

SECTION - II

QUESTION - 8 (a)

If ROAD = UQDG

LAKE = ?

LAKE = ODNH

QUESTION - 8 (b)

The woman is sister of
the man

QUESTION - 8 (c)

i) 4, 12, 6, 18, 9, 27 13ii) 1, 2, 6, 24, 120, 600

$$\begin{array}{r} 12 - \\ \underline{5} \\ 7 \end{array}$$

QUESTION - 8 (d)

The third tallest person
is P

 $T > S > P > R > Q$

180 cm
tall

Height

150 cm
tall

S = 170-180 cm

P = 160-170 cm

R = 150-160 cm

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Question 7(a)

Total = 100 people

Cricket = 65

Hockey = 40

Neither Cricket nor Hockey = 20

How many watch both = ?

Cricket + Hockey = $65 + 40 = 105$

How many watch both Hockey

and Cricket = $105 - 20 = 85$

Question 7(b)

Width = x

length = $x + 4$

Perimeter = 72

Volume of Water

needed to fill the pool to a

uniform depth = ?

Perimeter = $2(l + w)$

$72 = 2(x + 4 + x)$

$72 = 4x + 8$

$64 = 4x \Rightarrow x = 16$

$w = 16 \text{ m}$

$l = 20 \text{ m}$

$A = l \times w$

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$$= 16 \times 20$$

$$= 320 \text{ m}^2$$

$$\text{Volume} = 320 \times 2.5$$

$$= 800 \text{ m}^3$$

20

16

120

20 x

800

Question 7(d)

$$\text{Son} = x$$

$$\text{Father} = 4x$$

Sum of their present ages

$$x + y = 75 \quad \text{--- (1)}$$

Ten years ago, their ages were

$$S = x - 10$$

$$F = 4x - 10$$

Putting Father Son values in

eq (1)

$$x - 10 + 4x - 10 = 75$$

$$5x = 75 + 20$$

$$5x = 95$$

$$x = 19$$

Putting x in eq (1)

$$19 + y = 75$$

$$y = 75 - 19$$

$$y = 56$$

$$\text{Father} = 56 \quad \text{Son} = 19$$

SECTION - A

QUESTION 5(a)

Balanced Diet

Balanced diet refers to right intake of food of different types in right quantity so that body receives all essential nutrients needed for proper functioning, growth and energy.

Constituents of Balanced Diet

Following are the constituents of balanced diet

- i) Carbohydrates
- ii) Protein
- iii) Vitamins
- iv) Fats
- v) Minerals
- vi) Fiber and water

Function of Carbohydrates

Carbohydrates are the main source of energy in the body and perform variety of functions.

i) Energy supply

Carbohydrates provide quick energy that fuels body functions, physical activity, brain operations and breathing and heartbeat.

ii) Protein-sparing function

When adequate carbohydrates are present, proteins are spared from being used for energy and remain available for growth and repair.

iii) Brain functioning

Glucose, a form of carbohydrate, is the primary fuel for the brain and nervous system.

iv) Storage of energy

Excess carbohydrates are converted into fat and stored for later use.

Functions of proteins

Proteins are building blocks of nutrients essential for growth and repairment of the body.

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i) Growth and Development

The help form muscles, tissues, organs, skin, hair, and nails (e.g. Keratin).

ii) Repair of Tissues

Proteins heal damaged tissues after injuries, sicknesses or strenuous exercise.

iii) Formation of Enzymes and Hormones

These chemical substances regulate metabolism, immunity, digestion and other vital functions.

iv) Immune Function:

Antibodies that fight infections are made of proteins.

v) Energy Provision

If carbohydrates are insufficient, proteins can be converted to energy.

Question 5(b)

Food preservation

" Various methods used to prevent or slow down the spoilage of food caused by microorganisms, enzymes, insects and chemical reactions are called food preservation."

→ The purpose is to extend shelf life, maintain nutritional value, texture, flavor, and safety of food.

Principle of Pasteurization

Pasteurization is a preservation method in which food, such as milk or juice, is heated to a specific temperature for a fixed period of time and then rapidly cooled.

The moderate heat kills disease-causing bacteria (pathogens) and reduce spoilage organisms. It doesn't sterilize food completely.

but lower microbial load to a safe level. Pasteurization inactivates certain enzymes that cause food deterioration. After rapid cooling, surviving microbes are prevented from multiplying.

Principle of Canning

Canning involves packing food into airtight containers and heat-stabilizing them.

In canning, food is sealed in air-tight cans, or jars to prevent micro-organisms from re-entering. The sealed containers are heated at high temperature to kill all micro-organisms and ~~enzymes~~ enzymes that cause spoilage. Since container is sealed until opened, food remains safe for a long period. Removal of oxygen prevents oxidation and growth of aerobic microbes.

Question 5 (c)

Internet of Things (IoT)

Internet of Things (IoT) refers to a network of physical objects (things) such as devices, vehicles, appliances, sensors or machines that are connected to the internet and can collect, share, and respond to data.

These devices communicate with each other without human intervention to improve efficiency, decision-making, and comfort.

How IoT is transforming daily life

i) Automation of Household Tasks

Smart gadgets like voice assistants, smart bulbs, thermostats and security cameras make home safer and more energy-efficient.

ii) Improved Health Monitoring

Wearables like smartwatches track heart rate, sleep cycles,

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steps, and alert users in case of irregularities.

iii) Enhanced Convenience and efficiency

IoT reduced manual tasks -

e.g. automatic light, smart irrigation in garden and GPS-based connected vehicles.

