BIOLOGY 1 2015 - NECTA FORM FOUR

Solutions from: Maktaba by TETEA

By Yohana Lazaro

1.

i	ii	iii	iv	v	vi	vii	viii	ix	x
C	D	E	D	D	A	C	C	B	B

2

i	ii	iii	iv	v	vi	vii	viii	ix	x
I	H	O	N	E	L	G	M	F	K

3. (a) (i)Biology is the study of living and non-living organisms.

(ii)Zoology is the branch of biology that deals with the study of animals.

(b)Importance of studying biology

-helps to know some diseases

-helps to take some carriers like medicine, pharmacy.

-helps to solve some problems especially health problems

-helps to answer fundamental questions like, where life originated.

4(a) First Aid is an immediately assistance given to a victim before taken to hospital.

(b)First aid to an electric shock person;-

-switch of the electric current

-remove a person by using dry non-metallic material like wood

-lose any tight clothing around neck, chest of the victim.

-start artificial respiration to a victim

-take a victim to hospital if is not comfortable.

5(a) Digestion is the process of breaking food materials down to small particles, which can be assimilated by the body.

Feeding is the process by which organisms take in food.

(b)(i) Food is alkaline in the mouth because the saliva in the mouth contains hydrogencarbonate, which provides the alkaline medium for salivary amylase to work.

(ii)Food is acidic in stomach due to hydrochloric acid secreted to enable the functioning of stomach enzymes.

(iii)Food in the ileum is alkaline as it contains bicarbonate ions from pancreatic juice, which neutralize acid from the stomach and provide optimum pH for enzymes.

6(a) Characteristics of Phylum Arthropod

-they have jointed appendages.

-they possess an exoskeleton made up of chitin materials.

-are metamerically segmented; each segment has a complete set of organs.

-they are coelomate (has a body cavity)

-they have a bilateral symmetry.

(b)

class	Example of organism
insecta	Housefly,butterfly,mosquito
Arachnida	Tick,mites,spider
crustacea	Lobaters,woodlouder,crabs,water flea
chilopoda	centipedes
diplopoda	millipedes

7(a) A-ciliary body

B-lens

C-pupil

D-cornea

E-iris

F-conjuctiva

G-sclera

H-choroid

I-optic nerve

J-blind spot

K-fovea

L-retina

M-vitreous humour

(b)(i)in dim light,the radial muscles of the irisi contract while the circular muscles relax and the pupil becomes larger thus allow more light to pass through it.

(ii)in bright light,the circular muscles contract while the radial muscles relax and so the pupil becom narrow hence allow only small amount of light to pass through the eye.

8(a)Gene is the part of the chromosome that contains genetic materials, known as DNA.

Genetics is the branch of biology that deals with study of hereditary and variation.

(b)

RNA	DNA
RNA is single stranded except in some viruses	DNA is double stranded except in few viruses
RNA have ribose sugar	DNA have deoxyribose sugar
Bases present are adenine, guanine, cytosine and uracil.	Bases present are adenine, guanine, cytosine and thymine.
Adenine pairs with uracil	Adenine pairs with thymine
Purine is not equal to pyrimidine	Purine is equal to pyrimidine (Chargaff's rule)
Regions having complementary nucleotides, pairs, and form hair pin loop like structure and helical.	Complementary nucleotides are present throughout the length of the DNA.
RNA is genetic material in some viruses.	DNA is the genetic material in all living organisms.
Length of RNA is short consisting of only few thousands nucleotides.	Length of DNA is quite large consisting of millions of nucleotides.
Three types of RNA are present in an organism: mRNA, rRNA, tRNA.	DNA occurs only in one form in an organism.
mRNA occurs in nucleolus, rRNA and tRNA occur in cytoplasm.	DNA occurs in nucleus, nucleolus, and extrachromosomal DNA in mitochondria and chloroplast.

9(a)-HIV Human immunodeficiency virus.

-STI Sexual Transmitted Infections.

-TD Transmitted Diseases.

(b)ways through which HIV can be Transmitted,

-from mother to baby during breastfeeding.

-through unprotected sexual intercourse

-by sharing sharp items like needle with infected person.

10(a) Osmoregulation is the maintenance of relatively constant osmotic pressure of body fluids

(b)Blood sugar regulation.

