

"PART - II"

"SECTION - I"

(Question - 5)

Part (a)

Eukaryotic and prokaryotic cells are the two main categories of cells that make up all living organisms.

Their differences are mentioned below:

Prokaryotic cells:

- * They do not have a true Nucleus.
- * DNA is located in a region called nucleoid, which is not enclosed by a membrane.
- * It is smaller in size (0.1-5 micrometers).
- * It contains a single, circular DNA molecule.
- * DNA is not associated with histone proteins.
- * It lacks membrane bounded organelles.
- * It has smaller ribosomes.
- * It divides through binary fission.
- * It has a rudimentary cytoskeleton.
- * It has rigid cell wall made of peptidoglycan.

Eukaryotic Cells:-

* They have a true membrane-bounded nucleus

* Genetic material is stored in nucleus

* It is larger in size (10-100 micrometers)

* DNA is linear and organized into chromosomes.

* DNA is wrapped around histone proteins to form chromatin

* It contains membrane-bounded organelles

* It has larger ribosomes

* It divides through mitosis and meiosis.

* It has a well-developed cytoskeleton.

* Plants and fungi have cell walls while animal cell lacks cell wall.

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(Part - b)

Global Warming:-

As per IPCC: "An average and gradual change in the temperature of the earth is called global warming." It is instigated by the human activities and is a great threat.

Background of global Warming:-

Industrial and Agricultural revolutions have contributed tremendously towards the social, economic, political, scientific, and cultural development of the world, but due to these revolutions intensity and frequencies of human interferences within natural setting of environment has increased which aggravated risks of global warming along with many other global problems.

Factors Responsible for global Warming:

- * Green House Gases
- * Green House Effect
- * Depletion of Ozone layer
- * Population Explosions.

baddy failed due to non-serious behavior of the states and weakness of environmental law.

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Part (c)

Geographic Information System:-

GIS is a powerful tool that allows user to capture, store, manipulate, analyze, manage and visualize geographic or spatial data.

Functions of GIS:-

★ It is used in collecting geographic data from different sources.

★ It is used in data storage and its management.

★ It transforms data into usable formats.

★ It is used in conducting spatial analysis.

★ It represents data as maps, 3D models, graphs or charts to identify patterns and trends.

Advantages of GIS:-

- * It helps in improved decision making.
- * It is efficient as it automates processes like map-making and data analysis
- * It offers tools to design solutions tailored to specific needs
- * It transforms complex datasets into understandable ~~visi~~ visual formats.

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Part (d)

Antioxidants:-

They neutralize free radicals by donating an electron, stabilizing them and preventing chain reaction that lead to oxidative stress. This process helps protect cells and tissues from damage.

Types of ^{Anti-}Oxidants:-

- * Endogenous → Produced by body
- * Exogenous → Obtained from diet.

Sources of Antioxidants:-

- * Fruits
- * Vegetables
- * Nuts and Seeds
- * Beverages
- * Spices

Benefits of Antioxidants:-

- * Reduce oxidative stress
- * Protect against chronic diseases
- * Support the immune system
- * Slow down aging processes.

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(Question - 2)

(Part - a)

Lipids:-

Lipids are a diverse group of hydrophobic organic molecules that are insoluble in water but soluble in nonpolar solvents. They are crucial component of living organisms and play structural, energy storage and signaling roles.

Types of Lipids:-

① Triglycerides

↳ composed of glycerol and three fatty acid chains

② Phospholipids:

↳ contains two fatty acids, a glycerol, and a phosphate group

③ Steroids

↳ It has a four-ring structure

④ Waxes

↳ Composed of long-chain fatty acids and alcohols

⑤ Glycolipids

↳ These are lipids with carbohydrate groups.

Functions of Lipids:-

- * It is used for energy storage
- * It forms cell membranes and maintain cellular integrity
- * It serves as thermal insulators and protect organs from mechanical shock
- * It act as a precursors for hormones and signaling molecules.
- * It prevents water loss in plants and protect animal fur and skin
- * It facilitates the absorption of fat-soluble vitamins (A, D, E, K).

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(Part - b)

Measures for Energy Conservation and Sustainable Use:-

- * Energy-efficient appliances must be used to conserve energy.
- * Renewable energy sources must be adopted.
- * Public transport, carpooling, or cycling can be used to reduce fuel consumption.
- * Electric or hybrid vehicles should be prioritized.
- * Energy efficient machinery can be used in industries.
- * Natural light and ventilation must be used to minimize energy use.
- * Awareness and education should be provided to masses to adopt sustainable energy consumption practices.
- * Government incentives for those adopting energy saving technologies.
- * Energy efficient irrigation techniques and machinery should be used.

