



Mock-6 for CSS2025
December 2024
GENERAL KNOWLEDGE-I
GENERAL SCIENCE AND ABILITY

TIME ALLOWED: THREE HOURS	PART-II	MAXIMUM MARKS = 80
NOTE: i. Part-II is to be attempted on the separate Answer Book. ii. Attempt ONLY FOUR questions from PART-II by selecting TWO questions from EACH SECTION. ALL questions carry EQUAL marks.		

PART-II
SECTION-I

Q. No. 2

- Briefly explain lipids. What are some major types? What are their functions?
- Enlist a few measures for energy conservation and its sustainable use.
- What is hydrogen bonding? Give elaborating structures as examples.
- Discuss the nervous system of the human body.

Q. No. 3

- Explain and draw the structure of the sun.
- What is a tsunami? How is it generated? Give examples of a few recent tsunamis.
- Discuss environmental pollution. What could be its harmful effects? Give a few measures to curb it.
- What is wireless communication? Briefly explain the working of a satellite.

Q. No. 4

- What is hepatitis? Explain its causes, symptoms and prevention.
- Elaborate a few methods of food preservation.
 - Explain fertilizers. What are their types?
 - What is the anatomy of a human tooth?

Q. No. 5

- Differentiate between a eukaryotic and a prokaryotic cell.
- What is global warming? What is Kyoto protocol?
- Write a detailed note on GIS.
- Briefly describe antioxidants.

SECTION-II

Q. No. 6

- If sum of the 3-digit number is 15. Sum of 10th and unit digit is 12. The difference of the unit digit from 10th digit is equal to 2. What is the three digit number?
- A man ordered pizzas of small, medium and large sizes for 18 persons, one slice per person. Each size contains different numbers of slices and the ratio of their slices is 2: 3: 4. If each slice is of 40 gm and the price of a smaller pizza is Rs. 320, find the price and weight of a total pizza.
- Diameter of a circle is 6cm. Find circumference and area of circle.
- Identify the missing:
i. 13,24,46,90,178,_____. ii. 5,6,9,14,21,_____.

Q. No. 7

- Distinguish I.Q and E.Q
- What is the present age of Aman, if after 20 years, his age will be 10times his age 10 years back?
- Peter can mow the lawn in 40 minutes and John can mow the lawn in 60 minutes. How long will it take for them to mow the lawn together?

A person multiplied a number by $\frac{3}{5}$ instead of $\frac{5}{3}$. What is the percentage error in the calculation?

8

The width of a rectangular room is 60% of its length. If the length of the classroom is 15 ft. What are the room's dimensions?

While at the dog park, Veena ran 48ft east then turned and ran 20ft north to reach the water station. If she would have run straight there from where she started, how far would she have run?

In a class, the average marks of 40 students was calculated to be 52.15. It was later discovered that the marks of a student were taken to be 49, instead of 85. Find the average marks of the class.

37 people like vegetable pizza and 25 like chicken pizza, 3 people like neither. A person was randomly asked about pizza choice. Calculate what is the probability that person likes chicken pizza?

******* Good Luck for CSS2025*******

14th Jan-25

PART II

Section - I

Q. No. 2 (a) :-

Lipids :-

Lipids are a group of organic compounds that are hydrophobic (water-insoluble) but soluble in non-polar solvents like alcohol or ether. They are primarily made of carbon, hydrogen and oxygen, with some containing phosphorus or nitrogen. Lipids play vital roles in energy storage, cell membrane structure and cellular signaling. They are essential for various biological processes, including metabolism and insulation.

Major Types of Lipids :-

1. Triglycerides (Fats and Oils) :-

These are composed of one glycerol molecule and three fatty acid chains. They serve as the body's main long-term energy storage molecules and also provide insulation and cushioning for vital organs.

2. Phospholipids :-

These lipids consist of a glycerol backbone, two fatty acid tails and a phosphate group. They are a

critical component of cell membranes, forming the lipid bilayer that controls the movement of substances in and out of cells.