How IoT is Transforming Business

→ Devices like Amazon Alexa or Google Home enhanced efficiency in business environment.

→ Business use real-time data to monitor machinery, track goods and optimize operations.

→ IoT helps predict equipment maintenance needs, reducing downtime and repair costs.

→ Companies provide personalised services by analyzing customer usage patterns.

Real world examples:

i) Smart Homes

Alexa and Google Home allow

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Control of lights, fan, heating system and door lock using voice or mobile app.

ii) Smart farming

Sensors in fields, measure soil moisture and temperature and automatically operate irrigation system to improve crop production.

QUESTION 5(d)

Difference between RAM & ROM

	RAM	ROM
1.	Random Access Memory	Read Only Memory
2.	It is temporary and volatile memory.	It is permanent and non-volatile memory.
3.	Data is lost when power is turned off.	Data remains even without power.
4.	It stores data and instructions currently in use.	Stores startup instructions e.g. Firmware, BIOS

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- | | | |
|----|---|--|
| 5. | Both Read and write operations possible | Generally Read only |
| 6. | It is faster than ROM | It is slower than RAM |
| 7. | Example, used for running programs and OS | It is used to start the computer's boot process. |

Basic Architecture of Computer

A Computer System consists of

- Input devices
- Output devices
- Memory storage devices
- Central Processing Unit

CPU

CPU is the 'brain' of the computer. It performs calculations, execute instructions and controls all operations.

It has two major components.

i) Arithmetic Logic Unit

- It performs mathematical operations like addition, subtraction,

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multiplication and division.

→ it executes logical comparisons such as greater than, less than, or equal to.

→ it helps in decision-making by processing data from instructions.

ii) Control Unit

The CU manages and coordinates all computer activities.

→ It ~~operates~~ interprets instructions from memory and directs the movement of data between CPU, memory and input/output devices.

→ It controls when ALU should perform functions.

QUESTION 2(a)

Difference between a star and a planet

Star	Planet
A massive celestial object/body that produces its own	A celestial body that revolves around a star and doesn't

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light and heat
through nuclear
fusion.

Produce its
own light.

Emitte light and
heat.

Doesn't emit
light, only reflects
light of the star.

Nuclear fusion in
its core

No nuclear
fusion.

Mostly gas (H_2 , He)

Composed of gases
or rocks/metal

Stars rotate and
may have planets
orbiting around
them.

Planets rotate
around stars
and may have
moons.

Life cycle of a star

From Nebula to Black Hole

A star begins as a huge cloud
of gas and dust in space.

Gravity pulls these particles closer,
causing the gas to condense.

The particles compress and heat
up, forming a protostar, the
earliest stage. Temperature and
pressure continue to rise.

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When temperature becomes extremely high, nuclear fusion begins. The star shines steadily for millions to billions of years. Our sun is currently in the main sequence stage. After exhausting hydrogen fuel, the star expands. Low/medium-sized stars become Red Giants. Large stars become supergiants. After the supergiant stage, the star explodes in a dramatic supernova. If the remaining core is extremely dense, gravity crushes it further into a Black Hole. It has such a strong gravity that nothing, not even light, can escape. It is formed from collapsed core of a massive star after a supernova.

→ A star forms from a nebula, passes through Protostar and main sequence stages, expands to a giant, explodes as a

Supernova, and if massive enough,
will be a black hole.

QUESTION 2(b)

Semi-conductors

Semi-conductors are materials
whose electrical conductivity
lies between conductors (like
metals) and insulators (like rubber).

Their conductivity can be
controlled by adding impurities
(a process called doping) or
by temperature changes.

Common semi-conductors are

- i) Silicon (Si)
- ii) Germanium (Ge)

Difference between n-type and p-type semi-conductors

	n-type	p-type
1.	Doped with metals elements having more electrons (pentavalent elements)	Doped with elements having fewer electrons (trivalent elements like Boron)
2.	Majority charge carriers are	Majority charge carriers are

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	electrons	holes.
3.	Its conductivity is higher due to increased electrons.	Its conductivity is due to movement of holes.
4.	Polarity is negative type due to electrons.	Polarity is positive-type due to holes.
5.	Pentavalent elements like Phosphorus, Ar	Trivalent like Indium, Boron

Modern Applications

Following are the modern applications of semi-conductors

i) They are used in transistors

ii) They are used in computers and other technological equipments

iii) They are used to make the switching and amplifying devices in electronic circuits.

iv) Semi-conductors are used in solar cells. They convert sunlight into electricity through photovoltaic effects.

Question 2 (3)

Global warming

Global warming refers to the gradual increase in Earth's average temperature due to the rising concentration of greenhouse gases in the atmosphere. It results mainly from human activities such as burning fossil fuels, deforestation, and industrial processes.

Mechanism of greenhouse effect

The greenhouse effect is a natural process that keeps the Earth warm enough to support life, but human activities enhance it, causing global warming.

How it works

Sunlight reaches the Earth's surface and heats it. The warmed surface releases energy in the form of infrared radiation instead of allowing

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all the heat to escape,
greenhouse gases absorb
and reflect it back. This
trapped heat warms the
atmosphere, leading to global
warming and climate change.

Major greenhouse Gases

i) Carbon dioxide (CO_2)

ii) Methane (CH_4)

iii) Nitrous oxide (N_2O)

CCl_4 also contributed.