TEST BIOLOGY

***Dear applicants, please clearly mark by X your answers in the** Answer sheet!*

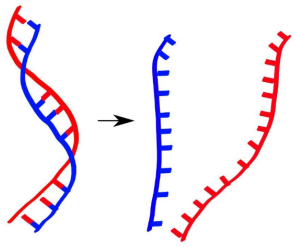
1. Which organelle functions as the *"powerhouse"* of the cell by producing the energy necessary for all cell functions to occur? **A.** cytoplasm **B.** ribosomes **C.** nucleus **D.** mitochondria

2. Which of the following organelles is surrounded by a double membrane?
A. lysosome **B.** nucleus **C.** peroxisome **D.** endoplasmic reticulum

3. Which are the four types of animal tissues?
A. epithelial, squamous, muscular, connective
B. epithelial, connective, muscular, cardiac
C. connective, muscular, epithilial, nervous
D. cuboidal, ciliated, glandular, columnar

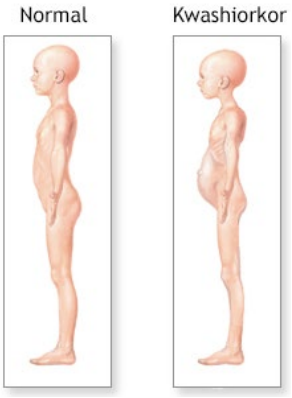
4. What do lipases break down?
A. complex carbohydrates **B.** simple carbohydrates **C.** fats **D.** proteins

5. Heat causes the two strands of DNA helices to separate. G/C pairs form with 3 hydrogen bonds, whilst A/T pairs form with 2 hydrogen bonds. Which of the following helices will denature at the HIGHEST temperature?



A. Short strand with a high proportion of A/T base pairs.
B. Long strand with a high proportion of A/T base pairs.
C. Short strand with a high proportion of G/C base pairs.
D. Long strand with a high proportion of G/C base pairs.

6. Which of the following elements is NOT present in hemoglobin?
A. iron **B.** oxygen **C.** nitrogen **D.** phosphorus



7. *Kwashiorkor* is a severe form of malnutrition which occurs when people eat insufficient protein. The levels of proteins in the blood plasma become very low. Which of the following are features of Kwashiorkor?
A. The blood has higher water potential.
B. Water is absorbed from the blood into tissues.
C. High sugar supplements are a treatment.
D. The amount of urea producing enzymes is increased.

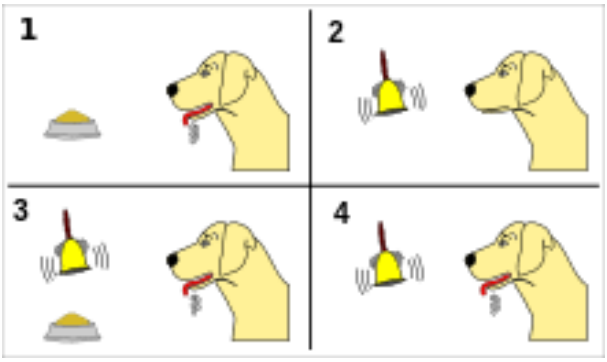
8. Several diseases can lead to someone producing large amounts of dilute urine. What could cause one of them?
A. absence of antidiuretic hormone (vasopressin)
B. blood loss (haemorrhage)
C. low blood glucose levels
D. damage to the large intestine

9. Some hormones have receptors in the cytosol (cytoplasm) and other have receptors on the plasma membrane. What could NOT explain this difference?
A. Some hormones have trans-membrane transporters.
B. Some hormones are hydrophobic and can pass through the plasma membrane.
C. Some hormones can interact with their receptor from the other side of the membrane.
D. Some signals move from one cell into another through tunnels between them.

10. Which organic molecule has long hydrocarbon chains and is a major element of cell membranes?
A. polypeptides **B.** carbohydrates **C.** phospholipids **D.** nucleotides

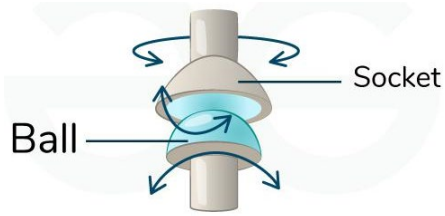
11. In which structure do sperm mature after they are produced?
A. prostate gland **B.** epididymis **C.** bulbourethral glands **D.** seminal vesicles

12. In the human body, muscle cells have an increased need for energy during exercise. To help supply this energy, the body will immediately increase
A. food intake to increase the substances available for respiration.
B. activity in the nervous system to stimulate intake of carbon dioxide.
C. the need for waste products to be retained.
D. the breathing rate to supply more oxygen to cells for the release of energy.