3. Steroids:-

Steroids have a structure of four fused carbon rings. Cholesterol, a key steroid, helps maintain membrane fluidity and serves as a precursor for steroid hormones such as cortisol, estrogen and testosterone.

4. Waxes:-

Waxes are made of long-chain fatty acids and alcohols. They provide a protective, waterproof barrier in plants (e.g. leaf cuticles) and animals (e.g. earwax).

5. Glycolipids:-

These lipids have a carbohydrate group attached and play a role in cell recognition, signaling and maintaining cell membrane stability.

Functions of Lipids:-

Lipids are crucial for storing energy, as they provide more than double the energy per gram compared to carbohydrates or proteins. They form the structural framework of cell membranes, ensure thermal insulation and protect internal organs. Lipids also act as precursors for hormones, facilitate cell signaling and provide waterproofing in plants and animals. These

multifunctional nature makes them essential for survival and biological processes.

Q. No. 2 (b) :-

Energy Conservation :-

Energy conservation refers to the practice of using less energy by being more efficient and reducing waste. It involves adopting behaviours and technologies that lower energy consumption without compromising on quality of life or productivity. Energy conservation is crucial for reducing environmental impact, saving costs and ensuring that energy resources are available for future generations.

Measures for Energy Conservation and Sustainable Use :-

1. Use Energy Efficient Appliances:

Replacing outdated appliances with energy-efficient models, such as LED lights and Energy Star-rated appliances, can reduce electricity consumption and lower energy bills.

2. Switch to Renewable Energy Sources:

Utilizing renewable energy sources like solar, wind and hydroelectric power helps decrease reliance on fossil fuels, reduce carbon emissions and supports sustainable energy production.

3. Improve Insulation and Build Energy Efficient Homes:

Proper insulation in homes can drastically reduce the need for heating and cooling, making energy use more efficient. Additionally, building homes with energy-efficient designs helps conserve energy over the long term.

4. Adopt Smart Power Management Systems:

Smart devices like programmable thermostats, energy monitoring apps and timers can optimize energy usage, ensuring that devices and systems are only in use when necessary.

5. Support Sustainable Agriculture and Green Practices:

Energy conservation in agriculture through practices like low-energy farming equipment and reducing food waste can help conserve resources and energy.

Q. No. 2 (c) :-

Hydrogen Bonding :-

Hydrogen bonding is a type of intermolecular force that occurs when a hydrogen atom, which is covalently bonded to a highly electronegative atom like oxygen, nitrogen or fluorine, experiences an attractive force with another electronegative atom. This bonding is not as strong as a covalent bond but is significant in influencing the physical properties of molecules, such as boiling and melting point.

Mechanism of Hydrogen Bonding:-

1. Electronegativity:

The highly electronegative atoms (like O, N, or F) pull electron density away from the hydrogen atom, creating a partial positive charge on the hydrogen atom.

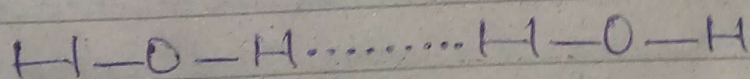
2. Attraction:

The partial positive charge on hydrogen is attracted to a lone pair of electrons on a nearby electronegative atom (e.g., another oxygen, nitrogen or fluorine atom).

Examples of Hydrogen Bonding:-

1. Water (H_2O):-

Water molecules exhibit hydrogen bonding between the hydrogen atom of one molecule and the oxygen of another molecule. This results in water's high boiling point, surface tension and its ability to dissolve many substances.

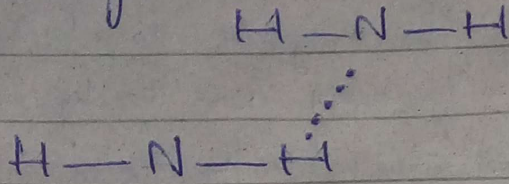


The dotted line represents the hydrogen bond between the hydrogen atom of one molecule and the oxygen atom of the other molecule.

