M#4

General Science and Ability

Sec #1

Q #2

(a)

Malnutrition

Malnutrition is a health condition that arises when nutrition is deficient in body. It occurs when a person does not consume enough essential nutrients.

2 Main Types

Undernutrition

- Undernutrition is when a person is deprived of protein, micronutrients or calories leading to stunted growth, low weight and height.

Overnutrition

- Overconsumption of certain nutrients like fat, protein or calories can lead to overnutrit resulting in obesity, diabetes or stroke

Causes of Malnutrition

Direct Causes

- Inadequate food intake
- Gastro-intestinal diseases
- Alcholism
- Mental health disorder
- Poor diet quality

Indirect causes

- Poverty
- Food insecurity
- Conflict and displacement
- Climate change
- Healthcare access

Consequences of malnutrition

Physical

- Weight loss
- Low energy
- Muscle wasting
- Increased risk of fractures
- Reduced mobility

Physiological

- Increased risk of infection
- Prolonged period of recovery
- Increased risk of side effects
- Reduced quality life
- Memory loss

- (b) -

Food Contamination	Food adulteration
Definition	
1- The presence of harmful substances in food that render it unfit for consumption is termed as food contamination.	1- The intentional addition of inferior or foreign substances to food to increase its weight, appearance or volume, while deceiving consumers is termed as food adulteration.
Causes	
2- Accidental or unintentional introduction of contaminants	2- Deliberate and fradulent actions
Nature of substances	
3- Can include micro-organisms (bacteria, viruses, parasites), chemicals or physical objects (glass metal)	3- often involved the addition of cheaper ingredients or artificial substances
Health Risks	
4- Can lead to foodborne illnesses, such as food poisoning, diarrhea or vomiting	4- May pose health risks if added substances are harmful or if

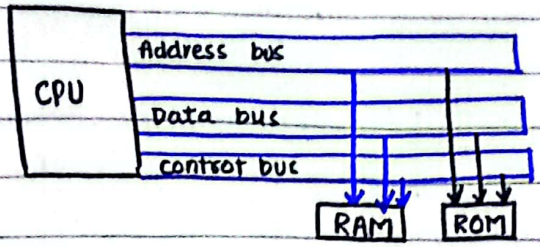
	they mask the presence of harmful contaminants.
Example	
5- Food contaminated with E. coli bacteria or toxins.	5- Addition of water or fillers to milk, meat or juice.
Detection	
6- Can be detected through laboratory testing and food safety inspections.	6- Difficult to detect because without specialized testing or knowledge of the adulterants.
Prevention	
7- Proper food handeling, storage and preparation practices can prevent food contamination	7- Strict regulatory controls and enforceme are necessary to Prevent adulteration.

- (C) -

Computer buses

These are the electrical wires through which CPU communicates with other parts of computer.

↳ Early PCs had single external bus or system bus



Structure of computer bus

Difference between

RAM	ROM
Definition	
• RAM can be defined as temporary memory that can hold data and instructions if there is adequate power supply	• ROM can be defined as permanent memory that can hold the data even power is switched off.
Type	
• The content in RAM (Random Access Memory) can be accessed and processed.	• The content in ROM (Read Only Memory) can not be processed. It can only be read.
Utility	
• It stores immediate instructions required by the processor.	• It keeps the boosting instructions of a computer.

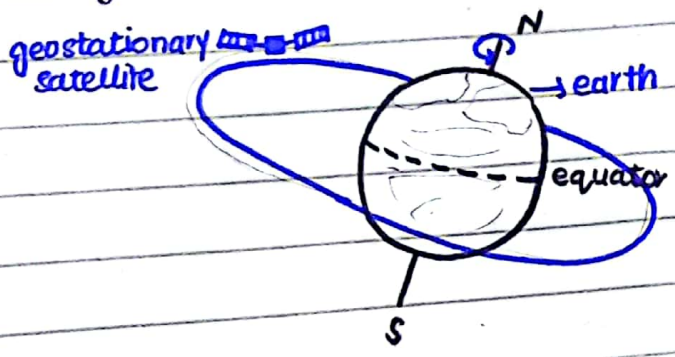
-(d)-

Geo-stationary satellite

A geo-stationary satellite is an earth orbiting satellite and placed directly over the equator. It revolves in the same direction the earth rotates and takes 24 hours to complete one rotation.

