



Subject: Grade 11 Life Sciences

Topic: Life Sciences: Term 2 - Exam 1

Total: 162 Marks

1. C: Put a glowing splint into a test tube containing the gas. If it relights, it indicates the presence of this gas. 4 marks

Explanation:

Oxygen is a supporter of combustion. So, in the abundance of oxygen the rate of burning or combustion increases, thereby, making the **splint glow brightly**.

2. glucose 3 marks

Explanation:

Carbohydrates break down to form **glucose** molecules that are absorbed into the blood stream.

This is performed by the enzymes called carbohydrases.

3. 2, 3, 6, 7 | 2; 3; 6; 7 3 marks

Explanation:

- Differences between monocots and dicots start from the very beginning of the plant's life cycle, with the seed in which the plant's embryo lies.
- Monocots have single (mono - one) cotyledon in the seed. On the other hand, dicots (di - two) have two cotyledons in the seed.

4. protozoa • algae 4 marks

Explanation:

- Protist organisms have different types of bodies, different life cycles, different ways to feed and to move.
- They include such a wide range of organisms, that it is **impossible to describe a general structure or functioning**.
- Some protists like protozoa are **unicellular**, while algae can be **multicellular**.
- They range from **microscopic to large**.
- Algae are **plant-like and autotrophic**, whereas protozoa **are more animal-like and heterotrophic**.



5. false

2 marks

Explanation:

- More than **75% of the fish in our world** has been depleted.
- Some people wrongly have the idea that our fish resources are **inexhaustible**.
- **Government** has taken steps to combat over-fishing: 1) a restriction on the size of fish allowed to be catch, 2) closed seasons for certain types of fish, 3) reserves where it is illegal to catch fish, 4) the number of legal fisherman, 5) the fish quota allowed per fisherman.

6. A: Mouth getting dry to prevent micro-organisms from entering the mucous membrane.

4 marks

Explanation:

- Your body produces between 0.5 and 1.5 litres of saliva – a unique mixture that consists of 99 percent water and contains many important enzymes, antibodies and minerals. A moist mouth is therefore **important to help protect you** against pathogens.
- The **skin (inside the nose and lungs) is the first external barrier or line of defence** that reacts if it comes in contact or is irritated or invaded by a foreign or harmful substance.
- Coughing, sneezing, forming of mucous and tears are all ways that the skin react.
- When pathogens **get past the barrier of natural immunity** and penetrate the body, the first response is usually **fever and inflammation**.
- These are ways to prevent the invading, harmful micro organisms to multiply and spread.

7. light • chemical

4 marks

Explanation:

- Photosynthesis is a biological process used by many cellular organisms to **convert light energy into chemical energy**, which is stored in organic compounds.
- This stored energy can later be **metabolised through cellular respiration** to fuel the organism's activities.

Explanation:

- **Human immunodeficiency virus (HIV)** is an infection that attacks the body's immune system. **Acquired immune deficiency syndrome (AIDS)** is the most advanced stage of the disease.
- HIV targets the body's **white blood cells** (more specific **CD₄ T lymphocytes** or "**helper T cells**"). These cells help fight infection by triggering your immune system to destroy viruses, bacteria, and other germs that may make you sick.
- This makes it easier to get sick with diseases like tuberculosis, infections and some cancers.
- HIV is spread from the body fluids of an infected person, including **blood, breast milk, semen and vaginal fluids**. It is not spread by kisses, hugs or sharing food.
- HIV can be treated and prevented with anti-retroviral therapy.
- Untreated **HIV can progress to AIDS**, often after many years.

Explanation:

- Contractile vacuoles **protect a cell from absorbing excess water** from the protoplasm. In doing so it prevents the cell from exploding.
- **Wastes**, such as ammonia, are soluble in water. It is **excreted** from the cell along with excess water.
- Contractile vacuoles function in a **periodic cycle** by expanding while collecting water and contracting to release the water.
- The filling and emptying cycle may last from **seconds to a minute**, depending on the species.
- To get rid of the ammonia and excess water the contractile vacuoles **merge with the cell membrane**, expelling wastes into the environment.

10. glucose • presence • large • absence • small

12 marks

Explanation:

Glucose is the main source of energy we gain from our food. It needs to be broken down to create the **ATP** molecules that give us the energy to live.

Aerobic respiration can only occur in the presence of oxygen, when the pyruvate molecules enter the mitochondria. This produces a large number of ATP molecules.

