

# Questions

Select the best answer

1. What is the major constituent of the cell membrane?
  - a. Proteins
  - b. Carbohydrates
  - c. Lipids
  - d. Glycoproteins
  
2. What is not found in animal cells?
  - a. Cell membrane
  - b. Lysosomes
  - c. Chloroplasts
  - d. Mitochondria
  
3. Which of the following is not true about all types of cells?
  - a. They contain complex enzyme systems for metabolism
  - b. They divide to give rise to new cell
  - c. They are the basic units of organisms
  - d. They all have a membrane bound nucleus
  
4. Which organelle plays a major role in protein targeting?
  - a. Golgi bodies
  - b. Ribosomes
  - c. Smooth endoplasmic reticulum
  - d. Mitochondria
  
5. The term used to describe similar chromosomes that pair just before cells divide is;
  - a. Heterozygous pair
  - b. Homozygous pair
  - c. Homologous pair
  - d. None of the above
  
6. Which one of the following statements is true about Mitosis?
  - a. It is a process by which organisms produce cells with a haploid number of cells.
  - b. The chromatids separate during anaphase II.
  - c. One division results in the formation of four daughter cells
  - d. It takes place in somatic cells only
  
7. What is a Karyogram?

- a. It is the process of staining and aligning picture cut outs of homologous chromosomes
- b. It is a picture of aligned homologous chromosomes
- c. It is a technique used to determine the gene sequence of DNA
- d. It is a process of comparing chromosomes of one individual with another.

8. Sex-linked disorders are:

- a. Diseases found only in men
- b. Disorders passed on from parent to child as a result of a sexually transmitted disease
- c. Diseases passed on from carrier parent(s) to offspring and prevalent in one type of sex (male or female)
- d. Genetic disorders that arise as a result of the offspring being exposed to either carcinogenic chemicals or X-rays.

9. What is the biological significance of meiosis?

- a. It results in the production of four daughter cells which are identical to the Parent cells.
- b. It results in the formation of only two daughter cells which are identical to the parent cells.
- c. The daughter cells produced have a diploid number of chromosomes.
- d. The daughter cells produced have a haploid number of chromosomes.

10. Which of the following is not an organelle in a prokaryotic cell?

- a. Vacuole
- b. Cell membrane
- c. Mitochondria
- d. Cytoplasm

11. Which macromolecule performs a structural as well as an enzymatic role in the animal cell?

- a. Protein
- b. Carbohydrate
- c. Lipids
- d. Amino acids

12. Which of the following is not found in a molecule of DNA?

- a. Ribose sugar
- b. Nitrogen base
- c. Sulphate group
- d. Phosphate group

13. Which of the following statements about the cell cycle is not true?
- It is a regulated process.
  - DNA replication takes place during the synthesis (S) phase.
  - The Go-phase is a period of dormancy.
  - No metabolic activity takes place during interphase.
14. Sex linked disorders are:
- Disorders of sex organs in males
  - Genetic disorders of blood affecting only males
  - Genetic disorders associated with the "sex chromosomes".
  - Sexually transmitted disorders
15. Which of the following is not true about meiosis?
- Somatic cells give rise to 4 daughter cells.
  - There is reduction cell division
  - There are two consecutive nuclear divisions
  - Cross-overs occur during meiosis (anaphase)
16. Which component is not found in mitochondria?
- Matrix
  - Mitochondrion DNA
  - Citric acid cycle enzyme complex
  - Enzyme complex for break down of glucose
17. What is the main function of the Golgi complex?
- synthesis of proteins
  - Break down of poorly assembled proteins
  - Modification of proteins
  - Targeting amino acids for use in the cell.
18. Which of the following factors is most likely to increase the risk of developing cancer?
- Prolonged exposure to none ionising radiation.
  - Prolonged exposure to ionising radiation
  - Exposure to none carcinogenic chemicals
  - None of the above
19. Which of the following nitrogen bases is not found in RNA?

- a. Adenine
- b. Cytocine
- c. Thymine
- d. Guanine

20. What is the difference between DNA and RNA?

- a. DNA is found in the nucleus and RNA in the cytoplasm only.
- b. DNA has deoxyribose sugar and RNA has ribose sugar.
- c. DNA is the genetic material in eukaryotic cells while RNA is found in prokaryotes.
- d. There is no chemical or structural difference between the two.

21. What is the function of cholesterol in the plasma membrane of cells?

- a. Reduce the fluidity of the plasma membrane.
- b. Stabilise the intrinsic proteins.
- c. Act as a carrier molecule across the plasma membrane.
- d. Synthesis of phospholipids.