USE:

A geo-stationary satellite is used in direct broadcast TV, communication network or global positioning system



Natural satellite

The satellite which revolve naturally are called natural satellites.

e.g: Moon is a natural satellite of earth

2- Artificial satellite

These are man-made satellites that revolve around a planet particularly earth.

2 Types

Geo-stationary

* Their motion is synchronized with the mostion of earth.

Polar satellites

These satellites move from north pole to the south pole

3- Artificial satellites of Jupiter

There are no artificial satellites of Jupiter.

Q#5

(a)

Radioactivity

Radioactivity is defined as;

Radioactivity is the spontaneous emission of energy and subatomic particles from an unstable atomic nucleı.

Radioactive decay:

The process of radioactivity is called radioactive decay.

Radiations:

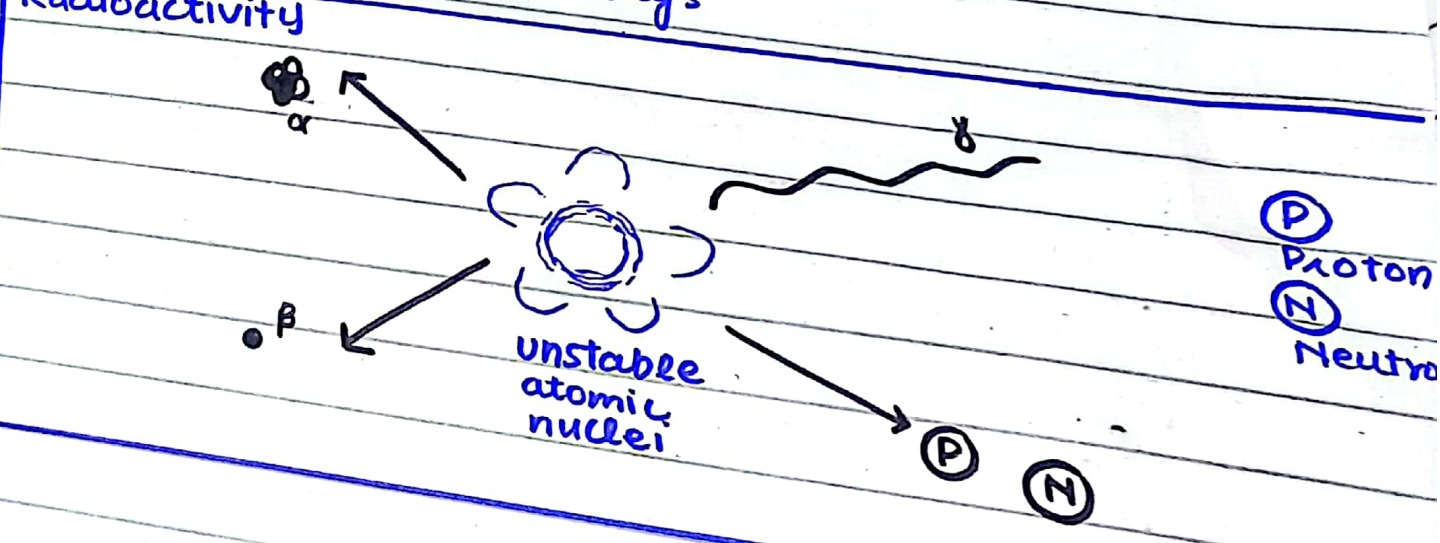
The energy emitted and particles collectively refered to as radioactivity.

e.g;

