1. award: 1 point

__________ is the portion of the cell cycle ...
__________ is the portion of the cell cycle in which the chromosomes are invisible under the light microscope because they are not yet condensed.

- Interphase
- Prophase
- Anaphase
- Telophase

Multiple Choice __________ is the portion of the cell cycle ...

2. award: 1 point

Prophase is the first stage of mitosis char...
Prophase is the first stage of mitosis characterized by the _________ of the chromosomes.

- duplication
- splitting
- condensation
- merging

Multiple Choice Prophase is the first stage of mitosis char...

3. award: 1 point

__________ is the stage of mitosis characte...
__________ is the stage of mitosis characterized by the alignment of the chromosomes in a ring along the inner circumference of the cell.

- Interphase
- Telophase
- Prophase
- Metaphase

http://ezto.mhhe.mhgraw-hill.com/hm_biology.tpx
4. The stage of mitosis characterized by the physical separation of sister chromatids is called _________.
- [ ] anaphase
- [ ] metaphase
- [ ] interphase
- [ ] telophase

5. The last stage of mitosis is characterized by the disassembly of spindle apparatus, the reestablishment of the nuclear membrane, and the decondensation of the chromosomes into invisible threads. This stage is known as _________.
- [ ] interphase
- [ ] telophase
- [ ] anaphase
- [ ] metaphase

6. The progress of mitosis is regulated by ________ and their dependent kinases.
- [ ] hormones
- [ ] chromosomes
- [ ] cyclins
- [ ] paracrine signaling
7. Normally, _____ functions in the cell to stop cell division if the cell has experienced extensive DNA damage.

- heat
- p53
- FtsZ
- DNA

8. Eukaryotic chromosomes are composed of a complex of 60% protein and 40% DNA. The name of this chemical complex is a

- histone complex
- chromatin
- histamine complex
- chromatid
- centromere

9. If a eukaryotic cell has a single set of chromosomes, it is called

- haploid
- diploid
- polyploid

Multiple Choice

- Normally, _____ functions in the cell to stop cell division if the cell has experienced extensive DNA damage.

- Eukaryotic chromosomes are composed of a complex of 60% protein and 40% DNA. The name of this chemical complex is a

- If a eukaryotic cell has a single set of chromosomes, it is called
10. **The physical distribution of cytoplasmic mat...**
The physical distribution of cytoplasmic material into the two daughter cells is called

- DNA replication.
- mitosis.
- **cytokinesis.**
- binary fission.

**Multiple Choice**

11. **The bacterial genome exist as a**
The bacterial genome exist as a

- single, circular, protein-coated, double stranded DNA molecule.
- single, circular, **uncoated**, double stranded DNA molecule.
- single, circular, uncoated, double stranded RNA molecule.
- single, linear, uncoated, double stranded DNA molecule.
- many, circular, uncoated, double stranded DNA molecules.

**Multiple Choice**

12. **The number of chromosomes characteristic of ...**
The number of chromosomes characteristic of eukaryotes, in general,

- can usually be determined without the use of a microscope.
- can usually be predicted from the size of the organism.
- change as the organisms grow and age.
- vary **considerably** from 2 to over 1000 in different species.
- vary depending on the type of the cell in the same organism.

**Multiple Choice**
13. Some of the portions of the chromatin are permanently condensed so that their DNA is never expressed. All of these portions stain very intensely and are given a common name of

- DNA dark bands.
- euchromatin.
- heterochromatin.
- genome.
- haploid DNA.

14. In the human, the body cells (non-sex cells) contain two sets of chromosomes totaling

- 2.
- 22.
- 44.
- 46.
- 23.

15. The two copies of each chromosome in body cells are called

- chromatids.
- homologous chromosomes.
- sister chromosomes.
- daughter chromosomes.
- genes.
16. 

Before cell division of the body cells, each homologue replicates into two parts. These parts are connected by a centromere and are called

- sister chromatids.
- daughter chromatids.
- sister chromosomes.
- daughter chromosomes.
- genes.

Multiple Choice

Before cell division of the body cells, each...

17. 

Which of the following sequence of cell-cycle phases is characteristic of eukaryotes?

- G to S to M
- G₁ to S to G₂ to M to C
- S to M to C
- G₁ to G₂ to S to C
- G₁ to G₂ to G₃ to S to C

Multiple Choice

Which of the following sequence of cell-cycl...

18. 

The framework of microtubules that appears i...

The framework of microtubules that appears in cell division which eventually moves the chromatids apart is called the

- aster.
- cell plate.
- centriole.
- spindle apparatus.
- centromere.

Multiple Choice

The framework of microtubules that appears i...
19. Which one of the following represents interphase?