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Part (c)

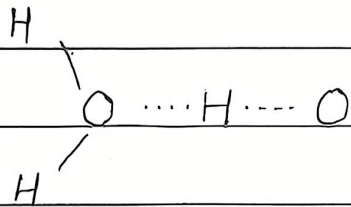
Hydrogen Bonding:-

It is a weak interaction between molecules or within a molecule, where a hydrogen atom covalently bonded to a highly electronegative atom interacts with another electronegative atom through electrostatic attraction.

Hydrogen bonds are weaker than covalent bonds.

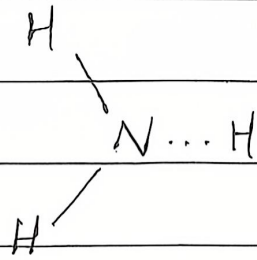
Elaborating structures:-

① Water (H_2O)

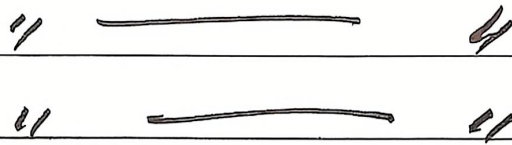


Each water molecule can form up to four hydrogen bonds: two as donors (hydrogen atoms) and two as acceptors (oxygen atoms)

② Ammonia (NH_3)



Hydrogen bonds form between the hydrogen atoms of one ammonia molecule and the lone pair of electrons on the nitrogen atom of another.



Part (d)

Central Nervous System:-

The nervous system is a complex network that coordinates and controls all the activities of the human body.

It is responsible for the overall management of the body. It is considered as the control-system of our body.

Divisions of Nervous System:-

1- Central Nervous System:-

* Brain:

- ① Cerebrum: It is mainly related to thinking, memory and emotions
- ② Cerebellum: It controls and manages the body coordination, long-term memory storage and body balance.
- ③ Brainstem: It regulates vital functions like heart rate, breathing and sleep
- ④ Hypothalamus: It manages hunger, thirst, menstrual cycle control.

* Spinal Cord:

It takes sensory information from the body to brain and manages reflex action

2- Peripheral Nervous System (PNS)

It consists of all nerves outside the central nervous system, including cranial & spinal nerves

It connects central nervous system to limbs, organs and tissues. Moreover, it facilitates communication between the body and the central nervous system.

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"SECTION - III"

(Question - 8)

Part (a)

Sol:-

length of the classroom = 15 ft

width of the classroom = 60% of length

$$= \frac{3}{5} (15)$$

$$= \frac{3}{5} (3 \times 5)$$

$$= 9 \text{ ft}$$

Room Dimensions:

Length = 15 ft

width = 9 ft

Thus dimensions of room are 15 ft x 9 ft.

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Part (b)

East distance (a) = 48 ft

North distance (b) = 26 ft

straight-line distance (c) = ?

Now,

using pythagorean theorem,

$$\begin{aligned}c^2 &= a^2 + b^2 \\ &= (48)^2 + (20)^2 \\ &= 2304 + 400\end{aligned}$$

$$c^2 = 2704$$

Taking square roots on b.s

$$\sqrt{c^2} = \sqrt{2704}$$

$$c = 52 \text{ ft}$$

So, Veena could have run 52 ft if she had run straight from where she started.

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Part (c)

Sol:-

$$\text{No. of Students} = 40$$

$$\text{Incorrect average} = 52.15$$

Now,

calculate total marks based on incorrect average

$$52.15 = \frac{\text{Total Marks}}{40}$$

$$\begin{aligned}\text{Total Marks} &= 52.15 \times 40 \\ &= 2086\end{aligned}$$

Now,

$$\begin{aligned}\text{Average} &= \frac{2086 + 49 + 85}{40} \\ &= \frac{2122}{40} \\ &= 53.05\end{aligned}$$

So,

the correct average is 53.05.

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Part (d)

Sol:-

Vegetable Pizza lover = 37

Chicken " " = 25

Neither = 3

Event (chicken Pizza lover) = $\frac{\text{No. of ways of occurrence}}{\text{Total possible outcomes}}$

$$= \frac{25}{65}$$

$$= \frac{5}{13}$$

$$= 0.3846$$

So, the probability that a person likes chicken pizza is approximately 0.3846 or 38.46%.