

There is one and only correct answer for each question, take your time to read the question and evaluate the possible responses.

Histology and Anatomy

- 1) Which organelle contains digestive enzymes?
 - a. Smooth endoplasmic reticulum
 - b. Rough endoplasmic reticulum
 - c. Golgi apparatus
 - d. Lysosome**
 - e. Mitochondria

- 2) What is the term for the general process that cells use to expunge material from the cell?
 - a. Endocytosis
 - b. Exocytosis**
 - c. Pinocytosis
 - d. Phagocytosis
 - e. Active transport

- 3) Which organelle is considered the powerhouse of the cell?
 - a. Rough endoplasmic reticulum
 - b. Smooth endoplasmic reticulum
 - c. Lysosome
 - d. Golgi apparatus
 - e. Mitochondria**

- 4) Which of the following is NOT a membranous organelle?
 - a. Lysosomes
 - b. Filaments**
 - c. Peroxisomes
 - d. Mitochondria
 - e. Endoplasmic reticulum

- 5) What type of epithelial cells are as tall as they are wide?
 - a. Simple
 - b. Stratified
 - c. Squamous
 - d. Cuboidal**
 - e. Columnar

- 6) What do you call the simple squamous epithelium that lines the blood vessels?
 - a. Epithelioid tissue
 - b. Mesothelium
 - c. Endothelium**
 - d. Transitional
 - e. Pseudostratified

7) What forms the brush border?

- a. **Microvilli**
- b. Stereocilia
- c. Cilia
- d. Keratinization
- e. Both a and b

8) Which of the following can be classified as "specialized connective tissue"?

- a. Mesenchyme
- b. Mucous connective tissue
- c. Dense connective tissue
- d. **Blood**
- e. Loose connective tissue

9) What type of tissue makes up the dermis of the skin?

- a. Mucous connective tissue
- b. Mesenchyme
- c. Loose irregular connective tissue
- d. **Dense irregular connective tissue**
- e. Dense regular connective tissue

10) Which type of cartilage forms the skeleton of the fetus?

- a. **Hyaline cartilage**
- b. Elastic cartilage
- c. Fibrocartilage
- d. All of the above
- e. None of the above

11) What cell is involved in bone resorption?

- a. **Osteoclast**
- b. Osteon
- c. Osteocyte
- d. Osteoblast
- e. Osteoid

12) Which fiber type is seen in skeletal muscle?

- a. Red fibers
- b. White fibers
- c. Intermediate fibers
- d. **All of the above**
- e. None of the above

13) Which cell is a macrophage found in the skin?

- a. Kupffer cells
- b. Histiocyte
- c. Dust cell
- d. **Langerhans cell**
- e. Microglia

14) Which meninx is made of a delicate web like connective tissue?

- a. Dura mater
- b. Arachnoid**
- c. Pia mater
- d. Both a and b
- e. All of the above

15) Which of the following is the exocrine portion of the pancreas?

- a. Islets of Langerhans
- b. Alpha cells
- c. Beta cells
- d. Delta cells
- e. Acini**

16) Which of the following is NOT a function of the liver?

- a. Metabolism of bilirubin
- b. Deamination of amino acids
- c. Storage of iron
- d. Storage of copper
- e. Storage of calcium**

17) Which type of papillae on the tongue is the most abundant?

- a. Filiform papillae**
- b. Circumvallate papillae
- c. Fungiform papillae
- d. Foliate papillae
- e. All of the above

18) Which structure is transparent?

- a. Choroid
- b. Ciliary body
- c. Iris
- d. Ora serrata
- e. Cornea**

19) What type of tissue is a tendon composed of?

- a. Mucous connective tissue
- b. Mesenchyme
- c. Loose irregular connective tissue
- d. Dense irregular connective tissue
- e. Dense regular connective tissue**

20) What is the total magnification achieved with a compound microscope?

- a. Magnification of objective lens
- b. Magnification of ocular lens
- c. Magnification of ocular lens added to the magnification of the objective lens
- d. Magnification of ocular lens multiplied by the magnification of the objective lens**
- e. Magnification of condenser lens multiplied by the magnification of the objective lens

Genetics

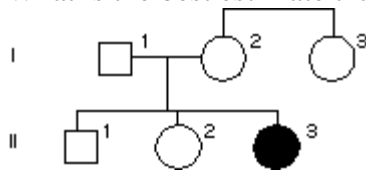
21) G6PD deficiency is common in African, Mediterranean, and Asiatic populations in which malaria has been endemic. Multiple different mutations have been found in different populations. This high frequency of G6PD mutations is best explained by:

- a. **Balanced polymorphism.**
- b. The mild phenotype of G6PD deficiency.
- c. Founder effect.
- d. Genetic drift.
- e. The influence of drugs that cause hemolytic anemia.

22) Hemophilia A and hemophilia B have nearly identical phenotypes, but they result from mutations in different genes on the X chromosome. This is an example of:

- a. Allelic heterogeneity
- b. Double heterozygosity
- c. Compound heterozygosity
- d. Variable expressivity
- e. **Locus heterogeneity**

23) The pedigree below is from a family with cystic fibrosis, an autosomal recessive condition. What is the best estimate that individual I-3 is a carrier of cystic fibrosis?



- a. 1/4
- b. 1/3
- c. **1/2**
- d. 2/3
- e. 3/4

24) Which karyotype would be MOST frequently seen in liveborn infants (as opposed to spontaneous abortions)?

