. B) They no longer carry receptors for signal molecules.   
C) They have been shunted into G₀. D) They can no longer bind Cdk to cyclin.

3> Which of the following defines a **genome**?   
A) the complete set of a cell's polypeptides B) the complete set of polysaccharides   
C) the karyotype D) the complete set of an organism's genes

4> The human X and Y chromosomes   
A) are both present in every somatic cell of males and females alike.   
B) are of approximately equal size and number of genes.   
C) are almost entirely homologous, despite their different names.   
D) include genes that determine an individual's sex.

5> After **telophase I** of meiosis, the chromosomal makeup of each daughter cell is   
A) diploid, and the chromosomes are each composed of a single chromatid.   
B) diploid, and the chromosomes are each composed of two chromatids.   
C) haploid, and the chromosomes are each composed of a single chromatid.   
D) haploid, and the chromosomes are each composed of two chromatids.

6> **Homologous chromosomes** move toward opposite poles of a dividing cell during   
A) mitosis. B) meiosis I. C) meiosis II. D) fertilization.

7>

**Independent assortment** of chromosomes occurs.   
A) The statement is true for mitosis only. B) The statement is true for meiosis I only.   
C) The statement is true for meiosis II only. D) The statement is true for mitosis and meiosis I.

8> Where do the microtubules of the spindle **originate** during mitosis in plant and animal cells?   
A) centromere B) centrosome C) centriole D) chromatid

9> For the following question, match the key event of meiosis with the stages listed below.   
I. Prophase I II. Metaphase I III. Anaphase I IV. Telophase I

V. Prophase II VI. Metaphase II VII. Anaphase II VIII. Telophase II

Tetrads of chromosomes are aligned at the equator of the spindle; alignment determines independent assortment.   
A) I B) II C) IV D) VI E) VIII

10> What is a cleavage furrow?   
A) a ring of vesicles forming a cell plate B) the separation of divided prokaryotes   
C) a groove in the plasma membrane between daughter nuclei   
D) the metaphase plate where chromosomes attach to the spindle

11> In a human **karyotype**, chromosomes are arranged in 23 pairs. If we choose one of these pairs, such as pair 14, which of the following do the two chromosomes of the pair **have in common?**A) Length and position of the centromere only.   
B) Length, centromere position, and staining pattern only.   
C) Length, centromere position, staining pattern, and traits coded for by their genes.   
D) Length, centromere position, staining pattern, and DNA sequences.   
E) They have nothing in common except they are X-shaped.

12> Density-dependent inhibition is explained by which of the following?   
A) As cells become more numerous, they begin to squeeze against each other, restricting their size and ability to produce control factors.   
B) As cells become more numerous, the cell surface proteins of one cell contact the adjoining cells and they stop dividing.   
C) As cells become more numerous, more and more of them enter the S phase of the cell cycle.   
D) As cells become more numerous, the level of waste products increases, eventually slowing down metabolism.

13> Why do chromosomes coil during mitosis?   
A) to increase their potential energy   
B) to allow the chromosomes to move without becoming entangled and breaking   
C) to allow the chromosomes to fit within the nuclear envelope   
D) to allow the sister chromatids to remain attached   
E) to provide for the structure of the centromere

14> If there are 20 chromatids in a cell, how many centromeres are there?   
A) 10 B) 20 C) 30 D) 40 E) 80

15> Measurements of the amount of DNA per nucleus were taken on a large number of cells from a growing fungus. The measured DNA levels **ranged from 3 to 6 picograms** per nucleus. In which stage of the cell cycle did the nucleus contain 6 picograms of DNA?   
A) G₀ B) G₁ C) S D) G₂ E) M

16> A human cell containing 22 autosomes and a Y chromosome is

A) a sperm B) an egg C) a zygote D) a somatic cell of a male

17> Homologous chromosomes move toward opposite poles of a dividing cell during

A) mitosis B) meiosis I C) meiosis II D) fertilization

18> Meiosis II is similar to mitosis in that

A) sister chromatids separate during anaphase B) DNA replicated before the division

C) the daughter cells are diploid D) homologous chromosomes synapse

19> If the **DNA content** of a diploid cell in the G1 phase of a cell cycle is **x**, then the DNA content of the same cell at metaphase of meiosis I would be

A) 0.25x B) 0.5x C) x D) 2x

20. If the **DNA content** of a diploid cell in the G1 phase of a cell cycle is **x**, then the DNA content of the same cells at metaphase of meiosis II would be

A) 0.25x B) 0.5x C) x D) 2x