Anaerobic respiration occurs without oxygen in the cytoplasm. Pyruvate does not enter the mitochondria to be broken down. Only a small number of ATP molecules are produced during this process.

11. C: Blindness

4 marks

Explanation:

Bulimia involves the binge-purge cycle. An individual will eat food then voluntarily vomit the food back up almost immediately. Alternatively, laxatives are used to prevent nutrient absorption and weight gain.

The act of continuous vomiting can lead to **stomach tears**.

The acidic stomach contents will also **break down tooth enamel** with the frequent vomiting.

Extreme dehydration can occur from one of two ways:

- The first being that not enough fluids are absorbed from vomited food, as it does not spend enough time in the body.
- The second is the excessive use of laxatives by bulimic individuals to prevent nutrients absorption and weigh gain. This leads to massive fluid loss.

Blindness is not a symptom of bulimia. This is a consequence of diabetes.

12. penicillin • Alexander Fleming • membrane • protein • resistance

10 marks

Explanation:

• Whereas the **first antibiotics were all obtained from living organisms**, today's antibiotics are **semi-synthetic**.

• This means that **natural antibiotics are chemically changed** to have different effects on different bacteria.

• Bacteria can develop resistance to antibiotics as part of an **evolutionary process, based on natural selection**.

• This means that via mutations, bacteria gain the ability to survive medicine that would previously have killed them. The **mutated, resistant bacteria are selected** and they survive.

13. D: The secretion of enzymes to assist with digestion.

4 marks

Explanation:

The liver does not secrete enzymes for digestion.

The liver (and gall bladder) secrete **bile** - but bile is **not** an enzyme.

14. A: Kidney stones

4 marks

Explanation:

It is possible for small calcium granules to form in the pelvic area of the kidney. These can eventually become so large that they block the ureter and other structures in the urinary system. These are known as **kidney stones**.

Gall stones form in the gall bladder near the liver, an issues of the digestive system.

Bilharzia is caused by a parasitic worm found in many rivers and lakes.

Dialysis is a treatment for kidney failure, where a machine artificially filters the blood of a patient.

15. asymmetrical

4 marks

Explanation:

- Animals that show **no symmetry** are called asymmetrical. The "**a**" in "**asymmetrical**" implies "without".

- The Cnidaria can be **divided radially into more than one plane through its centre**, to give two mirror images.

16. natural selection • mutations

4 marks

Explanation:

- When antibiotics are given to fight a **bacterial infection**, it manages to destroy most of the bacteria.

- The bacteria reproduces via **binary fission** and there are always **mutations present** in some of the bacteria.

- Through the process of **natural selection** some bacteria have the ability to be **resistant** against the effect of the antibiotics.

- The **antibiotic resistant** bacteria survive and multiply.

17. Kidney • Ureter • Urethra • aorta • vena cava

12 marks

Explanation:

The purpose of the urinary system is to filter blood of waste to produce urine. This urine is then stored before it exits the body through urination.

Label **W** represents the **kidney**, the organ that physically filters the blood and produces the urine. Once produced, the urine travels down structure **X**, which is the **ureter**.

This allows the urine to travel to the organ it is stored in, which is structure **Y**, the **bladder**. The bladder is an expandable pouch with impermeable walls, meaning no waste can get out and nothing can get in.

Once the bladder is full enough, the urine passes out of the body via structure **Z**, the **urethra**.

Blood that needs to be filtered and has high amounts of waste travels **into the kidney** from the **aorta**. Filtered blood, with the waste removed, then goes **back to the heart** via the **vena cava** vessel.

18. B: Protists are prokaryotes with no true cell nucleus.

4 marks

Explanation:

- The cell organisation of the Protista are much simpler than that of plants, animals and fungi, but **all protist species have a true nucleus** and are therefore **eukaryotes**. (It is just the Kingdom Bacteria that are prokaryotes).
- Some species reproduce **asexually by means of binary fission**. In this case the cell divides to give two, identical in all ways, cells. **Some algae** can however **reproduce sexually**.
- **Algae contains chlorophyll**, can photosynthesise and are therefore autotrophs. **Protozoa and slime and water moulds must take in food** to survive, they are heterotrophs.