α ⇒ alpha radiations

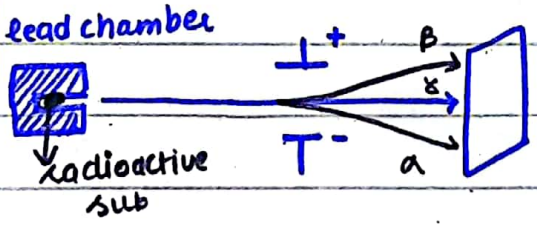
γ ⇒ gamma rays

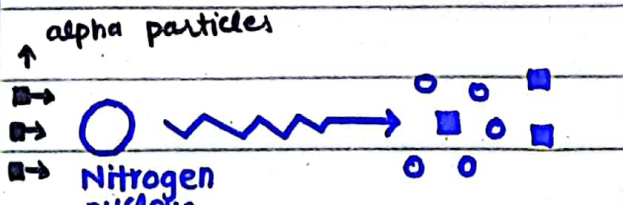
β ⇒ beta rays



Difference between

Natural Radioactivity	Artificial Radioactivity
1- Emission of radiations from an unstable nuclei due to self disintegaration of nuclei is called natural radioactivity	1- Emission of radiations from an unstable nuclei through induced process is called artificial radioactivity
2- This phenomenon is exhibited by elements with atomic number more than 83.	2. This phenomenon is exhibited by elements with atomic number less than 83.
3- It cannot be controlled once started.	0. It can be controlled.





$$^{14}_{7}N + {}^{4}_{2}He \longrightarrow {}^{17}_{8}O + {}^{1}_{1}H$$

(b)

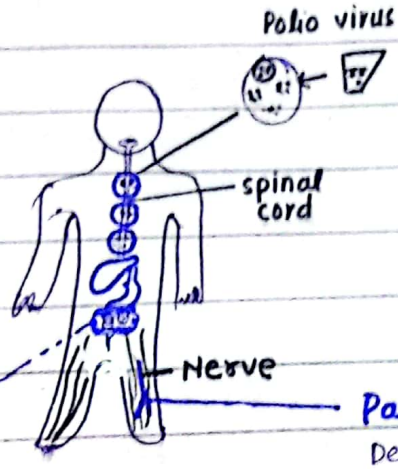
Polio

The poliomyelitis (Polio) is derived from a Greek word which refers to the inflammation of Grey matter of spinal cord. It is a viral infectious disease that sometime causes proalysis.

Infection Cycle of Polio

① **Entering the body**

Polio virus enters the body through mouth with direct contact with infected person or indirectly via contamination



② **settling in**

virus first infects and replicates in cells of instestine. From where it can enter main bloodstream

③ **Attacking body**

Paralyzing

Destruction of spinal cord result in paralysis

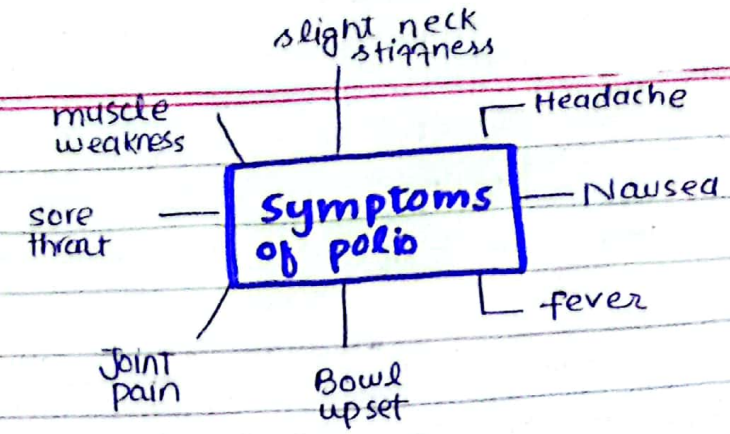
through feaces leaves body

Causes

through oral-fecal route

through fecal-oral route

intake of contaminated food / water



Prevention

Most effective way to prevent polio is through vaccination. The polio vaccine is safe and highly effective.

Vaccine

2 Types

i- Inactivated Polio vaccine (IPV)

- This vaccine contains a killed poliovirus

ii → Oral Polio vaccine (OPV)

This vaccine contains a weekend live polio virus.