- a. 46,YY
- b. 69,XXX
- c. **47,XX,+21**
- d. 46,XY,-11,+22
- e. 47,XX,+3

25) A type of muscular dystrophy is sex linked. If a woman is a carrier for the disease, what proportion of her SONS will have the disease

- A. None
- B. All
- C. **1/2**
- D. 1/4
- E. 2/3

Biochemistry and Molecular Biology

- 26) Physiological blood pH:
- a. 2
 - b. 7
 - c. **7,4**
 - d. 8
 - e. 10,2
- 27) $\text{NH}_2\text{-CH}_2\text{-COOH}$ This is a:
- a. **Amino acid**
 - b. Nucleotide
 - c. Carbohydrates
 - d. Lipid
 - e. Protein
- 28) Ribose is a constituent of:
- a. DNA
 - b. **RNA**
 - c. Proteins
 - d. Lipids
 - e. Carbohydrates
- 29) Lactose is a:
- a. DNA
 - b. RNA
 - c. Protein
 - d. Lipid
 - e. **Carbohydrate**
- 30) Glycogen is a polymer of
- a. Ribose
 - b. Deoxyribose
 - c. Fructose
 - d. Lactose
 - e. **Glucose**
- 31) In aerobic condition glycolysis:
- a. Consumes glucose to produce ATP, NADH and pyruvate
 - b. **Consumes glucose to produce ATP and lactate**
 - c. Consumes glucose and oxygen to produce ATP and CO_2
 - d. Produces glucose by consuming ATP and lactate
 - e. Produces glucose by consuming amino acids

- 32) Oxidative phosphorylation process take place in the:
- Nucleus
 - Endoplasmic reticulum
 - Plasma membrane
 - Mitochondria**
 - Cytoplasm
- 33) Phospholipids are constituents of:
- chromatin
 - ribosomes
 - extracellular matrix
 - cell membranes**
 - cytoplasm
- 34) The eukaryotic DNA polymerases to be functional need:
- A template, a primer and deoxyribonucleotides**
 - A template and deoxyribonucleotides
 - A primer and a template
 - A primer and deoxyribonucleotides
 - None of the above
- 35) The process of RNA synthesis using a DNA template by RNA polymerases is called:
- Transcription**
 - Translation
 - Translocation
 - Transversion
 - Transition
- 36) Messengers RNA provide information for:
- Protein synthesis in ribosomes**
 - Protein synthesis in the nucleus
 - Gene synthesis in the nucleus
 - Protein degradation in the nucleus
 - Gene degradation in the nucleus
- 37) Insulin promotes a:
- Decrease in plasma glucose**
 - Increase in plasma glucose
 - Decrease in plasma cholesterol
 - Increase in plasma cholesterol
 - Weight loss

- 38) Na^+ is actively pumped in the:
- a. Cytoplasm
 - b. Nucleus
 - c. Mitochondria
 - d. Extracellular fluids**
 - e. Plasma membrane
- 39) One of those is a measure of concentration:
- a. Molarity**
 - b. Polarity
 - c. Gravity
 - d. Weight
 - e. Volume
- 40) Proteins are polymers of:
- a. Carbohydrates
 - b. Nucleotides
 - c. Lipids
 - d. Amino acids**
 - e. DNA

Immunology

- 41- Which of the following statements most-accurately describes the role played by the immune system in animals?
- a. to regulate hormones that are involved in hunger and sleep
 - b. to differentiate self from non-self and protect the body from pathogens and cancer**
 - c. to maintain the skin and, thus, immunity from puncture wounds
 - d. all of these answers
 - e. none of the answers
- 42- Which of the following is a nonspecific barrier defense?
- a. mucous membranes**
 - b. antibodies
 - c. macrophages
 - d. complement
 - e. T and B cells
- 43- Which of the following cell phagocytose cellular debris and pathogens?
- a. eosinophils
 - b. natural killer cells
 - c. mast cells
 - d. macrophages**
 - e. T cells
- 44- Which of the following cells, presents antigens, on MHC Class II molecules, to T cells?
- a. mast cells
 - b. natural killer cells

- c. **dendritic cells**
- d. eosinophils
- e. endothelial cells

45- Which of the following stimulate a response by B cells and T cells?

- a. **antigens**
- b. platelets
- c. antibodies
- d. plasma
- e. complement

46- Which of the following statements applies to the role of memory cells?

- a. they are responsible for passive immunity
- b. they cannot be reactivated
- c. **they provide an accelerated immune response upon re-exposure**
- d. they produce cyclosporine
- e. all of these answers

47- Which of the following statements best describes the difference between T cell receptors (TCRs) and B cell receptors (BCRs)?

- a. **TCRs recognize peptides presented by MHC molecules, whereas BCRs recognize antigens in their native form.**
- b. TCRs help initiate the complement cascade, whereas BCRs help recruit phagocytes.
- c. BCRs recognize peptides presented by MHC molecules, whereas TCRs recognize antigens in their native form.
- d. TCRs are present on the inside of cells, whereas BCRs are present on the outside of cells.
- e. TCRs recognize only viruses while BCRs only bacteria

48- Which of the following statements accurately summarizes the humoral immune response?

- a. **antibodies on B cells recognize antigens in the body fluids and B cells proliferate**
- b. Cytotoxic T cells recognize pathogen antibodies presented on MHC I molecules and induce apoptosis
- c. NK cells recognize deficiencies in MHC I and release cytokines to recruit complement
- d. dendritic cells are invaded by pathogens and become APCs
- e. macrophages upon opsonization phagocytose bacteria

49- The part of the antigen recognized by the immune system is called the:

- a. paratope
- b. antigen
- c. protein
- d. **epitope**
- e. lipitope

50- Which subclass of antibodies are found in secretions such as milk and tears?

- a. **IgAs**
- b. IgMs
- c. IgGs
- d. IgDs
- e. IgEs