19. D: Protein capsule

4 marks

Explanation:

- All cells have a **cell membrane** which **encloses the cytoplasm**.
- Cell walls (be it **carbohydrates and amino acids in bacteria, chitin in fungi or cellulose in plant cells**) serve the purpose to give the cell a definite shape, structure and to protect it from osmotic pressure changes.
- A **slime layer** could enclose the bacterium on the very outside. This capsule offers **protection from a variety of different threats** to the cell, such as desiccation (drying out), toxic materials like detergents and bacterial viruses (bacteriophages).

20. false

2 marks

Explanation:

Ferns mostly occur in **moist**, shady environments. When spores are released they are dispersed by the wind, and when they land on suitable, wet places they germinate. The resulting gametophyte generation carries the **antheridia** with the sperm cells and **archegonia** with the egg cells.

21. coelom | celom

3 marks

Explanation:

- The coelom is the fluid-filled body cavity present **between the alimentary canal and the body wall**.
- The fluid-filled body-cavity acts as a **protective cushion** for the animal's internal organs.
- A coelom allows the internal organs to **move and grow independently** of the outer layer of the body wall.

22. ATP | Adenosine tri-phosphate | Adenosine triphosphate | ATP. | Adenosine tri-phosphate. | Adenosine triphosphate.

3 marks

Explanation:

Energy consuming processes require the molecule **ATP**, also known as adenosine triphosphate.

Consisting of three phosphate molecules, when one of them breaks off, the body is able to do work. This molecule must be reattached before the energy of one ATP molecule can be used again.

23. D: Some Anopheles mosquitos can act as vector to carry and transmit the Plasmodium parasite from an infected person to another.

4 marks

Explanation:

- It is only the **female Anopheles mosquito** that transmits the **Plasmodium** parasite from one person to the next.
- **Rickettsia** bacteria occur in the blood of infected animals. When ticks feed on the blood of these animals they become infected. When a human is bitten by an infected tick, it causes **tick fever**.
- The **Vibrio cholera** bacterium is transmitted by **infected food and water**. Flies come in contact with the bacterium when it feeds on infected faeces.
- Sleeping sickness is caused by the **Trypanosoma** parasite. the parasite is spread from one infected human or animal to the next by the **tsetse fly**.

24. true

2 marks

Explanation:

- *E. coli* bacteria **produce vitamin K** which plays an important role in blood clotting in humans, as well as **certain B vitamins**.
- In exchange for this the *E. coli* bacteria **obtain nutrients from the human intestine**, as well as a protected habitat.

25. true

2 marks

Explanation:

Vegans do not consume any animal products.

Vegetarians may eat some animal products like fish, eggs and dairy. This will depend on personal preference of the person following this type of diet.

26. false

2 marks

Explanation:

- Branching white mycelia are composed of three types of hyphae (stolons, rhizoids and **sporangiophores**).
 - **Black sporangia** are carried at the **tips of the sporangiophores** .
 - Each **sporangium produces numerous spores** during asexual reproduction.
-

27. true

2 marks

Explanation:

The **renal artery carries blood into** the **kidneys**. This blood contains nutrients and is relatively high in nitrogenous waste that needs to be filtered.

The **renal vein carries blood away** from the **kidneys**. This blood has been filtered and is low in nitrogenous waste.

28. sporophyte

2 marks

Explanation:

Meiosis need to take place in order to **produce a haploid generation**, and **fertilization** need to take place before a **diploid generation** will be produced.

29. true

2 marks

Explanation:

Absorption is occurring in the villus. Nutrients (glucose and amino acids) are moving from the small intestine **into** the blood vessels.

This means that blood leaving the villus will have a **greater** concentration of nutrients than the blood entering the villus.

30. bile • duodenum • emulsified • acidic • pancreas

10 marks

Explanation:

Bile is secreted by the gall bladder into the first division of the small intestine. This is the **duodenum**, which occurs just after the stomach.

Bile is an important substance that causes the **emulsification** (or breakdown) of fats in our food. Without emulsification, fats cannot be absorbed.

The chyme that is leaving the stomach is highly **acidic** due to the hydrochloric acid secreted by the stomach cells. This acidity is neutralised by bile.

The now acidic chyme will denature the enzymes secreted by the **pancreas**, meaning no further breakdown of food will occur. Absorption will therefore be prevented from occurring properly.

31. false

2 marks

Explanation:

The **lime water in test tube B** will be **clear /colourless** as only oxygen is passing through it. This is because the potassium hydroxide absorbed all the carbon dioxide from the air being pumped into it.

