

PART-II

SECTION-I

Q.No.2

(a)

As the name suggests, malnutrition is the imbalance of nutrients in one's body i.e., excessive or insufficient nutrients intake.

Such nutrients may include vitamins, protein, minerals, etc.

In simple terms, it is poor nutrition.

Causes:

The major causes of malnutrition in a person are given as follows:

- 1- low or excessive dietary intake
- 2- ~~low~~ low nutrient absorption by body
- 3- low income of a household
- 4- physical and mental disorders

Consequences:

- 1- higher level of illnesses and diseases
- 2- impaired growth and development
- 3- higher medical complications
- 4- may result in death (in extreme cases)

(b)

Food Contamination

- Contamination is the introduction of harmful substances in food due to accidents.
- It is done unintentionally.
- It is caused by mis-handling of food.
- Examples may include bacterial contamination, chemical contamination of contamination by objects such as broken glass, metal, etc.

Food Adulteration

- Adulteration is the deliberate introduction of harmful substances in food.
- It is done intentionally for economic gains.
- It is caused by intentional manipulation of food.
- Examples may include adding dyes to alter food color, reducing raw materials quality, using cheaper ingredients, etc.

(d)

Geo-stationary Satellites:

Geo stationary satellites are the ones that orbit the Earth at an altitude of ~~more than~~ around 35 thousand kilometers above the equator. They are called geo-stationary because their speed matches Earth's rotation speed, hence completing an orbit in 24 hours.

Natural and Artificial Satellites:

Natural satellites or moons are naturally made celestial bodies that orbit the planets due to the planets' gravitational pull. On the other hand, artificial satellites are made by humans and launched into the space for various purposes.

Satellites of Jupiter:

While Jupiter has many natural satellites (around 95), it has no artificial satellite orbiting around it.

(c)

Computer Buses:

Computer buses are parallel lines like components that transfer data from one component of computer to another or between computers. For example, a control bus helps the CPU communicate with other components of the computer.

RAM and ROM:

RAM	ROM
• RAM is a type of temporary memory that can hold currently used data and instructions. • It stands for Random Access Memory. • It is volatile i.e., based on power loss.	• ROM is a type of permanent memory that can hold data even when the power is switched off. • It stands for Read Only Memory. • It is non-volatile, i.e., retains data.

- | | |
|---|---|
| <ul style="list-style-type: none">• The instructions are written in RAM at the time of execution. | <ul style="list-style-type: none">• The instructions written in ROM are done at the manufacturing time. |
| <ul style="list-style-type: none">• Instructions can be changed. | <ul style="list-style-type: none">• Instructions are permanent. |
| <ul style="list-style-type: none">• It has higher storage capacity. | <ul style="list-style-type: none">• It has lower storage capacity. |

Q. No. 4

(d)

Conductors:

Materials that allow electricity to pass through them are called conductors. For example: metals like Silver, copper, etc.

Semiconductors:

Semi porous materials that allow electricity to pass through them, partially. For example, silicon.

Metals:

All elements that lose electrons in chemical reactions, thereby forming positive ions are called metals. Only exception is hydrogen. For example, mercury, silver, gold.

Plastics:

Plastic is a type of material formed by synthetic materials like polymers. For example, plastic bags, bottles, etc.

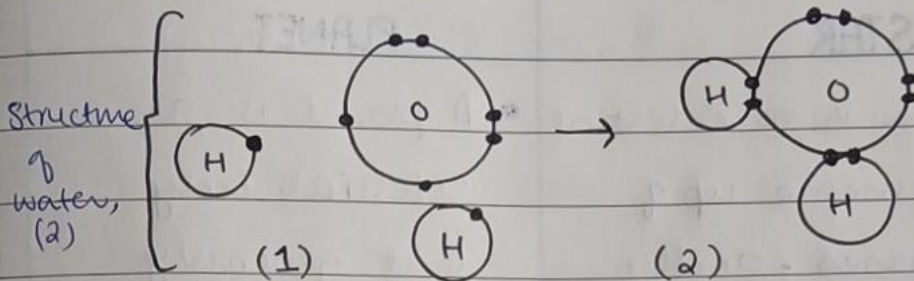
Ceramics:

Ceramics are made up of metal, metalloids and ~~no~~ nonmetal atoms. It is a solid, inorganic material. For example, porcelain.

