



Sample: Biology - Human Biology

Assignment 1

6)

Tissue Type	Description
Connective	b, f
Nervous	c
Muscle	b, d
Epithelium	a, e

11) b, c

12)

Skeletal muscle	1
Cartilage	4
Tendon	2
Articular capsule	X
Synovial fluid	3
Ligament	5
Smooth muscle	X
Vertebrae	X

13) a, d

14) b

15) Muscles use the energy from the breakdown of glucose, the latter being stored in the form of glycogen. Glycogen can be rapidly converted to glucose when energy is required. Muscle cells also contain globules of fat as an additional energy reservoir. Also, in fact, skeletal muscle is made up of myocytes. They are formed from the fusion of developmental myoblasts (a type of embryonic progenitor cell that gives rise to a muscle cell) in a process known as myogenesis. These long, cylindrical, multinucleated cells are also called myofibers.

16) a

17) While contracting, the muscle shortens, thickens and moves relative to the adjacent muscles. The shortening of the muscle is accompanied by convergence of its ends causing, therefore, the movement of bones it is attached to.

18) c

19) e



Assignment 2

8) a

9) b

10) Infecting and killing the T helper cells, HIV abolishes the acquired immune response. T helper cells are responsible for both, humoral and cell-mediated immune response, interacting with antigen-presenting cells, activating B and cytotoxic T cells. As T helper cells are lost, the named above processes don't take place, hence immune response cannot proceed normally.

24) The eye is an optical system, having light-refracting (e.g. cornea, lens) and light-sensing components (retina). Light rays are focused onto the retina by the light-refracting system. The retina has light-sensitive photoreceptors (cones and rods), which perceive the light and convey the information to the brain.

Humans have two eyes, oriented so that their fields of view overlap a lot. This allows perceiving two images of the same object from slightly different points. The brain analyzes the differences in the two images and calculates the distance to objects. This is called binocular vision and is crucial for spatially precise movements and positioning.

25) In vertebrates, the inner ear is responsible not only for sound detection, but also for balance. This is thanks to the vestibular system, which is located in the inner ear and consists of three semicircular canals oriented in perpendicular planes with respect to each other and filled with a fluid (endolymph). Specialized hair cells detect the fluid movement as the head is being rotated. Linear accelerations are detected with the help of otoliths. The brain receives, interprets and processes the information from these systems to control balance. The vestibular system works together with the visual system to keep objects in focus when the head is moving, keep balance, is responsible for spatial orientation.

26) The skin contains mechanoreceptors. These receptors, namely the ones located in the feet, tell the brain whether the foot is touching the ground, standing still or moving across a rough surface, accounting thus for posture and balance. There are four main types of skin receptors: Pacinian corpuscles, Meissner's corpuscles, Merkel's discs, and Ruffini endings. The tactile corpuscles respond to light touch, and adapt rapidly to changes in texture; the bulbous corpuscles detect tension deep in the skin and fascia; the Merkel nerve endings detect sustained pressure; the lamellar corpuscles in the skin and fascia detect rapid vibrations.

**Assignment 3**

18)

A	xi
B	iii
C	ii
D	xiii
E	vi
F	x

19) d

20) High concentrations of LH cause the Graafian follicle to rupture and release (Outcome X) the oocyte, which passes into the fallopian tube. Follicle cells that remain in the ovary ultimately develop into the corpus luteum.