2. Ammonia (NH_3):-

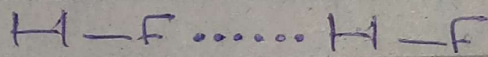
In ammonia, hydrogen bonds form between the hydrogen atom of one molecule and the nitrogen atom of another. Ammonia has a relatively high boiling point compared to

other molecules of similar size due to hydrogen bonding.



3. Hydrogen Fluoride (HF):-

Hydrogen fluoride molecules form strong hydrogen bonds between the hydrogen atom of one molecule and the fluorine of other atom. This gives HF an unusually high boiling point for such a small molecule.



Q. No. 2 (d) :-

Nervous System of the Human Body:-

The nervous system of the human body is a complex network of specialized cells that coordinates the body's activities by transmitting signals between different parts of the body. It is responsible for receiving stimuli from the environment, processing them and generating appropriate responses. The nervous system enables functions such as movement, thought, memory and sensory perception.

Major Divisions of the Nervous System:-

1. Central Nervous System (CNS):-

Composed of the brain and spinal cord, the CNS is

The control center of the body. It processes sensory input, stores information and coordinates the activities of the body.

a. Brain: The brain is divided into several parts, including:

(i). Cerebrum: The largest part, responsible for higher functions like reasoning, emotion and memory.

(ii). Cerebellum: Coordinates voluntary movements such as posture, balance and motor skills.

(iii). Brainstem: Controls basic life functions such as heartbeat, breathing and digestion.

b. Spinal Cord: A long, cylindrical structure that connects the brain to the rest of the body. It is responsible for transmitting signals between the brain and the body and also coordinates reflexes.

2. Peripheral Nervous System (PNS):-

The PNS consists of all the nerves outside the CNS. It connects the CNS to the limbs and organs.

a. Somatic Nervous System: Controls voluntary movements by regulating skeletal muscles.

b. Autonomic Nervous System: Controls involuntary functions, such as heart rate, digestion and respiratory rate. It is further divided into:

(i). Sympathetic Nervous System: Prepares the body for stress or emergencies (fight or flight).

(ii). Parasympathetic Nervous System: Promotes relaxation and energy conservation (rest and digest).

Q.No. 04 (a) :-

Hepatitis :-

Hepatitis is an inflammation of the liver, often caused by viral infections, although it can also result from other factors like alcohol abuse, autoimmune diseases or certain medications. The liver is a vital organ that helps in detoxifying harmful substances, producing bile and storing nutrients. When hepatitis occurs, it disrupts the liver's normal functioning and can lead to severe liver damage if left untreated.

Causes of Hepatitis :-

1. Viral Infections:

a. Hepatitis A (HAV):

Spread primarily through contaminated food or water (fecal-oral transmission).

b. Hepatitis B (HBV):

Transmitted through contact with infected bodily fluids (blood, semen, saliva, etc.), often through unprotected sex, sharing needles or from mother to child during childbirth.

c. Hepatitis C (HCV):

Primarily spread through blood-to-blood contact, such as through sharing needles or receiving contaminated blood products.

d. Hepatitis D (HDV):

Requires the presence of Hepatitis B to infect an individual and is transmitted through contact with infected blood.

e. Hepatitis E (HEV):

Typically transmitted through contaminated drinking water, often in areas with poor sanitation.

2. Non-viral Causes:

a. Alcoholic Hepatitis: Caused by excessive alcohol consumption over time, leading to liver inflammation.

b. Autoimmune Hepatitis: A condition where the immune system attacks the liver cells, causing inflammation.

C. Medications and Toxins: Certain drugs (e.g., acetaminophen overdose) or toxic substances can damage the liver, leading to hepatitis.

D. Fatty Liver Disease: Often associated with obesity, diabetes and poor diet, it can cause liver inflammation.

General and Chronic Symptoms of Hepatitis :-

1. General Symptoms :-

- Fatigue
- Fever
- Nausea and vomiting
- Loss of appetite
- Abdominal pain (especially in the upper right part of the abdomen).
- Dark urine
- Jaundice (yellowing of the skin and eyes).
- Pale-coloured stools.
- Joint pain.

