BIOLOGY 1 2014 - NECTA FORM FOUR

Solutions from: Maktaba by TETEA

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1.

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

2

i	ii	iii	iv	v	vi	vii	viii	ix	x
B	A	N	K	J	E	H	L	M	C

3.(i)when the temperature of the surrounding is low, the body do the following

-shivering

-increased metabolic activities

-vasoconstriction

-contraction of hair erectile muscles.

(ii)when the temperature of the surrounding is high,the body do the following

-sweating

-vasodilation

-relaxation of hair erectile muscles

+Decreased metabolic activities.

(b) People look pale when cold because the body undergoes vasoconstriction i.e the diameter of blood vessels become small such that small amount of blood on skin surface,hence look pale.

4(a)(i)waste is anything which is no longer needed for use.

(ii)An accident is unexpectedly dangerous event that occurs which damage, injury or can cause death.

(b) First Aid to a person who has been injured in a bus accident and has severe bleeding:-

Control bleeding by restricting blood flow through the wound. This can be done in two ways:

By elevation of the bleeding wound if it is on the limb.

By applying pressure directly or indirectly.

(i) Direct pressure: Press the bleeding wound by using a clean piece of cloth or handkerchief several times to ensure bleeding stops.

(ii) Remove clothing to expose the wound and cover it using a sterile gauze pad or clean cloth.

(iii) If bleeding continues use indirect pressure. This involves applying pressure to the artery that supplies blood to the affected area. A wide piece of folded cloth or belt is tied around the area just above the wound.

(iv) Loosen the tie after every hour to allow blood circulation but also to check if bleeding has stopped.

Take the patient to the hospital as soon as possible for medical care.

5(a) (i) Evolution refers to gradual development of organism from simp] life forms to complex life forms over a long period of time. Th. results to speciation; i.e the emergence of new species from th pre-existing ones.

(ii) Acquired characteristics: These are characteristics or traits a individual develops as a result of adaptation to the environment. For example, body weight and walking style. Acquire characteristics are never inherited and hence are said to be non heritable characteristics.

(b) Merits of Lamarcks theory of evolution

According to Lamarck an individual is able to develop structures that suit the need of the environment. This enables the organisms to survive in adverse environment.

His theory shows the importance of exercise and training, for example, in the development of muscles of a weight lifter.

Advantageous traits are perpetuated in a species from on(generation to another while less advantageous traits are eliminated.

His study gave rise to the discovery of genes and genetics.

Demerits of Lamack s theory

Modern genetics show that phenotypically acquired characteristics which do not affect the genotype of an individual can not be inherited. Lamerck had proposed that acquired characteristics in lifetime are inherited.

of an organ cannot affect the genome.

6(a) Functions of vascular system in plants

(i)Transport of water and mineral salts from the roots to the leaves by xylem tissue.

(ii) Transport of manufactured food from leaves to the rest of the plant body by phloem.

(iii) Provide support to the stem eg lignin materials in the xylem vessels prevent the plant from collapsing.

(b) Importance of transportation of materials in living things

(i)Provides a means through which useful substances like oxygen and food are distributed throughout their bodies.

(ii) Provides a means through which waste materials like carbondioxide are removed from their bodies before they accumulate to harmful levels.

(iii) Provides a means through which hormones are transported from where they are produced to different parts of the bodies wherethey act.

7.(a) Let TT be the gene for tallness (dominant) and tt the gene for dwarf (recessive)

Phenotypic results: All heterozygous Tall

Genotypic ratio 1; 1:1:1

(b) (i) Test cross: This is defined as crossing an individual of unknown genotype with homozygous recessive individual in order to find the unknown genotype. For example, to ascertain whether a black mouse is homozygous or heterozygous, the black mouse is crossed with a brown mouse (homozygous recessive). If the black mouse is homozygous, then all offsprings will be black. On the other hand, if the black mouse is heterozygous, there will be a mixture of black and brown mice.

(ii) Back cross involves crossing individual of unknown genotype with a homozygous parent.