(C)

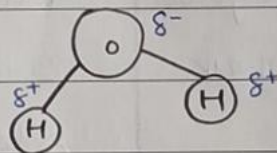
Atom without chemical bonds are highly unstable so by forming chemical bonds, they try to achieve a state of stability and exert lowest amount of energy. In simple terms, they do it to satisfy the "octet" rule i.e., having 8 valence electrons. For example, oxygen forms a chemical bond with 2 hydrogen atoms to

complete the octet rule and thereby becoming stable, as shown below.



Structure of Water

Water or H_2O is a molecule that is formed when an oxygen atom forms a bond with 2 hydrogen atoms, hence becoming stable. Water molecules have bent or angular shapes because of the lone electrons on the oxygen atom.



(b)

STAR	PLANET
• A star is a celestial body made up of hot gases, and emits radiations. • Stars emit light. • Stars are mostly made up of hydrogen and helium. • Stars have the highest temperature in their system.	• A planet is a celestial body that generally orbits around a star. • Planets have no light of their own. • Planets are made up of rocks, ice, gas, water, metals, etc. • Planets are always colder than their star.

Formation of Black Hole:

When a star (massive) exhausts its fuel, the fusion process stops and the outward pressure depletes, causing the gravity to overwhelm the internal pressure of the star. This causes the star to collapse

inward, thus forming a black hole.

SECTION - II

Q.No. 6

(a)

The sum of 3 consecutive prime numbers is 159.

Method of Trial and Error.

$$= \frac{159}{2} = \frac{159}{3}$$

$$= 53$$

$$\begin{array}{r} 2 \cancel{) 159} \\ \underline{53} \\ 3 \cancel{) 159} \\ \underline{15} \\ 9 \\ \times \end{array}$$

One of the prime numbers is 53.

The next closest prime numbers to 53 are 47 and 59. Thus,

$53 + 47 + 59 = 159$; 53, 47 and 59 are the consecutive prime numbers.

(b)

Given, radius, $r = 6$ cm.

Perimeter of a circle is basically its circumference, so,

$$\text{circumference} = C = 2\pi r$$

$$C \approx 2 \times 3.14 \times 6$$

$$C \approx 12 \times 3.14$$

$$12 \times 00$$

$$C \approx 37.68$$

$$\times 3.14$$

$$4800$$

$$1200 \times$$

$$3600 \times \times$$

$$37.6800$$

The perimeter of the circle

is 37.68

(c)

$$\text{Sum of ages (1/3 years ago)} = \text{Avg} \times \text{Number of years}$$

$$\text{Sum of ages (1)} = 27 \times 3$$

$$= 81 \text{ years}$$

Present ages of man (M), wife (N), and child (O), respectively are $M-3$, $N-3$ and $O-3$, 3 years ago.

$$(M-3) + (N-3) + (O-3) = 81$$

$$M + N + O - 9 = 81$$

~~At present~~

$$M + N + O = 81 + 9$$

$$= 90 \text{ years.}$$

Sum of ages of wife and child, 5 years ago.

$$\text{Avg} = \frac{\text{Sum of numbers}}{\text{Total numbers}}$$

$$20 = \frac{\text{Sum}(2)}{2}$$

$$20 \times 2 = \text{Sum}(2)$$

$$\text{Sum}(2) = 40 \text{ years.}$$

Present ages of wife and child, 5 years ago.

$$(N-5) + (O-5) = 40$$

$$N + O - 10 = 40$$

$$N + O = 40 + 10$$

$$= 50 \text{ years.}$$

Present age of man,

$$M + N + O = 90$$

$$M + 50 = 90$$

$$M = 90 - 50$$

$$M = 40 \text{ years.}$$

substituting
→ $(N+O)$ for 50 years

(d)

Given, ratio (i) = 2:3

ratio (ii) = 5:8

Sum of 3 numbers = 98

Suppose the 3 numbers are x, y, z .

