

Name of applicant:

1. The bacterium causing tuberculosis was discovered in 1882 by:
a) Ilja I. Metschnikov b) Louis Pasteur c) Robert Koch
d) Alexander Fleming e) none of the answers is correct

- 2) A shortage of phosphorus in the soil would make it especially difficult for a plant to manufacture
a) fatty acids b) proteins c) DNA d) cellulose
e) none of the answers is correct

3. In the following three columns, cell constituents, biochemical components and biochemical functions are listed. Which of the triads has a meaning?
a) cytoplasm histidine synthesis of ATP
b) vacuole vitamin C glucose oxidation
c) Golgi apparatus guanine synthesis of RNA
d) mitochondria adenine synthesis of DNA
e) none of the answers is correct

4. The flagellum of eukaryotic cells has a structural basis similar to:
a) a bundle of collagen fibres b) the flagellum of a bacterial cell c) a centriole
d) the tail of a bacteriophage e) none of the answers is correct

5. To film the movement of chromosomes in a dividing cell one would chose the following:
a) a bright-field light microscope, because it permits good visibility of stained chromosomes
b) a phase-contrast light microscope, because it permits good visibility of condensed chromosomes
c) a transmission electron microscope, because of its greater resolving power
d) a scanning electron microscope, because it permits viewing of living specimen
e) none of the answers is correct

6. Which response correctly lists the proper biological organization?
a) atoms, molecules, cells, tissues, organs b) molecules, atoms, cells, organs, tissues
c) atoms, molecules, cells, organs, tissues d) molecules, atoms, organs, cells, tissues
e) none of the answers is correct

7. Which of the following stimulates the release of neurotransmitters from the synaptic terminal (terminal bulb)
a) calcium ions b) potassium ions c) sodium ions d) chloride ions
e) none of the answers is correct

8. Which of the following is true about plasma membrane?
a) it is a rigid structure containing protein and lipid
b) it consists of a double layer of phospholipid in which globular protein molecules can be found
c) it consists primarily of protein with a small amount of lipid
d) it is structurally dissimilar from the rest of the membranes found in the cell
e) none of the answers is correct

9. Mutations

- a) are changes in the protein structure that alter their structure and function
- b) are changes in the structure of genes that result in shifts in the structure of proteins that dramatically alter their structure and function
- c) are of little concern in cells because proteins are so large and a change in one or two amino acids has little effect
- d) are variations of the phenotype
- e) none of the answers is correct

10. What will enable you to distinguish between a prokaryotic and a eukaryotic cell:

- a) presence or absence of a rigid cell wall
- b) presence or absence of ribosomes
- c) presence or absence of the electron transport chain
- d) presence or absence of the nucleus with a nuclear envelope
- e) none of the answers is correct

11. The mitotic spindle first appears during

- a) prophase
- b) metaphase
- c) anaphase
- d) telophase
- e) none of the answers is correct

12. During mitosis, chromosomes begin to separate during

- a) prophase
- b) metaphase
- c) anaphase
- d) telophase
- e) none of the answers is correct

13. Germ cells

- a) in humans contain 46 chromosomes
- b) are diploid
- c) contain half the number of chromosomes of somatic cells
- d) contain XX or XY combinations of sex chromosomes
- e) none of the answers is correct

14. Plants are part of a group known as a

- a) genus
- b) family
- c) kingdom
- d) species
- e) none of the answers is correct

15. The lipids that make up the bulk of the plasma membrane of the cell are

- a) fatty acids
- b) steroids
- c) phospholipids
- d) amino acids
- e) none of the answers is correct

16. Endocytosis is accomplished by:

- a) small invaginations in the plasma membrane
- b) ion channels
- c) tracheids
- d) release of hydrolytic enzymes from lysosomes
- e) none of the answers is correct

17. Plasmolysis is:

- a) a response of animal cells to hypotonic solution
- b) a response of plant cells to hypotonic solution
- c) a response of animal cells to hypertonic solution
- d) a response of plant cells to hypertonic solution
- e) none of the answers is correct

18. A biochemist measured the amount of DNA in cells growing in the laboratory and found that the quantity of DNA is doubled

- a) between the prophase and anaphase of mitosis
- b) between the G1 and G2 phases of the cell cycle
- c) during the M phase of the cell cycle
- d) between the anaphase and telophase of mitosis
- e) none of the answers is correct