(iii) Trait: Genetically determined characteristics shown by an organism for example red, tall, blood group A.

8. (a) i) Meiosis: A type of nuclear division whereby the number of chromosomes is halved in the daughter cell. It takes place in reproductive cell to produce gametes.

(ii) Mitosis: The process by which a cell divides to produce two daughter cells which are identical to the parent cell.

(iii) Growth: This is a permanent and irreversible increase in size and mass of an organism, which can be measured in terms of volume, mass and length.

(b)(i)Mitosis results to an increase in the number of cells, hence growth.

-In unicellular organisms, mitosis results in the formation of daughter cells which become independent organisms. Each daughter cell formed then grows to attain full size of the parent.

-Mitosis ensures genetic stability since genetic information from the parent is transmitted to the daughter cells.

-Mitosis helps in cell replacement in constantly wearing surfaces such as the epithelial cells in the small intestine and buccal cavity.

-Regeneration is also made possible to some animals e.g. the salamander.

(ii) Factors affecting growth in human beings

(a) Environmental factors:-

(i) Nutrition: The mode of feeding can greatly affect growth. Nutrients such as proteins build the body while fats basically result to overweight and diseases. Whereas over nutrition and under nutrition affect the body negatively.

(ii) Diseases and infections: Pathogens deprive our bodies nutrients and oxygen, damage the tissues and produce toxic substances that accelerate deterioration.

(iii) Toxins and chemicals: Chemicals such as steroids can make an individual to mature faster by stimulating early development of muscles and bones.

Toxins in the environment can also delay growth.

(iv) Emotional disturbances: They include stress, frustration, tension and anxiety. These shorten the life span.

(v) Physical activities: Several physical activities can enhance growth, therefore bringing variation to individuals based on their activities.

(vi) Genetic factors: Some genetic disorders cause premature ageing.

(vii) Socio-cultural factors: These include traditional beliefs that affect the kind of food one should eat. E.g. in some tribes, pregnant women are not supposed to eat eggs, which contain proteins that are needed for the growth and development of the unborn baby.

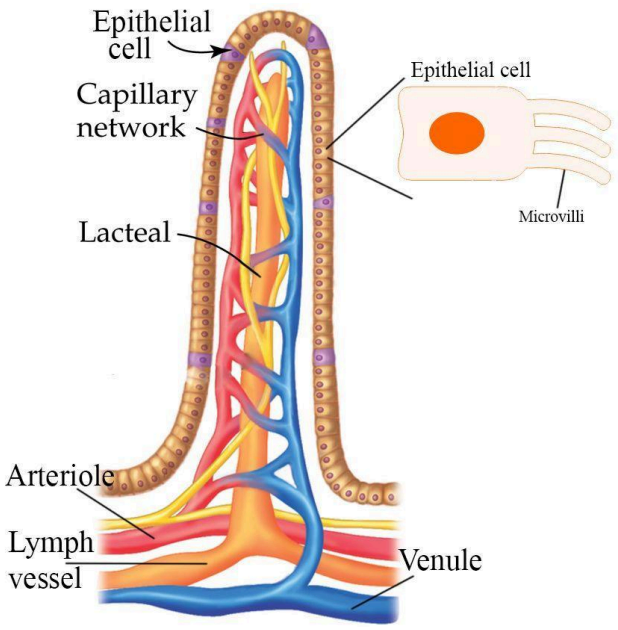
viiiPoverty: Poor or insufficient diet and lack of medical care due to poverty results into poor growth and even death, especially at infancy.

Religion: Some sects do not allow their followers to go for treatment in hospitals resulting to poor health and even death.

Ignorance: Lack of knowledge about proper diet, proper medical care and education contribute to poor health.

(d) Growth hormones: These also affect growth since their over-secretion or under-secretion can result to massive effects on growth such as giantism, dwarfism and acromegaly.

9(a)



(b) (i) Bile

- Contains bile salts that help in emulsification of fats thereby facilitating fat absorption.

