Cells, DNA, Cell Division, Mitosis, Meiosis...Practice

Multiple Choice
Identify the choice that best completes the statement or answers the question.

___ 1. Normal human body cells contain how many chromosomes?
   A. 22  B. 23  C. 46  D. 44  E. 42

___ 2. At the end of meiosis I, the resulting two cells are
   A. identical in all ways  B. genetically identical  C. genetically different  D. hexaploid.
   E. prepared to enter interphase so the chromosomes can be replicated.

___ 3. Genes are composed of
   A. DNA  B. proteins  C. chromosomes  D. carbohydrates  E. lipids.

___ 4. If DNA is likened to a ladder, what are the compounds that make up the sides of the ladder?
   A. phosphates and bases  B. phosphates and sugars  C. bases only  D. phosphates only  E. bases and sugars

___ 5. Packaged DNA is referred to as
   A. chromosomes  B. histones  C. chromatin  D. protein  E. nucleosomes.

___ 6. Pairs of chromosomes that are similar in size and genetic composition are
   A. chromatids  B. diploid  C. haploid  D. chromatin  E. homologous chromosomes.

___ 7. If an organism's diploid chromosome number is 18, how many different possible combinations of homologous chromosomes lining up during meiosis exist for the eggs or sperm produced by that organism?
   A. 9  B. 18  C. 36  D. 128  E. 512

___ 8. What is the sugar molecule found in DNA?
   A. ribose  B. phosphatase  C. deoxyribose  D. oxyribose  E. polymerase

___ 9. DNA replication occurs
   A. during cell division  B. continuously  C. before cell division  D. only once in the life of the organism  E. only in gametes.

___ 10. What structure holds the sister chromatids to the spindle fibers?
    A. kinetochore  B. centromere  C. chromatin  D. cyclin  E. MPF

___ 11. DNA replication
    A. occurs in the cytoplasm of the cell  B. does not require proteins  C. occurs in G1 of interphase.
    D. takes place in the nucleus of the cell  E. is constantly happening in a cell.
12. Cytokinesis in plant cells differs from cytokinesis in animal cells because
   A. the contractile protein, actin, is important only in plant cells. B. a contractile ring forms only in plant cells. C. in plant cells, the cell plate must also divide into two parts. D. plant cells have a rigid cell wall. E. there is no difference.

13. A package of histones with DNA wrapped around them forms spherical structures called

14. The process in which the cell actually divides is called

15. All of the terms listed below occur during interphase except

16. In what phases is the genetic material in the cell correctly referred to as chromatids?
   A. interphase and telophase B. metaphase and prophase C. anaphase and metaphase D. metaphase and telophase E. interphase and prophase

17. $^{12}$C, $^{13}$C, and $^{14}$C are all isotopes of carbon. They differ in their
   A. overall charges. B. number of electrons. C. number of protons. D. number of neutrons. E. electron energy shells.

18. Which of the following is not found in DNA?
   A. guanine B. uracil C. deoxyribose D. thymine E. phosphate

19. The fact that the two strands composing a DNA molecule are called antiparallel has to do with the orientation of the

20. Joining thousands of simple sugars together through a series of chemical reactions forms polysaccharides. These are referred to as ____________ reactions.
   A. ligation B. dehydration C. hydrolysis D. linking E. rejoining

21. The bases are bonded to what part of the backbone of the DNA molecule?
   A. the 1’ carbon atom of the sugar molecule   B. the 2’ carbon atom of the sugar molecule   C. the 3’ carbon atom of the sugar molecule   D. the 4’ carbon atom of the sugar molecule   E. the 5’ carbon atom of the sugar molecule

22. Microtubules are
   A. affected by cancer-fighting chemicals such as Taxol. B. responsible for formation of the contractile ring. C. involved in cell plate formation. D. only built up to make longer and longer microtubules. E. important during interphase of the cell cycle.
23. In a DNA double helix, each loop of the helix
   A. is wound around histone proteins.  B. consists of 10 nucleotides.  C. always contains equal
      amounts of G and T.  D. contains the sugar-phosphate backbones in the interior of the helix.
   E. represents one nucleotide.

