

Answer all the following questions

Q.I. Choose the correct answer: (15 marks)

1. The chromosome that has only one arm is called
  - a. telocentric chromosome
  - b. acrocentric chromosome
  - c. submetacentric chromosome
  - d. metacentric chromosome
  
2. Which of the following causes the unwinding of the DNA double helix?
  - a. DNA helicase
  - b. RNA prime
  - c. RNA polymerase
  - d. DNA polymerase
  
3. The antiparallel nature of double-stranded DNA means that
  - a. the two strands run from 5' to 3' in opposite direction.
  - b. The 5' ends of the two strands are on the opposite ends of the DNA molecule.
  - c. the two DNA strand twist around each other in a helical patten.
  - d. (a and b)
  - e. (a and c)
  
4. A protein that is composed of more than one polypeptide has
  - a. primary structure
  - b. secondary structure
  - c. tertiary structure
  - d. quaternary structure
  
5. In DNA replication, lagging strand is synthesized
  - a. continuously in the 3' to 5' direction as a series of Okazaki fragments.
  - b. continuously in the 5' to 3' direction as a series of Okazaki fragments.
  - c. discontinuously in the 3' to 5' direction as a series of Okazaki fragments.
  - d. discontinuously in the 5' to 3' direction as a series of Okazaki fragments.

6. Bacteria do not have
- a. ribosome
  - b. a plasma membrane
  - c. a true nucleus
  - d. a genome.
7. Which of these does not require energy?
- a. simple diffusion
  - b. osmosis
  - c. facilitated diffusion
  - d. all of the above
8. Decreasing of the cholesterol level in human blood is carried out by
- a. pinocytosis
  - b. phagocytosis
  - c. exocytosis
  - d. receptor mediated endocytosis
9. Chromosomes replicate in
- a. prophase
  - b. G<sub>1</sub> phase
  - c. G<sub>2</sub> phase
  - d. S phase
10. ----- anchor the nucleus and some organelles to their places in the cell.
- a. Intermediate filaments
  - b. Microtubules
  - c. Microfilaments
  - d. Centrioles
11. The process by which the bacteria enter the cell is called
- a. pinocytosis
  - b. phagocytosis
  - c. exocytosis
  - d. none of the above
12. ----- move the chromosomes in cell division.
- a. Microtubules
  - b. Intermediate filaments
  - c. Microfilaments
  - d. Centrioles
13. Insulin is
- a. transport protein
  - b. structural protein
  - c. contractile protein
  - d. regulatory protein
  - e. none of the above
14. ----- is non branched polymer of  $\beta$ -glucose.
- a. Chitin
  - b. Cellulose
  - c. Amylose
  - d. Amylopectin
  - e. Glycogen
15. ----- is base substitution that result in change in amino acid.
- a. Silent mutation
  - b. Nonsense mutation
  - c. Missense mutation
  - d. Frame-shift mutation

**Q.II. True or False? And correct the false. (10 marks)**

1. ( ) Germ line cells and somatic cells are diploid ( $2n$ ).
2. ( ) Synapsis, crossing over, and reduction of number of chromosomes occur during prophase I.
3. ( ) Translocation results when a segment of DNA breaks off, moves from one chromosome, and is inserted into its homologous chromosome.
4. ( ) In Na / K pump, three  $\text{Na}^+$  pumping in the cell and two  $\text{K}^+$  out.
5. ( ) A general characteristic of cells is their microscopic size because as a cell grow, its surface area increases much faster than its volume does.
6. ( ) Glycoproteins and glycolipids act as surface markers that identify cell type.
7. ( ) Microfilaments are about  $7 \mu\text{m}$  in diameter, while microtubules are about  $25 \mu\text{m}$  in diameter.
8. ( ) Dyneins move organelles away from the nucleation center.
9. ( ) At spot desmosome, The plasma membranes of two adjacent cells are separated by a distance of 30 to 50 nm. And this desmosome joins actin filaments in one cell to a similar filaments in neighboring cell.
10. ( ) In counter transport,  $\text{Na}^+$  enters the cell against its concentration gradient while  $\text{Ca}^{++}$  leaves the cell down its concentration gradient.

**Q.IV. Define (4 marks)**

1. Codon: \_\_\_\_\_  
\_\_\_\_\_

2. Terpenes: \_\_\_\_\_  
\_\_\_\_\_

3. Plasmid: \_\_\_\_\_  
\_\_\_\_\_

4. Centrosome: \_\_\_\_\_  
\_\_\_\_\_

**Q.V. What are the differences between the following:**

**(8 marks)**

1. Simple diffusion and facilitated diffusion

2. Intermediate filaments and microfilaments

**Q.III. Complete the following: (9 marks)**

1. Lactose consists of ----- and ----- that joined by covalent bond called -----.
2. The intermediate filaments that occur in all types of muscle fibers composed of protein called -----.
3. ----- attach epithelial cells to the basement membrane.
4. Meiosis is reduction division because -----.
5. ----- is a specific nucleotide sequence of DNA where RNA polymerase binds and initiates transcription.
6. The first step in protein synthesis is the activation of amino acids by enzymes called -----.
7. The type of animal ribosomes is 80S ribosomes. The S refers to ----- and it is defined as -----.
8. The ATP consists of -----, ----- and -----.
9. Pores in the cell wall of plant are called -----.
10. DNA replication is semi-conservative, and this means -----.
11. During S phase, the centromere is bound to a disk of protein called ----- This disk functions as -----.
12. ----- is the microscope that uses ultraviolet to illuminate specimens.

**3. Asexual reproduction and sexual reproduction**

**4. Spontaneous mutations and induced mutations**

**5. DNA replication and DNA transcription**

**6. Heterophagosomes and autophagosomes**

**Q.VII. With drawing illustrate the following: (4 marks)**

**1. The structure of nucleotide**

**2. Lysine**

**3. Cellulose**

**4. Chloroplast**

**Q.VI. What are the functions of the following (7 marks)**

**1. Smooth endoplasmic reticulum.**

**2. Cholesterol in plasma membrane of animal cells.**

**3. Peroxisomes**

**4. Microfilaments**

**5. Central vacuole**



2. Write short note about: (5 marks)

a. Spermatogenesis

b. Posttranslational events

c.  $G_0$  phase

**Q.VIII. Comment (3 marks)**

1. Water is a polar compound. ,

2. Keeping the food in a solution containing high salt concentration

3. Red blood cell has biconcave shape.

**Q.IX. Answer the following:**

1. Explain the three checkpoints that control the cell cycle in eukaryotes.  
(3 marks)

3. Explain the composition of flagella with drawing. (2 marks)

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Good Luck ☺