13. Pavlov's dogs are famous for salivating when they heard a bell ring. What is the best explanation for this?
A. The bell made the dogs hungry.
B. The dogs learnt that food appears when the bell rings.
C. The bell sounds like the dogs' food bowls.
D. The dogs salivate after any loud noise.

14. Trace the flow of blood for a nephron:
A. peritubular capillaries, efferent arteriole, glomerulus, afferent arteriole
B. efferent arteriole, glomerulus, afferent arteriole, peritubular capillaries
C. afferent arteriole, glomerulus, efferent arteriole, peritubular capillaries
D. afferent arteriole, glomerulus, peritubular capillaries, efferent arteriole



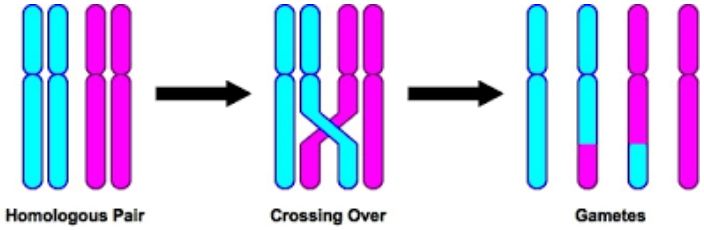
15. Ball and socket joint permits movement in any direction. It allows bone movement in circular or in up and down motion free. Where can we find ball and socket joint?
A. shoulder **B.** knee **C.** finger **D.** elbow

16. Proteins that are secreted by cells are generally:
A. not synthesized on membrane-bound ribosomes
B. initially synthesized with a signal peptide or leader sequence at their C terminal
C. found in vesicles and secretory granules
D. secreted in a form that is larger than the form present in the endoplasmic reticulum

17. Which of the following is synthesized and stored in the human liver cells?
A. galactose **B.** lactose **C.** glycogen **D.** vitamin B_{12}

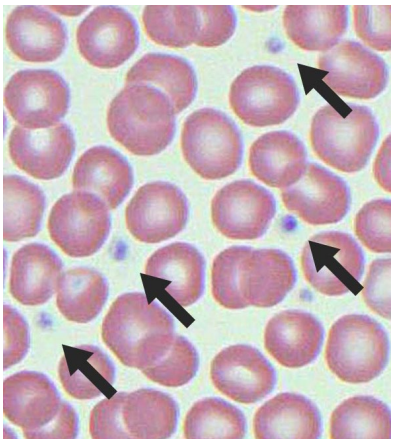
18. In the neonates, the brown fat is located at the following sites EXEPT:
A. around the heart **B.** in the axillae **C.** around the brain **D.** around the kidney

19. When does chromosome crossing over occur?
A. synthesis phase
B. mitosis
C. meiosis 1
D. meiosis 2



20. Chromosome constitution of secondary oocyte is: A. 23, Y **B.** 23, X **C.** 46, XY **D.** 46, XX

21. All of the following are hormones of the anterior pituitary EXCEPT:
A. human growth hormone **B.** follicle-stimulating hormone
C. parathyroid hormone **D.** thyroid-stimulating hormone



22. The following are true about the structures, indicated by arrows on the scheme:
1. they are formed in the bone marrow from megakaryocytes
2. their life span in circulation is about 120 days
3. in a normal person 20% of the structures are found in the spleen
4. they are found only in mammals
5. the main function is to carry oxygen in human body
Answers: **A.** 1, 2 and 3 **B.** 1, 3 and 4 **C.** 2, 3 and 5 **D.** 3, 4 and 5

23. The effects of sympathetic nervous system include:
1. contraction of the bladder detrusor muscle
2. pupillary dilatation
3. reduced gastrointestinal motility
4. constricts bronchiole smooth muscle
Answers: **A.** 1 and 2 **B.** 1 and 3 **C.** 2 and 3 **D.** 2, 3 and 4

24. Sort each description by the different types of RNAs.
a. contains an anticodon
b. specifies the amino acid squence for a protein
c. contains exons
d. has amino acids covalently attached
e. is a component of ribosomes
f. is the most abundant form of RNA
Answers: **A.** a, b, d – tRNA, c – mRNA, e, f – rRNA **B.** a, c – tRNA, d, e – mRNA, b, f – rRNA
C. a, e, f – rRNA, b – mRNA, c, d – tRNA **D.** b, e, d – tRNA, a, c – mRNA, d, f – rRNA

25. Insulin:
1. is secreted as a pro-insulin in beta cells of pancreas
2. increases protein synthesis
3. is required for glucose uptake in all tissues
4. is a steroid hormone
5. deficiency results in diabetes, a condition of low blood sugar level (hyporglycaemia).
Answers: **A.** 1 and 2 **B.** 1, 3 and 4 **C.** 2, 3 and 5 **D.** 3, 4 and 5

26. Describe shortly the functions and secretion of digestive enzymes of the organ listed:
a. Pancreas **b.** Small intestine