-How Insulin Helps Control Blood Glucose Levels

Insulin and glucagon are hormones secreted by islet cells within the pancreas. They are both secreted in response to blood sugar levels, but in opposite fashion!

Insulin is normally secreted by the beta cells (a type of islet cell) of the pancreas. The stimulus for insulin secretion is a HIGH blood glucose...it's as simple as that! Although there is always a low level of insulin secreted by the pancreas, the amount secreted into the blood increases as the blood glucose rises. Similarly, as blood glucose falls, the amount of insulin secreted by the pancreatic islets goes down.

As can be seen in the picture, insulin has an effect on a number of cells, including muscle, red blood cells, and fat cells. In response to insulin, these cells absorb glucose out of the blood, having the net effect of lowering the high blood glucose levels into the normal range.

Glucagon is secreted by the alpha cells of the pancreatic islets in much the same manner as insulin...except in the opposite direction. If blood glucose is high, then no glucagon is secreted.

When blood glucose goes LOW, however, (such as between meals, and during exercise) more and more glucagon is secreted. Like insulin, glucagon has an effect on many cells of the body, but most notably the liver.

The Role of Glucagon in Blood Glucose Control

The effect of glucagon is to make the liver release the glucose it has stored in its cells into the bloodstream, with the net effect of increasing blood glucose. Glucagon also induces the liver (and some other cells such as muscle) to make glucose out of building blocks obtained from other nutrients found in the body (eg, protein)..

11.MAMMALIAN HEART.

Muscular to pump blood over long distance;

- Myogenic cardiac muscles which contract and relax rhythmically without fatigue; hence heart continues pumping;

- Cardiac muscle fibres interconnected to form a network of fibre to ensure rapid and uniform spread of excitation throughout the walls of the heart;

- Heart divided into 4 chambers which are hollow to accommodate more blood;

- Ventricles have thicker walls than auricles to generate higher pressure to drive blood over long

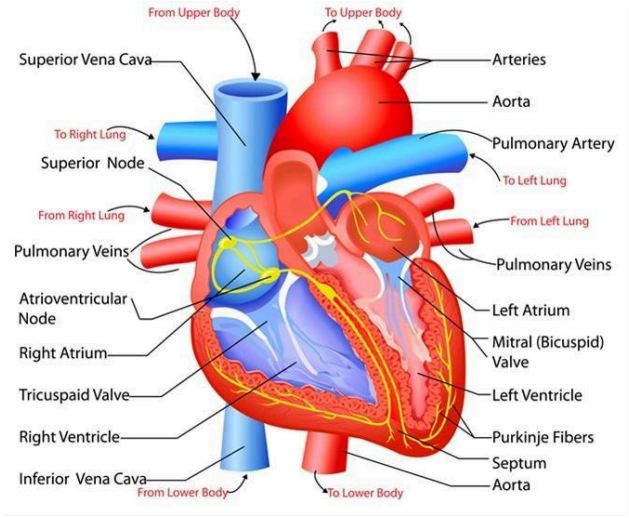
distance into more elaborate circulation/to the lungs and to all body tissues;

- Walls of left ventricles are thicker than those of right ventricles to generate more pressure to pump

blood to longer distance in the systemic circulation/rest of the body;

- Longitudinal septum which separates the heart into two halves to prevent mixing of oxygenated and deoxygenated blood;

- Valves to prevent back flow of blood;



- Valves have strands of connecting tissue (chordas tendinae) to prevent them from being pushed

inside out when ventricles contract;

- Has coronary artery and coronary vein to supply myocardium with oxygen and nutrients; and remove waste products/carbon IV oxide and nitrogenous wastes;

- Fibrous layer of pericardium surrounds the heart to keep it in position; and prevent overdilation;

- Inner percadium secretes the pericardial fluid; which reduces friction between the two layers during contraction;

- outer pericardium surrounded by layer of fat which acts as shock absorber; protect it from

mechanical damage

- Sino Atrial Node (S.A.N) acts a pacemaker regulating rate of beating and excitation of heart;

- Heart located in the thoracic cavity where it is protected from any external mechanical damage;

- Atrio Ventricular node (A.V.N) which delays depolarization wave from Sino Atrial Node to ensure that auricles empty completely before the ventricles contract.

