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OB-73

G S A (Mock Exam-I)

PART-II (Section-I)

Q no 2

- a. Define the term malnutrition, elaborate its major causes and consequences.

Malnutrition : It is a health condition resulting from an imbalanced diet where an individual either consumes insufficient nutrients (undernutrition) or excessive nutrients (overnutrition), leading to adverse effects on the body.

It encompasses a range of issues, including deficiencies, excesses, or imbalances in energy, protein, vitamins and minerals. Malnutrition can affect people of all ages but is particularly harmful to children, pregnant women, and the elderly due to their increased nutritional needs.

Major Causes of Malnutrition

Undernutrition Causes :

1. Poverty and Food Insecurity:

Limited access to nutritious food due to financial constraints or lack of

availability in certain regions, especially in developing countries, leads to inadequate calorie and nutrient intake.

2. **Poor Dietary Diversity:** Diets lacking variety, often due to cultural practices or economic limitations, can result in deficiencies of essential nutrients like vitamins A, D or iron.

3. **Diseases and Infections:** Conditions such as diarrhea, malaria, or parasitic infections can impair nutrient absorption or increase nutrient loss, exacerbating undernutrition.

4. **Lack of Education:** Insufficient knowledge about proper nutrition and feeding practices, particularly for infants and young children, can contribute to malnutrition.

Overnutrition Causes:

1. **Excessive Calorie Intake:** Overconsumption of high-calorie foods, especially those rich in sugars and fats, often driven by the availability of processed foods, leads to obesity.

2. **Sedentary Lifestyle** : Lack of physical activity contributes to weight gain and metabolic issues

3. **Urbanization and Economic development** : Easier access to unhealthy ^{food} and lifestyle changes.

Micronutrient deficiency :

Malnutrition caused by lack of essential vitamins and minerals even if calorie intake is sufficient.

→ Causes :

1. **Monotonous diets** : Meals lacking fruits, vegetables, dairy and protein sources.

2. **Depleted soils** : Reduced nutrients content in crops due to poor agricultural practices.

3. **Lack of Food Fortification** : Absence of government programs to enrich common foods with essential nutrients (e.g., iodine in salt, iron in flour).

CONSEQUENCES OF MALNUTRITION

Malnutrition can have serious short-term and long-term health effects:

1. **Stunted growth and Underdevelopment:** Especially in children, affecting height, weight and mental development.
2. **Weakened Immune System:** Making the body more vulnerable to infection and diseases.
3. **Poor Cognitive function:** Nutritional deficiencies can impair memory, concentration, and learning ability.
4. **Increased mortality risk:** Severe malnutrition can lead to death, particularly among children under five.
5. **Chronic diseases:** Overnutrition is a major contributor to obesity, diabetes, hypertension, and heart diseases.
6. **Low productivity and fatigue:** Undernourished individuals often suffer from weakness and reduced work efficiency.

7. Maternal and Infant Complications:

Malnourished mothers are more likely to have complications during pregnancy and give birth to underweight babies.

Bo.

- b. Differentiate between food contamination and adulteration.

Food Contamination

Food contamination occurs when harmful microorganisms (bacteria, viruses, parasites) or chemical substances (pesticides, heavy metals) unintentionally enter food, making it unsafe to eat. It is usually accidental and may occur during production, processing, transportation, or storage.

Examples :

1. Raw meat contaminated with E. Coli bacteria.
2. Fruits and Vegetables exposed to harmful pesticides.
3. Milk stored in unclean containers leading to bacterial growth.

Food Adulteration

Food Adulteration refers to the deliberate addition, substitution or removal of ingredients in food to increase quantity and reduce production costs, often compromising quality and

safety. This act is unethical and illegal.

Examples:

1. Mixing water in milk to increase volume
2. Adding brick powder to chili powder to enhance color.
3. Using toxic colorants in sweets to improve appearance.

KEY DIFFERENCES

Features	Food Contamination	Food Adulteration
Nature	Unintentional	Intentional
Purpose	Accidental during handling	Economic gain
Result	Foodborne Illness	Health hazards and loss of quality.
Control	Through hygiene and safety practices	Through regulation and law enforcement.

- c. What are Computer buses?
Differentiate RAM and ROM?

COMPUTER BUSES

In computer architecture, a bus is a communication system that transfers data between components of a computer or between computers. It acts as a highway for data transmission. A bus can carry data, addresses, and control signals among the CPU, memory, and other hardware devices.

Types of Buses:

1. **Data Bus**: It carries actual data to and from the CPU, memory and peripherals.
2. **Address Bus**: It carries the address of memory locations to be accessed.
3. **Control Bus**: It carries ^{control} signals like read/write commands and synchronization instructions.

DIFFERENCE BETWEEN RAM And ROM

Features	RAM (Random Access Memory)	ROM (Read-Only Memory)
Volatility	Volatile; data lost when power is off.	Non-volatile; data retained.
Function	Temporary storage for active tasks.	Permanent storage for firmware or BIOS.
Modifiability	Can be read and written	Cannot be modified (in general use).
Speed	High-Speed memory	Comparitively slower
Usage	Runs programs and processes	Stores Startup instructions

RAM is essential for multitasking and performance, while ROM ensures the system can start up and

perform basic functions even before loading the operation system.

- d. What are geo-Stationary Satellites? Distinguish natural and Artificial Satellites, how many artificial Satellites of Jupiter are there?

Geo-Stationary Satellites:

A geo-stationary satellite is a type of satellite that orbits the Earth at an altitude of approximately 35,786 kilometers above the equator. It revolves around the Earth at the same rotational speed as the Earth itself, making it appear stationary over a fixed position.

