Q. No. 2 Part (i) سوال نمبر 2 جز (i)

Enzyme are biological catalysts (usually proteins) that speed up chemical reactions in living organisms without being consumed

Characteristics :-

1) They are highly specific in their action (lock and key mechanism
2) They work best at an optimum temperature and pH

Q. No. 2 Part (ii) سوال نمبر 2 جز (ii)

- Nitrogen : 78%
- Oxygen : 21%
- Argon : 0.9%
- carbon dioxide : 0.03 - 0.04%
- others (water vapor, Neon etc)

Q. No. 2 Part (iii) (iii) سوال نمبر 2 جز

Air pollutant	source	Harmful effect
• Sulphur dioxide	Burning of coal/oil	Acid Rain, breathing issues
• Ozone	Vehicle exhaust + sunlight	smog, lung irritation
• Carbon dioxide	Burning fossil fuels	Global warming (Greenhouse effect)

Q. No. 2 Part (iv) (iv) سوال نمبر 2 جز

It allows harmful Ultraviolet (UV) rays from the sun to reach the Earth leading to:

- Increased risk of skin cancer and cataracts
- Damage to crops and marine life (phytoplankton).

Q. No. 2 Part (v) سوال نمبر 2 جز (v)

- To provide energy for daily activities.
- for growth and repair of body tissues.
- To protect the body against diseases.

Q. No. 2 Part (vi) سوال نمبر 2 جز (vi)

- To detect and track the speed/position of aircraft and ships.
- Used in weather forecasting to track storms
- Used by police to monitor vehicle speed.

Q. No. 2 Part (vii) سوال نمبر 2 جز (vii)

- They can carry much more data (higher bandwidth)
- They are immune to electromagnetic interference.
- Signals travel faster with less loss over long distances

Q. No. 2 Part (viii) سوال نمبر 2 جز (viii)

- To transport astronauts and equipment (like satellites) to space and back.
- To conduct scientific experiments in a microgravity environment.

Q. No. 2 Part (ix) سوال نمبر 2 جز (ix)

- Cancer Treatment : Killing tumors using high-energy gamma rays
- sterilization : Cleaning medical tools by killing bacteria.
- Industrial Testing: checking for cracks or flaws in metal parts and welds
- food safety : Using radiation to kill pests and extend the shelf life of food.

Q. No. 2 Part (x) سوال نمبر 2 جز (x)

AC : The direction of current changes periodically
eg: house mains.

DC : The current flows in only one direction
eg: Batteries.

Q. No. 2 Part (xi) سوال نمبر 2 جز (xi)

• Resistance : The opposition offered by a substance to the flow of electric current

• Unit : The SI unit is the Ohm (Ω)

Q. No. 2 Part (xii) سوال نمبر 2 جز (xii)

Agging : The gradual process of Physiological decline in an organism over time

Reasons : Accumulation of DNA damage, shortening of telomeres and buildup of metabolic waste products in cells.

(Section C)

Q. No. 3 (Page 1) سوال نمبر 3 (صفحہ 1)

A transformer is a static electrical device that transfers electrical energy between the two or more circuits through electromagnetic induction

Transformers work on the principle of Mutual Induction

- Primary coil : When an alternating current (AC) flows through the primary coil, it creates a continuously changing magnatic field around it.
- Magnetic core : This magnetic field is linked to the secondary coil through a laminated iron core
- secondary coil : The changing magnetic flux induces an electromotive force (voltage) in the secondary coil

Types of Transformers :

1) Step-up Transformer : this increases the voltage from the primary to the secondary coil then in the primary coil.

2) step-down Transformer : This decreases the voltage from the primary to the secondary side. It has fewer turns in the secondary coil then in the primary coil.

Q. No. 3 (Page 2) سوال نمبر 3 (صفحہ 2)

Q. No. 3 (Page 3) سوال نمبر 3 (صفحہ 3)

Q. No. 4 (Page 1) سوال نمبر 4 (صفحہ 1)

Blood consists of different types of cells suspended in plasma, each performing a vital role in keeping the body healthy

• Red Blood cells :

• structure : They are biconcave, disc-shaped cells that lack a nucleus when mature.

• function : They contain a protein called hemoglobin, which binds to oxygen in the lungs and carries it to all tissues in the body. They also help transport carbon dioxide back to the lungs.

• White Blood cells :

• structure : these are larger than red blood cells and contain a nucleus.

• function : they are the soldiers of the body's immune system. they protect the body against infectious diseases and foreign invaders by producing antibodies or engulfing bacteria.

• Platelets :

• structure : these are small, irregular cell fragment

• function : their primary job is blood clotting.

Q. No. 4 (Page 2) سوال نمبر 4 (صفحہ 2)

when a blood vessel is injured, platelets clump together to form a plug (clot) to prevent excessive bleeding.

Q. No. 4 (Page 3) سوال نمبر 4 (صفحہ 3)

Q. No. 5 (Page 1) سوال نمبر 5 (صفحہ 1)

A) Angiography

Angiography is a specialized medical imaging technique used to visualize the inside blood vessels and organs of the body, particularly the arteries, veins and heart chambers.

- Process: A contrast agent is injected into the bloodstream, which makes the blood vessels visible under X-ray.

- Purpose: It is primarily used to identify blockage, narrowing (stenosis), or aneurysms in the blood vessels to help doctors plan treatments like stenting or bypass surgery.

B) MRI

MRI is a non-invasive imaging technology that produces three-dimensional, detailed anatomical images.

- Process: It uses a powerful magnetic field and computer-generated radio waves to align the protons in the body. It does not use ionizing radiation (unlike X-rays or CT scans)

- Purpose :- It is exceptionally good at showing soft tissues, such as the brain, spinal cord,

Q. No. 5 (Page 2) سوال نمبر 5 (صفحہ 2)

muscles, and ligments. It is used to diagnose tumors, strolses and joint injuries.

Q. No. 5 (Page 3) سوال نمبر 5 (صفحہ 3)