24. DNA replication of a single DNA molecule is referred to as semiconservative because
   A. it results in two nonidentical DNA molecules.  B. one DNA strand is replicated continuously, while
      the other must be replicated discontinuously.  C. of the two DNA molecules, one is made up totally of
      parental DNA, while the other is entirely newly synthesized DNA.  D. all the DNA strands in the two
      DNA molecules will have both parental and newly synthesized DNA.  E. each of the two DNA
      molecules will consist of one parental strand and one newly synthesized strand.

25. Base pairing
   A. occurs between identical bases.  B. requires hydrogen bonds.  C. takes place between sugars and
      phosphates on the two strands in a helix.  D. explains the X-ray results from Rosalind Franklin.
   E. occurs between A and C.

26. DNA replication involves all of the following steps except
   A. separation.  B. joining.  C. production of single-stranded DNA molecules.  D. complementary
      base pairing.  E. formation of a primer.

27. Transcription begins at a site on the DNA molecule marked by a

28. Special cells found in the gonads that give rise to gametes upon division are called
   A. germ cells.  B. somatic cells.  C. stem cells.  D. basal cells.  E. egg cells.

29. Spindle fibers
   A. are composed of DNA.  B. only appear during interphase.  C. attach to the ends of chromosomes.
   D. connect chromosomes to the center of the cell.  E. are used to organize and move chromosomes
      during mitosis.

30. At the beginning of mitosis or meiosis (e.g., after condensation), the recently replicated copies of a
    chromosome are known as

31. The two strands of DNA in a DNA double helix
    A. are identical to each other.  B. are connected to each other by covalent chemical bonds.  C. both
       contain nucleotides, but the order of the nucleotides on the two strands is not related.  D. are oriented
       in the same direction.  E. are antiparallel to each other.

32. What step in DNA replication precedes the pairing of complementary bases?
    A. polymerization of DNA  B. separation of the two strands  C. joining of the two strands
    D. mitotic division  E. formation of the histone core

33. At the end of metaphase I, _____________ separate.
    A. homologues  B. only the autosomes  C. sister chromatids  D. centrioles  E. tetrads
34. If you view a cell in which the genetic material is beginning to be visible as separate bodies, and the nucleoli have disappeared from view (particularly noticeable in plant cells), you may surmise that the cell is in
   A. telophase. B. anaphase. C. prophase D. metaphase E. interphase.

35. After the DNA is replicated, and it condenses in prophase, two identical rods of DNA are seen. These are

36. Most cells are small. When they reach a certain size, cells typically divide. This has to do with the
   A. amount of genetic material. B. Surface-to-volume ratio. C. inability to produce more components of the cell membrane. D. fact that they cannot possess sufficient numbers of organelles for normal cell functioning. E. differences between viral particles and eukaryotic cells.

37. Which is not true of DNA replication?
   A. It occurs in the S phase of the cell cycle. B. It functions similarly for all organisms. C. It is semiconservative. D. Both strands are synthesized in one direction only. E. Both strands are synthesized continuously.

Matching

Match the following structures with the proper description.
   A. separate, duplicated structures composed of DNA visible under the microscope
   B. genetic material that is "unwound" in between cell divisions
   C. a duplicated strand of DNA held to its duplicate by a centromere
   D. a proteinaceous band holding duplicate copies of the genetic material
   E. a structure that holds the sister chromatids to the spindle fibers

38. kinetochore
39. chromosome
40. chromatid
41. chromatin
42. centromere

Match the following examples.
   A. mitosis
   B. meiosis
   C. both

43. Produces genetically identical daughter cells
44. Occurs in somatic cells
45. Gives rise to gametes
46. Generally produces 4 daughter cells
47. Requires chromosome replication must be completed beforehand
Match the following action with the correct phase.
A. metaphase
B. telophase
C. anaphase ii
D. telophase i
E. prophase ii
F. cytokinesis

48. Of the phases listed, this is the first in which the cells are haploid.
49. Chromosomes align at the center of the cell.
50. The cell splits into two daughter cells.
51. A diploid number of chromosomes are present at each end of the cell.
52. Sister chromatids start to pull apart.