19. In 1 mm^3 of human blood there are:
 a) $5 \cdot 10^6$ leukocytes b) $5 \cdot 10^6$ erythrocytes c) $5 \cdot 10^9$ erythrocytes
 d) $5 \cdot 10^6$ thrombocytes e) none of the answers is correct
20. The alleles of a given gene differ from each other in that:
 a) they are localized on chromosomes of different pairs
 b) they carry information for different proteins with the same function
 c) they are localized on different loci of the same chromosome
 d) each carries a different mutation of a gene e) none of the answers is correct
21. All offspring of a white hen and a black rooster are gray. The simplest explanation of this pattern of inheritance is:
 a) pleiotropy b) sex linkage c) incomplete dominance
 d) independent assortment e) none of the answers is correct
22. Gregor Mendel studied heredity using the following organisms
 a) fungi b) mice c) rabbits d) peas e) none of the answers is correct
23. In a monohybrid cross between an individual with a genotype AA and Aa
 a) all offspring are heterozygous b) all individuals are homozygous dominant
 c) the ratio of phenotypes is 3 : 1 d) the ratio of genotypes is 1:1
 e) none of the answers is correct
24. Crossing over is:
 a) a synonym for chromosome segregation b) assortment of new sets of chromosomes
 c) exchange of chromosome segments between maternal and paternal chromatids
 d) reduction in the number of chromosomes in a set e) none of the answers is correct
25. Which of the following proteins is involved in blood clotting?
 a) albumin b) gamma globulins c) fibrin d) collagen
 e) none of the answers is correct
26. The most important chemical in the control of breathing is
 a) oxygen b) carbonic acid c) hydrogen
 d) carbon dioxide e) none of the answers is correct
27. Red blood cells
 a) are produced in the liver b) are produced in yellow marrow
 c) are produced from undifferentiated cells known as stem cells
 d) are destroyed in the liver e) none of the answers is correct
28. During embryonic development, the sperm and ovum combine to form
 a) a morula b) a zygote c) endoderm d) ectoderm
 e) none of the answers is correct
29. The substance that gives bone its flexibility is known as
 a) calcium phosphate b) actin c) myosin d) collagen
 e) none of the answers is correct
30. Which of the following is the correct order for the movement of air to the lungs?
 a) nose, larynx, pharynx, trachea, bronchi b) nose, pharynx, larynx, trachea, bronchi
 c) nose, pharynx, larynx, bronchi, trachea d) nose, bronchi, larynx, bronchi, trachea
 e) none of the answers is correct

31. The condition caused by excess secretion of growth hormone in adults is called
 a) giantism b) diabetes mellitus c) acromegaly
 d) hypertension e) none of the answers is correct
32. The islets of Langerhans in the pancreas are the site of production of which substance?
 a) calcitonin b) insulin c) digestive enzymes d) thyroxine
 e) none of the answers is correct
33. _____ is the central atom in the hemoglobin molecule and is needed in the diet because of the constant loss of red blood cells.
 a) sodium b) lead c) calcium d) iron
 e) none of the answers is correct
- 34) Substances that trigger an immune reaction are called
 a) interferons b) antimatter c) antibodies d) antigens
 e) none of the answers is correct
35. In each nephron of the kidney , the glomerulus and Bowman´s capsule
 a) filter blood and capture the filtrate b) reabsorb water into the blood
 c) break down harmful toxins and poisons d) refine and concentrate urine for excretion
 e) none of the answers is correct
36. The most important source of ready energy in the human body are:
 a) lipids b) proteins c) nucleic acids d) sugars
 e) none of the answers is correct
37. Which of the receptors respond to a change in body position in humans?
 a) chemoreceptors b) mechanoreceptors c) radioreceptors
 d) free nerve endings e) none of the answers is correct
38. The corpus luteum is formed:
 a) in menopause b) by the effect of prolactin c) by the effect of progesteron
 d) from a ruptured follicle e) none of the answers is correct
39. The process of photosynthesis consumes _____ and produces _____ :
 a) chlorophyll.....H₂O b) H₂OCO₂
 c) H₂OO₂ d) glucose.....O₂
 e) none of the answers is correct
40. The earliest paleontological evidence of the existence of cells is found in sediments aged:
 a) 1.10⁸ years b) 1.10⁹ years c) 3.5 10⁹ years
 d) 5.10⁹ years e) none of the answers is correct