2. Chronic Hepatitis Symptoms :-

- Ongoing fatigue and malaise
- Weight loss
- Swelling in the abdomen or legs (ascites or edema).
- Confusion or difficulty concentrating (due to liver dysfunction).
- Bleeding easily or bruising (due to liver's role in

blood clotting).

General Prevention :-

1. Vaccination: Vaccines are available for HAV and HBV.
2. Safe Sex Practices: Using condoms and other barrier methods can reduce the risk of transmission.
3. Safe Injection Practices: Avoiding sharing needles or other injection equipment can reduce the risk of transmission.
4. Proper Hygiene: Washing hands regularly, especially after using the bathroom or before handling food.
5. Avoiding Contaminated Food and Water: Avoiding raw or undercooked shellfish and avoiding contaminated water or ice.
6. Screening and Testing: Getting tested for viral hepatitis if you are at risk or have been exposed.

Q. No. 04 (b) :-

Food Preservation :-

Food preservation is a process of treating and handling food to prevent spoilage, decay and foodborne illnesses. Food preservatives are substances added to food to extend its shelf life and maintain its quality.

Methods for Food Preservations :-

1. Natural Food Preservatives:
 - a. Salt: Inhibits bacterial growth and preserves food.
 - b. Sugar: Inhibits bacterial growth and preserves food.

c. Vinegar: Acidic properties inhibit bacterial growth and preserve food.

d. Spices and Herbs: Certain spices and herbs, such as garlic and rosemary, have antimicrobial properties.

2. Chemical Food Preservatives:

a. Sulfites: Prevent browning and spoilage in foods like meat and wine.

b. Sorbic Acid: Prevents mold and yeast growth in foods like cheese and bread.

c. Benzoic Acid: Prevents mold and yeast growth in foods like jam and soda.

d. Nitrates and Nitrites: Prevent bacterial growth and preserve food, commonly used in cured meats.

3. Artificial Food Preservatives:

a. Artificial Sweeteners: like aspartame and sucralose, used to extend shelf life and reduce spoilage.

b. Artificial Colors: like tartrazine and sunset yellow, used to enhance appearance and extend shelf life.

c. Artificial Flavours: like vanillin and ethyl maltol, used to prevent oxidation and spoilage.

4. Modern Preservatives Methods:

a. Refrigeration: Uses low temperatures to slow down bacterial growth and spoilage.

b. Canning: Uses heat and airtight containers to kill bacteria and prevent spoilage.

c. Vacuum Packaging: Removes air from packaging to prevent bacterial growth and spoilage.

5. Ancient Preservatives Methods:

a. Drying: Removes moisture from food to prevent bacterial growth and spoilage.

b. Fermentation: Uses microorganisms to break down food and create lactic acid, which acts as a natural preservative.

c. Fattening: Uses fat or oil to preserve food by preventing bacterial growth and spoilage.

Q.No. 04 (c):-

Fertilizers:-

Fertilizers are substances added to soil or plants to provide essential nutrients and enhance growth, productivity and fertility. They are used in agriculture to replenish nutrients that plants remove from the soil during growth. Fertilizers can be natural or synthetic and are categorized based on their composition and origin.

Types of Fertilizers:-

1. Based on Origin:

a. Organic Fertilizers:

Derived from natural sources like animal manure, compost and crop residues.

Examples: Cow dung, compost, bone meal.

b. Inorganic (Synthetic) Fertilizers:

Manufactured using chemical processes.

Examples: Urea, ammonium nitrate, superphosphate.

2. Based on Nutrients:

a. Nitrogen Fertilizers:

Provide nitrogen, essential for plant growth and chlorophyll formation.

Examples: Urea, ammonium sulfate, ammonium nitrate.

b. Phosphorus Fertilizers:

Supply phosphorus, important for root development and flowering.

Examples: Single superphosphate (SSP), triple superphosphate (TSP).

c. Potassium Fertilizers:

Contain potassium, which improves plant disease resistance and water regulation.