- G1 + S + G2
- S + M + C
- prophase + metaphase + anaphase + telophase
- cytokinesis + mitosis
- G0 + G1 + G2

Multiple Choice

Which one of the following represents interphase?

20. Which of the following is essentially the reverse of prophase?

- anaphase
- interphase
- metaphase
- telophase
- cytokinesis

Multiple Choice

Which of the following is essentially the reverse of prophase?

21. Animal cells typically achieve cytokinesis by

- binary fission.
- forming a cell plate across the middle of the cell.
- forming a cleavage furrow that pinches the cell into two.
- chromosome condensation.
- chromosome elongation.
Multiple Choice

**22.**

*Animal cells typically achieve cytokinesis b...*

---

22. award: 1 point

**Recent studies on cell cycle controls have r...**

Recent studies on cell cycle controls have revealed that animal cells can employ certain factors to override the inhibitory controls of cell division. These belong to a class of proteins called

- histones.
- channel proteins.
- growth factors.
- gating proteins.
- neurotransmitters.

---

Multiple Choice

**23.**

*The actual process of cell division in eukar...*

The actual process of cell division in eukaryotic cells is called

- meiosis.
- mitosis.
- binary fission.
- cytokinesis.

---

Multiple Choice

**24.**

*Nuclear division in eukaryotic cells is call...*  
Nuclear division in eukaryotic cells is called

- meiosis.
- mitosis.
- binary fission.
- cytokinesis.
25. If a cell has 32 chromosomes prior to S and ... If a cell has 32 chromosomes prior to S and undergoes mitosis followed by cytokinesis, each new daughter cell will have how many chromosomes?
- 64
- 32
- 16
- 8

26. Cytoplasmic organelles are partitioned between two daughter cells.
- G₁
- S
- G₂
- M
- C

27. Hereditary information is partitioned equally between two daughter cells.
- G₁
- S
- G₂
- M
- C
28. **Multiple Choice**  

*Duplicate copy of the hereditary information is made.*

- $G_1$
- $S$
- $G_2$
- $M$
- $C$

29. **Multiple Choice**  

*If the centrioles are mispositioned in the cell, a functional mitotic spindle will fail to form. In this situation, how will chromosome segregation be affected?*

- Microtubules will not attach to the kinetochores.
- The sister chromatids will be pulled apart and equally divided among daughter cells.
- All of the chromosomes will go to one of the daughter cells.
- Sister chromatids will not be divided equally among daughter cells.

30. **Multiple Choice**  

*If you wanted to convert a proto-oncogene to an oncogene, which of the following methods would you choose?*

- Growth factor exposure
- Genetic damage
- Pair the proto-oncogene with a tumor-suppressor gene
- Halt cell cycle progression

*If you wanted to convert a proto-*
Multiple Choice

31. award: 1 point

_____ is a process of nuclear division in...

_____ is a process of nuclear division in which the number of chromosomes in certain cells is halved during gamete formation.

- Mitosis
- Meiosis
- Spermatogenesis
- Glycolysis

Multiple Choice

32. award: 1 point

P. J. van Beneden proposed that an egg and ...

P. J. van Beneden proposed that an egg and a sperm, each containing half the complement of chromosomes found in somatic cells, fuse to produce a single cell called a(n) _______.

- zygote
- karyotype
- embryo
- oocyte

Multiple Choice

33. award: 1 point

_____ cells such as gametes contain one se...

_____ cells such as gametes contain one set of chromosomes.

- Muscle
- Somatic
- Diploid
- Haploid

Multiple Choice
34. The two homologous chromosomes pair along their length early in the first nuclear division. During this physical joining genetic exchange occurs between them in a process called _________.
   - fusion
   - mitosis
   - meiosis
   - recombination

35. Sexual reproduction is significant in increasing genetic _______.
   - similarity
   - diversity
   - robustness
   - connections

36. The pairing of chromosomes along their lengths which is essential for crossing over is referred to as
   - syngamy.
   - synapsis.
   - prophase.
   - recombination.
   - centromere.
37. The zygote has 
   The zygote has
   - one copy of each chromosome.
   - one full haploid complement of chromosomes.
   - chromosomes identical to those of a sperm cell.
   - chromosomes identical to those of an egg cell.
   - two copies of each chromosome.

38. The cell produced by the fusion of an egg an...
   The cell produced by the fusion of an egg and a sperm is the
   - gamete.
   - haploid.
   - zygote.
   - germ line cell.
   - somatic cell.

39. The reduction division that separates two ha...
   The reduction division that separates two haploid complements from each other is called
   - mitosis.
   - meiosis.
   - syngamy.
   - haploid division.
   - binary fission.
40. Which of the following produces identical cells?
   - meiosis
   - mitosis
   - gamete formation
   - syngamy
   - fertilization

Multiple Choice Which of the following produces identical ce...