Match the following examples with the correct cellular organelle.
A. nucleus
B. ribosomes
C. golgi apparatus
D. smooth endoplasmic reticulum
E. lysosomes
F. mitochondria

53. The genetic material is stored here.
54. Proteins are made on these.
55. These break down carbon-containing molecules to make ATP.
56. Lipids and phospholipids are produced here.
57. Modification of proteins takes place, often determining the final destination for these proteins.

Match the following phases of the cell cycle with the appropriate activity.
a. DNA is replicated.
b. The cell divides.
c. Each organelle divides in half.
d. Proteins necessary for mitosis are formed.
e. New proteins and cell components are made.

58. G₁
59. G₂
60. S
61. M
Match the following phases with the proper description.
A. a period in which the cell manufactures cellular molecules in preparation for replication of the genetic material
B. a period in which the cell prepares for division by producing, among other things, much tubulin
C. the actual division of the genetic material
D. the actual splitting of the cytoplasm of the two daughter cells
E. replication of DNA

62. S
63. G₂
64. cytokinesis
65. G₂
66. mitosis

Match the following terms with their characteristics.
A. building block of DNA
B. joins nucleotides during DNA replication
C. molecule associated with RNA
D. cytosine, guanine, adenine, and thymine
E. spool of protein associated with DNA

67. Bases of DNA
68. DNA polymerase
69. Nucleotide
70. Histone

Match the following descriptions with the appropriate mechanism of transport across the plasma membrane.
A. active transport
B. diffusion
C. exocytosis
D. facilitated diffusion
E. endocytosis

71. For moving very small, inorganic substances down their concentration gradient
72. For moving substances against their concentration gradient
73. For moving small, water-soluble, organic compounds down their concentration gradient
74. For taking up very large particles and small cells
Match the following organic compounds with the appropriate subunit.
A. fatty acids
B. amino acids
C. nucleotides
D. phosphates
E. monosaccharides

____ 75. carbohydrates
____ 76. proteins
____ 77. nucleic acids
____ 78. lipids
Cells, DNA, Cell Division, Mitosis, Meiosis...Practice
Answer Section

MULTIPLE CHOICE

1. ANS: C
2. ANS: C
3. ANS: A
4. ANS: B
5. ANS: C
6. ANS: E
7. ANS: E
8. ANS: C
9. ANS: C
10. ANS: A
11. ANS: D
12. ANS: D
13. ANS: C
14. ANS: C
15. ANS: B
16. ANS: B
17. ANS: D
18. ANS: B
19. ANS: A
20. ANS: B
21. ANS: A
22. ANS: A
23. ANS: A
24. ANS: E
25. ANS: B
26. ANS: C
27. ANS: A
28. ANS: A
29. ANS: E
30. ANS: C
31. ANS: E
32. ANS: B
33. ANS: A
34. ANS: C
35. ANS: A
36. ANS: B
37. ANS: E
MATCHING

38. ANS: E
39. ANS: A
40. ANS: C
41. ANS: B
42. ANS: D
43. ANS: A
44. ANS: A
45. ANS: B
46. ANS: B
47. ANS: C
48. ANS: E
49. ANS: A
50. ANS: F
51. ANS: B
52. ANS: C
53. ANS: A
54. ANS: B
55. ANS: F
56. ANS: D
57. ANS: C
58. ANS: E
59. ANS: D
60. ANS: A
61. ANS: B
62. ANS: E
63. ANS: A
64. ANS: D
65. ANS: B
66. ANS: C
67. ANS: D
68. ANS: B
69. ANS: A
70. ANS: E
71. ANS: B
72. ANS: A
73. ANS: D
74. ANS: E
75. ANS: E
76. ANS: B
77. ANS: C
78. ANS: A