Key Characteristics:

1. Fixed position over one point on the equator.
2. Used for communication, weather forecasting, and television broadcasting.

3. Orbits in the Earth's equatorial plane.

4. Takes 24 hours to complete one orbit.

DIFFERENCE BETWEEN NATURAL AND ARTIFICIAL SATELLITES

Features	Natural Satellites	Artificial Satellites
Origin	Formed naturally (e.g., Moon)	Man-made and launched to space.
Purpose	No specific purpose (natural phenomena)	Serve communication, research, navigation, and more.
Movement	Orbits planets due to gravity.	Orbits based on design and mission purpose.
EXAMPLE	Moon (Earth's natural Satellite)	GPS, weather satellites, Hubble Telescope

Artificial Satellites of JUPITER

As of now, Jupiter does not have any artificial satellites launched by humans. However, it has confirmed 95 natural moons (as of 2024), with Ganymede being the largest.

Several space missions such as NASA's Galileo, Juno and Europa Clipper (planned) have visited or will explore the Jovian system, but these are not permanent satellites in orbit around Jupiter, like Earth's artificial satellites.

Q no. 4

Differentiate between Temperate and Tropical Cyclones.

Temperate Cyclones :

Temperate Cyclones are large weather systems that form in mid-latitudes (between 30° and 60°) where cold and warm air masses meet. They usually develop over both land and ocean and are associated with frontal systems. These cyclones move from west to East and can bring prolonged rainfall and snowfall.

Tropical Cyclones :

Tropical cyclones, on the other hand, form over warm ocean waters in tropical regions (between 5° and 30° latitude). They are powered by heat and moisture from the ocean and have a warm core without any fronts. These cyclones are typically smaller in size but more intense, often leading to severe storms, heavy rains and flooding. They move from East to West due to trade winds.

DIFFERENCE BETWEEN TEMPERATE AND TROPICAL CYCLONES

Feature	Temperate	Tropical Cyclone
	Cyclone	
1. Location	Mid latitudes (30° - 60°)	Tropical regions (5° - 30°)
2. Formation Area	Over land & sea	Over warm ocean water
3. Energy Source	Temperature difference b/w air masses	Warm, moist air cover
4. Structure	Frontal System	No fronts, warm core
5. Season	Any time of year	Mostly in summer & early autumn.
6. Time / Duration	Larger, lasts several days	Smaller, can be intense, last days to a week
7. Movement	West $\rightarrow$ East	East $\rightarrow$ West

b.

Differentiate between Star and Planet ; How a Star becomes a Black hole .

DIFFERENCE BETWEEN STAR And PLANET

<u>Feature</u>	<u>Star</u>	<u>Planet</u>
Light	Emits its own light and heat	Does not emit light. It reflects star's light.
Fusion	Undergoes nuclear fusion	No nuclear fusion.
Position	Center of Solar System.	Orbits a Star.
<u>Examples</u>	Sun , Sirius	Earth , Mars, Jupiter.

How a Star becomes a Black Hole :

When a massive star (more than 3 times the mass of the Sun) exhausts its nuclear fuel, it collapses under its own gravity.

This collapse compresses the star's core into a very dense point, where gravity is so strong that not even light can escape, this forms a **black hole**.

c.

Why do atoms form chemical Bonds. Explain Structure of Water.

Reason for Bond Formation:

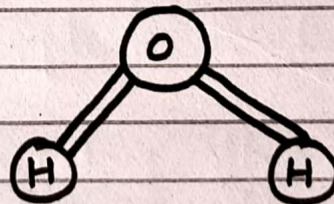
Atoms form chemical Bonds to achieve a stable electron configuration, usually an octet (8 electrons) in their outer shell.

By sharing, gaining, or losing electrons, atoms reach a lower energy and more stable state.

Structure of Water (H_2O):

- A water molecule consists of two hydrogen atoms and one oxygen atom.

- The oxygen atom shares one electron each with two hydrogen atoms forming two covalent bonds.



H_2O
Water Molecule

- The molecule has a bent shape due to the lone pairs on oxygen.

This causes water to be a polar molecule, giving it unique properties like high boiling point and surface tension.

d. What are Conductors, Semiconductors, Metals, Plastics and Ceramics?

Material	Description	Example
Conductor	Allows electricity to pass easily due to free electrons	Copper (widely used in electrical wiring).
Semi-Conductor	Conductivity between conductor and insulator, can be controlled	Silicon (used in computer chips and solar panels)
Metal	Hard, Shiny, ductile, good conductor of heat and electricity.	Iron (used in construction and tools.)
Plastic	Synthetic material, light, flexible, insulating.	PVC (Poly Vinyl Chloride): used in pipes and cables
Ceramic	Inorganic, non-metallic, heat-resistant, brittle.	Porcelain (used in dishes and sanitary ware)

SECTION - II

Q no. 6

- a. The sum of three consecutive numbers is 159, find the numbers.

Answer: The three consecutive prime numbers whose sum is 159 are:
47, 53, and 59.

- b. The Perimeter of a circle having a radius 6 cm is equal to ?

Answer

The perimeter of a circle with radius 6 cm is : 37.7 cm.

- c. Find the present age of a man when their average ^{age of the} man, wife and their child 3 years ago was 27 and that of wife and the child 5 years ago was 20 years.

Answer: Let present ages of man, wife and child be x , y and z

$$x + y + z = 90$$

$$\text{wife's age} = y = 25$$

$$\text{So, man + child} = 65$$

Q no 7

Answers

- a. The two numbers whose sum is 23 and product is 132 are 11 and 12.
- b. The number is 800.
- c. The marked price of the car is Rs. 87.5 million.
- d. Net change after a 10% increase followed by a 10% decrease is 1% decrease.