Examples: Muriate of potash (MOP), manganese and boron.

3. Specialized Fertilizers:

a. Compound Fertilizers:

Contain a combination of two or more nutrients (e.g., NPK fertilizers).

Examples: Diammonium phosphate (DAP)

b. Biofertilizers:

Contain living microorganisms that promote nutrient availability and plant growth.

Examples: Rhizobium, Azotobacter, Blue-green algae.

Q.No. 04 (1) :-

Antonymy of a Human Tooth:-

The concept of a "antonym" for a human tooth is abstract, as a tooth is a specific anatomical structure with no direct opposite. However, from a functional, structural and biological perspective, the following can be considered antonyms.

1. Edentulous State (Toothlessness):-

This is the condition where teeth are absent, making it the direct functional opposite of having a tooth.

2. Gum Tissue (Gingiva):-

Gums are soft tissues that support and protect teeth but lack the hardness and biting function of a tooth, representing a structural opposite.

3. Decay or Cavity (Caries):-

A cavity signifies the destruction or loss of a tooth's function, symbolizing the opposite of a healthy, functional tooth.

4. Artificial Replacements (Dentures):-

While not strictly an antonym, dentures or implants represent an artificial substitute for natural teeth, contrasting with the natural biological nature of a tooth.

5. Smooth or Soft Structures:-

Since teeth are hard and textured for grinding and cutting food and soft and smooth structure, such as the tongue or lips, can be seen as an opposite in terms of texture and function.

Section - II

Q. No. 06 (a):-

Solution:-

Let the number be xyz , where x, y, z are digits.

Given:

$$x + y + z = 1 \rightarrow (i)$$

$$y + z = 12 \rightarrow (ii)$$

$$z - y = 2 \rightarrow (iii)$$

From $z - y = 2$

$$z = y + 2 \rightarrow (iv)$$

Substitute equ (iv) into (ii)

$$y + (y + 2) = 12$$

$$2y + 2 = 12$$

$$2y = 10$$

$$y = 5 \rightarrow (v)$$

Substitute equ (v) into (iii)

$$5 + z = 12$$

$$z = 7 \rightarrow (vi)$$

Now put value of y and z in eqn (i)
 $= x + 5 + 7 = 15$

$$= x = 15 - 12$$

$$\boxed{x = 3}$$

So, the three digit numbers are

3, 5, 7

Answer

Q. No. 06 (b) :-

Solution :-

Given Data:

= Man ordered pizzas for 18 persons, with each getting 1 slice.

= Ratio of slices = 2:3:4

= Weight of each slice = 40 gm

= Small pizza price = Rs. 320

= let total number of slices in each size be;

$2x, 3x, \text{ and } 4x.$

$$= 2x + 3x + 4x = 18 \Rightarrow 9x = 18$$

$$x = \frac{18}{9} \Rightarrow x = 2$$

\Rightarrow Now, weight per slice = 40 gm

$$\text{Small} = 2(x) \times 40 = 4 \times 40 = 160 \text{ gm}$$

$$\text{Medium} = 3(2) \times 40 = 6 \times 40 = 240 \text{ gm}$$

$$\text{Large} = 4(2) \times 40 = 8 \times 40 = 320 \text{ gm.}$$

$$\text{Total weight} = 160 + 240 + 320 = 720 \text{ gm.}$$

= Now, Price of each pizza:

$$\Rightarrow \text{Small} = \text{Rs. } 320$$

\Rightarrow Price is proportional to the number of slice.

$$\Rightarrow \text{Medium} = 320 \times \frac{3}{2} = 480$$

$$\Rightarrow \text{Large} = 320 \times \frac{4}{2} = 640$$

$$\Rightarrow \text{Total Price of all pizzas} = 320 + 480 + 640 = 1440 \text{ Rs.}$$

So, the

$$= \text{weight of total pizza} = 720 \text{ gm.}$$

$$= \text{Price of total pizza} = \text{Rs. } 1440$$

Answer.