12.CHOLERA

Cholera

Cholera is a serious bacterial disease that usually causes severe diarrhea and dehydration. The disease is typically spread through contaminated water.

SYMPTOMS.

Common symptoms of cholera include:

sudden onset of diarrhea

nausea

vomiting

mild to severe dehydration

The dehydration caused by cholera is usually severe and can cause tiredness, moodiness, sunken eyes, dry mouth, shriveled skin, extreme thirst, reduced urine output, irregular heartbeat, and low blood pressure.

Dehydration may lead to loss of minerals in your blood. This can lead to an electrolyte imbalance. The first sign of an electrolyte imbalance is severe muscle cramps. An electrolyte imbalance can eventually lead to shock.

Children usually have the same cholera symptoms as adults. Children may also experience the following:

drowsiness

fever

convulsions

coma

Preventing cholera infection

If you're traveling to an area where cholera is common, your chances of catching the disease are still low if you:

wash your hands

drink only bottled or boiled water

avoid raw food and shellfish

avoid dairy foods

eat raw fruits and vegetables that you can peel yourself

Since cholera vaccines don't work very well, and most people have a slim chance of catching cholera, your doctor is not likely to provide you with a vaccination.

13.HUMAN SKELETON.

Human skeleton, the internal skeleton that serves as a framework for the body. This framework consists of many individual bones and cartilages. There also are bands of fibrous connective tissue—the ligaments and the tendons—in intimate relationship with the parts of the skeleton.

Axial skeleton anatomy

The adult axial skeleton consists of 80 bones. It's made up of the bones that form the vertical axis of the body, such as the bones of the head, neck, chest, and spine.

Skull bones

The adult skull comprises 22 bones. These bones can be further classified by location:

Cranial bones. The eight cranial bones form the bulk of your skull. They help to protect your brain.

Facial bones. There are 14 facial bones. They're found on the front of the skull and make up the .

Hyoid

The hyoid is a U-shaped bone found at the base of the jaw. It serves as a point of attachment for muscles and ligaments in the neck.

Vertebral column

The vertebral column is made up 26 bones. The first 24 are all vertebrae, followed by the sacrum and coccyx (tailbone).

The 24 vertebrae can be further divided into the:

Cervical vertebrae. These seven bones are found in the head and neck.

Thoracic vertebrae. These 12 bones are found in the upper back.

Lumbar vertebrae. These five bones are found in the lower back.

The sacrum and coccyx are both made up of several fused vertebrae. They help support the weight of the body while sitting. They also serve as attachment points for various ligaments.

Thoracic cage

The thoracic cage is made up of the sternum (breastbone) and 12 pairs of ribs. These bones form a protective cage around the organs of the upper torso, including the heart and lungs.

Some of the ribs attach directly to the sternum, while others are linked to the sternum via cartilage. Some have no attachment point and are referred to as “floating ribs.”

Appendicular skeleton anatomy

There are a total of 126 bones in the appendicular skeleton. It consists of the bones that make up the arms and legs, as well as the bones that attach them to the axial skeleton.

Pectoral girdle

The pectoral girdle is where the arms attach to the axial skeleton. It’s made up of the clavicle (collarbone) and scapula (shoulder blade). There are two of each of these — one for each arm.

Upper limbs

Each arm contains 30 bones, known as the:

Humerus. The humerus is the long bone of the upper arm.

Radius. The radius is one of two long bones of the forearm, found on the thumb side.

Ulna. The ulna is the second long bone of the forearm, found on the pinky finger side.

Carpals. The carpals are a group of eight bones found in the wrist area.

Metacarpals. The metacarpals are five bones found in the middle area of the hand.

Phalanges. The phalanges are 14 bones that make up the fingers.

Pelvic girdle

The pelvic girdle, commonly known as the hips, is where the legs attach to the axial skeleton. It’s made up of two hipbones — one for each leg.

Lower limbs

Each leg is composed of 30 bones, known as the:

Femur. The femur is the large bone of the upper leg.

Tibia. The tibia is the main bone of the lower leg. It forms the shin.

Fibula. The fibula is the second bone in the lower leg, found in the outer leg.

Patella. The patella is also called the kneecap.

Tarsals. The tarsals are the seven bones that make up the ankle.

Metatarsal. The metatarsals are the five bones that make up the middle area of the foot.

Phalanges.