41. Chromosomes exchange genetic information by
   - fertilization.
   - mitosis.
   - syngamy.
   - DNA replication.
   - crossing over.

Multiple Choice Chromosomes exchange genetic information by

42. Crossing over of chromosomes takes place in
   - prophase II.
   - prophase I.
   - interphase II.
   - interphase I.
   - metaphase II.

Multiple Choice Crossing over of chromosomes takes place in
43.  

At the end of telophase II of meiosis, each...  
At the end of telophase II of meiosis, each of the four resulting cells contains

- one full set of chromosomes, each with two chromatids.
- two full sets of chromosomes, each with two chromatids.
- one full set of chromosomes, each a single chromatid.
- two full sets of chromosomes, each a single chromatid.
- a different number of chromosomes.

44.  

Sexual reproduction increases genetic variab...  
Sexual reproduction increases genetic variability through all of the following except

- crossing over in prophase I of meiosis.
- independent assortment in meiosis.
- fertilization.
- mitosis.

45.  

Meiosis and mitosis are both processes that ...  
Meiosis and mitosis are both processes that involve nuclear division. What is the difference between the two?

- Mitosis is nuclear division, which ultimately leads to haploid gametes. Meiosis is nuclear division, which ultimately leads to diploid somatic cells.
- Mitosis is nuclear division, which ultimately leads to diploid somatic cells. Meiosis is nuclear division, which ultimately leads to haploid gametes.
- Mitosis is nuclear division, which ultimately leads to diploid gametes. Meiosis is nuclear division, which ultimately leads to haploid somatic cells.
- Mitosis is nuclear division, which ultimately leads to syngamy. Meiosis is nuclear division, which ultimately leads to zygotes.
Consider the following representation of four chromatids during prophase I shown below. The paternal homologue is in upper case, while the maternal homologue is in lower case.

A B C D E F G
A B C D E F G
a b c d e f
a b c d e f

Section Break

Consider the following representation of four chromatids during prophase I shown below. The paternal homologue is in upper case, while the maternal homologue is in lower case.

A B C D E F G
A B C D E F G
a b c d e f
a b c d e f

46. award: 1 point

If there was a single crossing over event be...
If there was a single crossing over event between the second and third chromosomes from the top, the resulting chromosomes (in order) would be

- A B C D E F G; A B C D E F G; a b c d e f g; a b c d e f g.
- A B C D E F G; A b c d e f g; A B C D E F G; A B c d e f g.
- A B C D E F G; A B c d e f g; a b C D E F G; a b c d e f g.
- A B C D E F G; A B c d e F G; a b C D E f g; a b c d e f g.

Multiple Choice

If there was a single crossing over event be...

47. award: 1 point

During anaphase I, which of the following pa...
During anaphase I, which of the following pairs will move to opposite poles? (For purposes of this question, assume that there were no crossing over events.)

- A B C D E F G and A B C D E F G to one pole; a b c d e f g and a b c d e f g to the other pole.
- By anaphase I, only two chromatids remain, so A B C D E F G will go to one pole and a b c d e f g will go to the other pole.
- Neither. The pairs separate in anaphase II, not anaphase I.

Multiple Choice

During anaphase I, which of the following pa...
48. award:  
1 point  

You are studying mitosis in an organism that...  
You are studying mitosis in an organism that has 28 chromosomes as its diploid number. How many chromosomes will the cell have after mitosis, but before cytokinesis?

- [ ] 7  
- [ ] 14  
- [ ] 28  
- [ ] 56

Multiple Choice  
You are studying mitosis in an organism that...

49. award:  
1 point  

You are studying meiosis in an organism that...  
You are studying meiosis in an organism that has 28 chromosomes as its diploid number. How many chromosomes will each nucleus have after meiosis I, but before cytokinesis?

- [ ] 14  
- [ ] 28  
- [ ] 56  
- [ ] cannot determine from the information provided

Multiple Choice  
You are studying meiosis in an organism that...

50. award:  
1 point  

Which of the following statements about crossing over is false?  
Which of the following statements about crossing over is false?

- [ ] Crossing over takes place between non-sister chromatids.  
- [ ] Crossing over takes place between sister chromatids.  
- [ ] Recombination nodules may be observed.  
- [ ] Sites of crossing over are called chiasmata.

Multiple Choice  
Which of the following statements about crossing over is false?
In 95% of cases of Down's syndrome, there is an entire extra chromosome 21
In 95% of cases of Down's syndrome, there is an entire extra chromosome 21 in every cell. This aneuploid condition is the result of

- improper crossing over.
- independent assortment.
- **nondisjunction.**
- achiasmate segregation.

**Multiple Choice**

- In 95% of cases of Down's syndrome, there is an entire extra chromosome 21