22. What significant contribution did Watson and Crick make to Cell Biology?

- a. They discovered the microscope
- b. They elucidated the structure of the cell membrane
- c. They discovered phospholipids and intrinsic protein interactions
- d. They elucidated the structure of DNA and its replication.

23. Lipids do not contain

- a. Long chain fatty acids
- b. Glycerol
- c. Peptide bonds between fatty acids and glycerol
- d. Double bonds in some fatty acid chains.

24. What condition results from an individual having two X- chromosomes and a Y-chromosome?

- a. Down's syndrome
- b. Haemophilia
- c. None disjunction disease
- d. Klenifelters syndrome

25. Which of the following statements is true about cross overs in chromosomes?

- a. It occurs in mitosis
- b. It occurs during telophase of meiosis.

- c. It occurs in meiosis
- d. There is no evidence of cross overs in actual cells.

26. What property of phospholipids enables them to form bi-layers in the plasma membrane?

- a. They are hydrophobic
- b. They are hydrophilic
- c. They are amphipathic
- d. They have tails and heads

27. Amino acids combine to form proteins by\*

- a. Peptide bonds
- b. Glycosidic bonds
- c. Amino acids
- d. Ionic bonding

28. Which organelle is responsible for protein synthesis?

- a. Nucleus
- b. Endoplasmic reticulum
- c. Golgi complex
- d. Ribosomes

29. What is the difference between a mono hybrid and dihybrid cross?

- a. A mono hybrid cross involves two characteristics while a dihybrid cross involves one characteristic.
- b. There mono hybrid cross is found in prokaryotes while dihybrid cross in eukaryotes.
- c. A mono hybrid cross involves one characteristic while a dihybrid cross involves two characteristics.
- d. Mono hybrid crosses produce 9:3:3:1 ratios in the F2 generation while dihybrid crosses produce 3:1 ratios.

30. Which researchers developed our present model of the plasma membrane?

- a. Robertson
- b. Daniell and

32. What are oncogenes?

- a. Cancer causing genes
- b. Cancer causing viruses

- c. Dysfunctional genes in the DNA molecule
- d. Promoter and operator genes

33. Which of the following is not one of the stages in the cell cycle?

- a. interphase
- b. Metaphase II
- c. Synthesis (s) phase
- d. Gap 2 phase

34. Protein synthesis takes place at which organelle

- a. Ribosomes
- b. Endoplasmic reticulum
- c. Golgi complex
- d. Nucleus

35. What is the function of the lysosomes in the cell?

- a. Production of enzymes
- b. Destruction of foreign bodies inside the cell
- c. Production of ATP
- d. Modification of lipids

36. What is the function of the smooth endoplasmic reticulum?

- a. Lipid synthesis
- b. Protein modification
- c. Carbohydrate metabolism
- d. Storage of ATP

37. What structure gives an animal cell its shape and holds the organelles in place.

- a. The cytoskeleton
- b. The Cell membrane
- c. The cytoplasm
- d. The cell wall

38. What is the complimentary sequence to the following DNA strand

-C -G -A - T - G - G - G - A - A -C - C -T - G - T-

- a. -G-C-T-C-C-G-C-T-T-G-G-A-G-A-
- b. -C-G-A-T-G-G-G-A-A-C-C-T-G-T-
- c. -G-C-T-A-C-C-C-T-T-G-G-A-C-A-

d. -G-C-T-U-C-C-C-T-T-G-G-U-C-U-

39. Which of the following is not true about the nitrogen base cytosine?

- a. It is a purine
- b. It is normally paired with guanine in the DNA molecule
- c. It is a pyrimidine
- d. It has a ring structure.

40. Which of the following if not true about mRNA?

- a. It is a carried molecule of genetic information within the cell
- b. It is a double stranded molecule
- c. It carried information for the synthesis of proteins
- d. It has a uracil base in its structure.

41. Which of the following is true about chromosomes?

- a. They are composed of long chains of DNA super coiled around histone Proteins.
- b. They are composed of long chains of single stranded DNA supper coiled around histone proteins.
- c. They contain short chains of DNA coiled around amino acid groups
- d. During mitosis they uncoil from the histone proteins and become visible.

42. What are the monomers of carbohydrate starch?

- a. Sucrose
- b. Glucose
- c. Fructose
- d. Ribose

43. What is a Human Pedigree use for?

- a. The study of inheritance of human blood groups
- b. To determine the sex of a baby before birth
- c. To study how characteristics are passed on from generation to generation in a family.
- d. To determine how hemophilia is inherited in males from their mothers.