The **seeds** have been boiled, meaning they **have been killed**. The seeds are **not** performing cellular respiration. They are not absorbing oxygen for respiration.

This means that the oxygen from test tube B will go into test tube C, meaning the **lime water in test tube C** will also be **clear /colourless**.

If these were living seeds (not boiled), then they would be respiring and producing carbon dioxide, which would turn the lime water in test tube C milky white.

32. inflammation, fever | fever, inflammation

4 marks

Explanation:

- The body's temperature is increased during **fever**. As most pathogenic bacteria grow optimally at lower temperatures, the **higher body temperature** will **slow down their multiplication and spreading**.

- **Inflammation** causes **redness, pain, heat and swelling** at the place of injury or infection. This is because the **blood vessels in this area dilate**, causing **more blood** to flow to the infected area, also allowing **more immune cells** to reach the area faster.

33. glomerulus

3 marks

Explanation:

The Malpighian body (or renal corpuscle) shown in the diagram has two parts.

The bundle/network of capillaries shown in Label X is known as the **glomerulus** which contains the blood that will be filtered. Due to the dense network, blood is filtered under pressure.

The cup surrounding the glomerulus is called the Bowman's capsule.

34. The cells begin to use insulin less effectively • The blood glucose remains high • The pancreas tries to compensate by secreting more insulin • This results in type 2 diabetes 10 marks

Explanation:

A poor diet high in carbohydrates and lack of exercise means glucose levels are higher than normal in the blood.

Due to the consistently high amount of glucose, the cells become **less responsive**, or use the hormone insulin **less effectively**. This leaves a high amount of sugar in the blood.

As such, the pancreas tries to secrete **more insulin** to compensate for the high blood glucose.

Over time, the continued over secretion cannot be maintained. The pancreas then **loses its ability to secrete insulin** correctly. Once this occurs, a person will have type 2 diabetes.

The overall process leading to type 2 diabetes can take years to develop.

35. metabolism | metabolic 3 marks

Explanation:

Metabolism is the word to describe **all the chemical reactions** in your body **controlled by enzymes**.

This can be subdivided into anabolic (or building up) and catabolic (or breaking down) reactions.

36. mitochondria | mitochondrion 3 marks

Explanation:

Aerobic respiration begins in the cytoplasm, but **no oxygen** is required for this to occur. This is when glycolysis will occur where glucose is broken down into pyruvic acid molecules.

When oxygen is present, the pyruvic acid molecules will **move into the mitochondria** for aerobic respiration to continue (the Krebs cycle and oxidative phosphorylation).

If no oxygen is present, aerobic respiration cannot occur.

37. true 2 marks

Explanation:

- An example of **passive, naturally acquired immunity** is a baby becoming immune by getting antibodies that comes from its mother via the placenta and breast milk.

- **Passive, artificially acquired immunity** is where a person is injected with antibodies. This gives immediate protection against a pathogen with its specific antigen.

- **Active, naturally acquired immunity** would be a person becoming immune via contact with a pathogen which stimulates the production of antibodies by the immune system.

- **Active, artificially acquired immunity** happens when a body is vaccinated with dead or weakened version of the pathogen. This stimulates the body's own immune system to form antibodies.

38. homeostasis

3 marks

Explanation:

Homeostasis as a term can be broken into two parts:

Homeo - meaning 'the same'

stasis - meaning 'state of being'

Factors that must be kept constant like body temperature, water levels, blood glucose and blood pressure require homeostasis.

39. false

2 marks

Explanation:

- The process of photosynthesis entails the conversion of **light energy into chemical energy** that may be used by living things. It's a complicated process that takes place over a number of stages.
- The so-called first or light phase of photosynthesis **requires light**, it cannot happen without captured light.
- For the second or dark phase however **no light is required**, but it does not have to be dark in order to take place.
- During the light phase light energy is captured and used to produce **energy rich ATP and NADPH**, whereas during the dark reaction the energy from ATP and NADPH is used to produce **glucose from carbon dioxide**.

40. B: Spores

4 marks

Explanation:

In terms of characteristics there is progression from the **mosses** which are the **least adapted** for life on land, then the ferns and gymnosperms (naked seeds), up to the **angiosperms** (covered seeds) which are the **most successful** terrestrial plants.

Total: 162 Marks