Q. No. 06 (c) :-

Solution :-

$$\text{Circumference} = 2\pi r$$

The radius (r) is half of the diameter;

$$r = \frac{d}{2} \Rightarrow \frac{6}{2} = 3 \text{ cm}$$

$$\text{Circumference} = 2\pi(3) = 6\pi \text{ cm}$$

$$\text{Circumference} = 6 \times 3.14 = \boxed{18.84 \text{ cm}}$$

Now the Area;

$$\text{Area} = \pi r^2$$

$$\text{Area} = \pi(3)^2 = \pi(9)$$

$$\text{Area} = 9\pi \text{ cm}^2$$

$$\text{Area} \approx 9 \times 3.14 = \boxed{28.16 \text{ cm}^2}$$

Answer.

Q. No. 06 (a) :-

Solution :-

(i). 13, 24, 46, 90, 178, —

$$24 - 13 = 11$$

$$90 - 46 = 44$$

$$46 - 24 = 22$$

$$178 - 90 = 88$$

$$\Rightarrow 88 \times 2 = 176$$

$$178 + 176 = \boxed{354}$$

So, the missing number is 354.

(ii). 5, 6, 9, 14, 21, —

$$6 - 5 = 1$$

$$14 - 9 = 5$$

$$9 - 6 = 3$$

$$21 - 14 = 7$$

$$\Rightarrow 7 + 2 = 9$$

$\therefore 2 \Rightarrow$ increasing differences

$$21 + 9 = 30$$

$$\begin{array}{cccc} 1, & 3, & 5, & 7 \\ \cup & \cup & \cup & \\ 2 & 2 & 2 & \end{array}$$

So, the missing no. is $\boxed{30}$

Answer.

Q. No. 08 (a) :-

Solution :-

Given, the width of the room is 60% of its length, and the length of the room is 15ft, we can find the width as follows:

$$= \text{length} = 15 \text{ ft}$$

$$= \text{Width} = 60\% \text{ of length} = 0.60 \times 15 \text{ ft}$$

$$\text{Width} = 9 \text{ ft.}$$

So, dimensions of the room

$$\text{length} = 15 \text{ ft}$$

$$\text{Width} = 9 \text{ ft} \quad \text{Answer.}$$

Q. No. 08 (b) :-

Solution :-

⇒ Veena ran 48ft east and 20ft north.

⇒ We need to find the straight-line distance from her starting point to the water station.

Using the Pythagorean Theorem:

$$c^2 = a^2 + b^2$$

$$c^2 = 48^2 + (20)^2$$

$$c^2 = 2304 + 400$$

$$c^2 = 2704$$

$$c = 52$$

So, the straight-line distance Veena would have run is 52 feet. The direction is north east.

Q. No. 08 (c) :-

Solution :-

⇒ Original average marks of the class = 52.15

⇒ Students = 40 students.

$$\text{Total marks (original)} = 52.15 \times 40$$

$$\text{Total marks (original)} = 2086$$

One student marks mistakenly = 49,
instead of 85, so the difference is
 $= 85 - 49 = 36$

$$\text{So, Total marks (corrected)} = 2086 + 36$$

$$\text{Total marks (corrected)} = 2122$$

Now, the average:

$$= \text{Corrected average} = \frac{\text{Total marks (corrected)}}{\text{Number of students}}$$

$$= \text{Corrected average} = \frac{2122}{40} = 53.05$$

So, the average marks of the class are $\boxed{53.05}$ Answer

Q. No. 08 (d) :-

Solution :-

$$= \text{People like vegetable pizza} = 37$$

$$= \text{People like chicken pizza} = 25$$

$$= \text{People like neither} = 3$$

Assume there is an overlap (u) of people who like both types of pizza.

$$= \text{Total people} = 37 + 25 - u + 3$$

$$= \text{Total people} = 65 - u$$

$$\therefore \text{Probability (likes chicken pizza)} = \frac{\text{No. of people who like chicken pizza}}{\text{Total no. of people}}$$

So,

$$= P(\text{likes chicken pizza}) = \frac{25}{65 - u}$$

Answer.