44. Some animal cells are mobile, what organelle gives them this ability?

- a. Cell membrane extentions
- b. Cytoskeleton
- c. Carrier proteins
- d. Flagella

45. At what stages is the cell cycle regulated

- a. At the G1 and S –phase
- b. At the G2 and M phase
- c. At the G1 and G2 phase
- d. At the S and M phase

46. By what mechanism is DNA replicated?

- a. Conservative replication
- b. Strand by strand replication
- c. Reverse enzyme replication
- d. Semi conservative replication

47. What is the application of the Ames test in medicine?

- a. Determination of mutagenic materials
- b. Determination of cancer causing genes
- c. Prevention of mutation in cells
- d. Detecting mutations in cells

48. What can be concluded about a cell that has a high concentration of mitochondria?

- a. It is an animal cell
- b. It is involved in high metabolic activity
- c. It is just about to undergo mitosis
- d. It is in a state of dormancy

49. What is the major function of the cell vacuole?

- a. Storage of enzymes
- b. Storage of cell products and waste
- c. Storage of water
- d. Storage of cell particles

50. What are the structural elements of the cell cytoskeleton?

- a. Fibrous material composed of carbohydrates
- b. Fibrous proteins containing Actin and Myosin
- c. Phospholipid strands
- d. Membranous strands in the cytoplasm

61. What is the function of peroxisomes in cells?

- a. Destruction of hydrogen peroxide



- b. Production of oxygen inside the cell
- c. Storage of enzymes
- d. Storage of hydrogen peroxide

62. How is magnification determined in a light microscope?

- a. Measuring the size of the specimen before and after observation
- b. Multiplying the eye piece and objective lens power
- c. Multiplying the objective lens power by 10
- d. By measuring the diameter of the drawn specimen

63. What is the function of the cell cytoplasm?

- a. It contains all the organelles
- b. It Stores water in a cell
- c. It is a medium of many cellular reactions
- d. Storage of materials for cell division

64. What are anti-oncogenes?

- a. Genes that suppress other genes from functioning
- b. Genes that suppress DNA transcription
- c. They are signal genes on the DNA
- d. They suppress oncogenes from being expressed

65. Why are viruses not considered as living organisms?

- a. They infect living cells
- b. They do not have organelles
- c. They can only replicate inside a host cell
- d. They only have proteins and DNA

66. What are Co-dominant Alleles?

- a. A pair of alleles that suppress other alleles from being expressed
- b. A pair of alleles that are suppressed in the presence of dominant alleles
- c. A pair of alleles that are jointly expressed
- d. Genes that suppress each other and are both not expressed

67. Anaphase is the stage in mitosis during which

- a. the chromosomes align at the "equatorial" region of the cell
- b. the chromosomes begin to separate to opposite poles of the cell
- c. the cell begins to divide into two separate daughter cells
- d. the chromosomes begin to coil and become visible

68. At during which stage does crossing over occur in meiosis?

- a. Metaphase I
- b. Metaphase II
- c. Anaphase I
- d. Anaphase II

69. Why is it not likely for human spermatozoa (23 chromosomes) to fertilize a drosophila egg (4 chromosomes?)

- a. An abnormal offspring would arise
- b. The chromosomes are incompatible and pairing would not occur
- c. The human chromosomes would be dominant to the drosophila chromosomes
- d. The drosophila chromosomes would be dominant to the human chromosomes

70. Growth and tissue repair is made possible because of the process of

- a. Meiosis
- b. Cell differentiation
- c. Protein targeting
- d. Mitosis

## SECTION B

Answer questions one and any other two questions from this section starting with. Answers must strictly not be more than one (1) page long.

1. A baby of blood group O was found dumped. There are three (3) couples who the police suspect and they have the following blood groups:

a. <b>Couple A</b>	Man	Woman
Blood group	<b>O</b>	<b>AB</b>

b. <b>Couple B</b>		
Blood group	<b>Heterozygous A</b>	<b>Heterozygous B</b>

c. <b>Couple C</b>		
Blood group	<b>Homozygous B</b>	<b>O</b>

Which of these three couples is the most likely to have been the parent of the dumped baby.

2. Explain the experiment that conclusively showed that DNA is the genetic material in the cell.
3. What is the relationship between oncogenes and anti-oncogenes in the development of cancer.
4. Describe in detail the architecture of the plasma membrane of the cell, explaining the role of each class of macromolecules.
5. Describe the Cell Cycle in detail and explain the biological significance of this process.
6. Describe the process of protein targeting and the organelles involved.
7. Explain in detail how to prepare and examine a microscopic slide of cells from the inner lining of the mouth of a human.