- Contains cholesterol that is used in making hormones.

- Bile pigments are used in the manufacture of heme .

- Alkaline salts are useful for neutralization of acidic chime entering the duodenum.

10. (a) Breathing; This refers to the exchange of respiratory gases that is carbondioxide and oxygen between the external environment and respiratory surfaces. On the other hand respiration is the chemicals breakdown of food pigments in order to produce energy.

Inhalation is the taking in and out of air through nostril or mouth, while exhalation is taking out of air from the respiratory surface to the external environment.

(b) i) During vigorous exercise the rate of cells consuming oxygen is higher than the rate at which the lungs and blood can supply the respiring cells. As a result anaerobic respiration occurs and lactic acid formed accumulates in skeletal muscles. A person therefore breathes more so as to increase oxygen supply so as to covert the lactic acid to carbondioxide, water and energy. Also to get rid of carbondioxide which is produced.

(ii) Both actions increase the volume of the thorax. As a result the pressure in the thorax and hence in the lungs, is reduced to less than atmospheric pressure. Air therefore enters the lungs.

11. Irresponsible sexual behaviour includes a variety of behaviours such as unprotected sex, having many sexual partners at once, prostitution and engagement in sexual activities at early age that have adverse outcome to an individual, society and the nation at large.

The following are effects and ways of eradicating irresponsible sexual behaviour in the community:-

Effects of irresponsible sexual behaviours

-High number of unwanted pregnancies

-Increases the number of abortions.

-Increases transmission of STDs including HIV and AIDS

-Increases the number of school drop outs

-Premature deaths and loss of manpower due to abortion and HIV/AIDS.

-Increases the risk of domestic violence. jealous lovers will either take their rage out on the ex or whoever stole the ex.

Ways of eradicating irresponsible sexual behaviours

-Provision of education concerning effects of irresponsible sexual behaviour.

-Encouraging the practice of safe sex such as use of condoms

-Abstaining from sexual intercourse before marriage and being faithful to ones spouse after marriage.

-Provision of education on reproductive health.

12.Malaria.

(a) Cause –Plasmodium

(b)Vector– Female anopheles mosquito.

(c) Factors that encourage malaria.

Bush environment

Long grasses

Stagnant water

Open containers.

(d) Symptoms:

Fever

Body ache

Chills

Heavy sweating

Joint pains.

(e) Methods of preventions:

Use treated mosquito nets

Clean grasses and bush around house

Drains stagnant water.

Use window with wire – mesh.

Use anti – malarial drugs.

13. Classification is a branch of biology that deals with grouping living things according to their similarities and differences. There are two types of classification; namely, natural and artificial system of classification.

Natural system of classification is based on evolutionary relationship and presence of a large number of common and similar features. This system shows true relationship among organisms.

On the other hand artificial system of classification is not based on evolutionary relationship; instead it is based on easily and observable characteristics of identification and it considers only one or a few features at a time.

Advantages of artificial system of classification:

It is less costly in terms of resources and time.

It is easy to classify using this system since it considers only a few characteristics.

It does not require sophisticated and detailed knowledge about an organism to be able to place it in a group.

Disadvantages of artificial system of classification:

Usually unrelated organisms are placed in the same group due to presence or absence of certain features whereas, closely related organisms are placed in different groups. E.g. Birds and bats would be placed in the same group because they both fly. However birds have beaks and feathers while bats do not. Instead bats have mammary glands, sweat glands and hair all of which are characteristics of a mammal.

It does not show true relationship among organisms.

It provides less information about organisms.

Advantages of natural system of classification:

It avoids confusion since unrelated organisms cannot be placed in the same group.

It is accurate since only closely related organisms with common characteristic features are placed in the same group.

It gives much information about an organism.

It reveals true relationship among organisms.

Disadvantages of natural system of classification:

It is costly in terms of resources and time.

It is difficult to classify since one must consider revolutionary relationship and many characteristics of an organism.