$$x:y = 2:3$$

$$y:z = 5:8$$

 $\Rightarrow$ ratio of first to second number:

$$\# x:y = 2:3 \Rightarrow \frac{x}{y} = \frac{2}{3}$$

$$x = \frac{2}{3} y$$

 $\Rightarrow$ ratio of second number to 3rd number

$$y:z = 5:8 \Rightarrow \frac{y}{z} = \frac{5}{8}$$

$$\cancel{y} z = \frac{8}{5} y$$

Sum of numbers:

$$x + y + z = 98$$

$$\frac{2}{3} y + y + \frac{8}{5} y = 98$$

$$\frac{10y + 15y + 24y}{15} = 98$$

15

$$\frac{49y}{15} = 98$$

$$y = \frac{98 \times 15}{49}$$

$$y = 2 \times 15$$

$$y = 30$$

Hence, the second number is 30.

$$\begin{array}{r} 49 \\ \times 2 \\ \hline 98 \end{array}$$

$$\begin{array}{r} 49 \overline{) 98} \\ \underline{98} \\ 0 \end{array}$$

Q. No. 7

(a)

Sum of 2 numbers = 23

product of 2 numbers = 132

Let the 2 numbers be a and b .

$$a + b = 23 \quad \text{--- (1)}$$

$$ab = 132 \quad \text{--- (2)}$$

$$a + b = 23 \Rightarrow b = 23 - a \quad \text{--- (3)}$$

Adding the value of b in equation (2)

$$ab = 132$$

$$a(23 - a) = 132$$

$$23a - a^2 = 132$$

$$a^2 - 23a + 132 = 0$$

$$(a - 11)(a - 12) = 0$$

$$(a-11) = 0 \quad ; \quad (a-12) = 0$$

$$a = 11 \quad ; \quad a = 12$$

Putting the value of a in equation 3 to find the value of b .

$$b = 23 - a \quad \text{OR} \quad b = 23 - a$$

$$b = 23 - 11 \quad b = 23 - 12$$

$$b = 12 \quad b = 11$$

The 2 numbers are 11 and 12

(b)

Let the ~~missing~~ number be x .

The equation will be,

$$40\% \times x - 20\% \times 650 = 190$$

$$\frac{244}{5} \times x - \frac{20}{100} \times \frac{1300}{2} = 190$$

$$\frac{2}{5}x - 130 = 190$$

$$\begin{array}{r} 190 \\ + 130 \\ \hline 320 \end{array}$$

$$\frac{2}{5}x = 190 + 130$$

$$\frac{2}{5}x = 320 \Rightarrow x = \frac{320 \times 5}{2} = \boxed{x = 800}$$

(c)

Given, Selling Price = SP = 70,000,000 rupees.

Discount % = 20%

Marked Price = MP = ?

$$SP = MP - (MP \times \text{Discount \%})$$

$$70,000,000 = MP - (MP \times 20\%)$$

$$70,000,000 = MP - \frac{20}{100} MP$$

$$70,000,000 = MP - \frac{1}{5} MP$$

$$70,000,000 = \frac{5MP - MP}{5}$$

$$70,000,000 = \frac{4}{5} MP$$

$$\begin{array}{r} 175,000,000 \\ \underline{35,000,000} \\ 70,000,000 \times 5 = MP \\ \hline 350 \end{array}$$

$$175,000,000 \times 5 = MP$$

$$MP = 87,500,000 \text{ rupees.}$$

$$\begin{array}{r} 350 \\ \times 5 \\ \hline 1750 \end{array}$$

marked Price was 87.5 million rupees.

(d)

Suppose the original number is a .

Increase by 10%

$$a + 10\%a \Rightarrow 1.1a$$

$$\begin{aligned} &= a + 0.1a \\ &= 1.1a \end{aligned}$$

Decrease by 10%

$$= 1.1a - 0.1(1.1a)$$

$$= 1.1a - 0.11a$$

$$= 0.99a$$

$$\begin{array}{r} 1.1 \\ \times 0.1 \\ \hline 11 \\ 00 \\ \hline 0.11 \end{array}$$

Net change $\Rightarrow$

$$0.99a - a \Rightarrow -0.01a$$

$$\begin{array}{r} 0.11 \\ \times 0.11 \\ \hline 11 \\ 11 \\ \hline 0.0121 \end{array}$$

$$\% \text{ change} = \frac{-0.01a}{a} \times 100$$

$$= -1\%$$

Decrease of 1%