* OPV is more effective vaccine

-(d)-

Population planning

Population planning also known as population control or family planning, is set of policies and programs designed to regulate the growth and size of population. It involves ~~serious~~ strategies aimed at influencing fertility rates, mortality rates and migration patterns.

Benefits of population planning

The benefits of population planning involves;

i- Improved health and well-being
ii- Enhanced education and economic
iii- opportunities
iv- Greater choice and autonomy
v- Reduced poverty and inequality
vi- Improved environmental sustainability
vii- Enhanced socio-economic development
viii- Improved food security

Section - II

Q# 6

(a)

Given

Enrollment in Jan. 2022 = 850 pupils

Enrollment in Jan 2023 = 1120 pupils

To find

%.age increase in enrollment = ?

Solution

To find

Increase in enrollment.

Difference in enrollment $= 1120 - 850$

$= 270$

$$\%.age\ Increase = \frac{(increase\ in\ value)}{(original\ value)} \times 100$$

$$= \frac{270}{850} \times 100$$

$$= 31.76\%.$$

Hence, the percentage increase in enrollment is 31.76%.

(b)

Given

Suppose current age of boy = x

age of father $= 5x$

To Find

Present age of father (son) = ?

Solution

2 years ago

Age of father + Age of son $= 114$

$$(5x-2)^2 + (x-2)^2 = 114 \quad \text{——①}$$

solve the equation

$$25x^2 - 20x + 4 + (x^2 + 4x + 4) = 114$$

$$25x^2 - 24x + 4 + x^2 - 4x + 4 = 114$$

$$26x^2 - 24x + 8 = 114$$

$$26x^2 - 24x = 114$$

$$26x^2 - 24x = 106$$

$$26x^2 - 24x - 106 = 0 \quad \text{——②}$$

Divide the equation by 2

$$\frac{1}{2}(26x^2 - 24x - 106) = 0$$

$$13x^2 - 12x - 53 = 0 \quad \text{——③}$$

Now, factorize the quadratic equation using quadratic formula

~~$13x^2 = 13$~~

$$x = \frac{(-b \pm \sqrt{b^2 - 4ac})}{2(a)}$$

$b = -12$, $a = 13$, $c = -53$

Put values in formula

$$x = 12 \pm \sqrt{(-12)^2 - 4(13)(-53)} / 2(13)$$

$$x = 12 \pm \sqrt{144 + 2756} / 26$$

$$x = 12 \pm \sqrt{2900} / 26$$

$$x = 12 \pm 54/26$$

ignore -ve sign because age cannot be negative

$x = (12 + 54)/26$

$x = 66/26$

$x = 3$

So, the present age of son is 3 years

-(C)-

Given

No. of heads of cows & hens = 48

no. of feet of cows & hens = 140

To Find

No. of Hens = ?

Solution

Let the cows = C

Hens = H

$$C + H = 48 \quad \text{—①}$$

$$C = 48 - H \quad \text{—②}$$

As a cow has 4 feet and hen has 2 feet so,

$$4C + 2H = 140 \quad \text{—③}$$

Put value of "C" from eq ② in eq ③

$$4(48 - H) + 2H = 140$$

$$192 - 4H + 2H = 140$$

$$-2H = 140 - 192$$

$$-2H = -48$$

$$2H = 48$$

$$H = \frac{48}{2}$$

$$\boxed{H = 24}$$

So, the number of Hens are 24.

(d)

Given:

Speed during first half $= V_1 = 40 kmh^{-1}$

Speed during during 2nd half $= V_2 = 60 kmh^{-1}$

To find:

Average speed = ?

Solution:

$$\text{Average speed} = \frac{V_1 + V_2}{2}$$

$= \frac{40+60}{2}$

$= \frac{100}{2}$

$= 50 \text{ Kmh}^{-1}$

So, the average speed of car is 50 Kmh^{-1}

Q # 7

(a)

Suppose the number $= x$

No. divided by 6 $= \frac{x}{6}$

then added 50 $= \frac{x}{6} + 50$

$$\frac{x}{60} + 50 = 60$$

$$\frac{x}{60} = 60 - 50$$

$$\frac{x}{60} = 10$$

Multiply by 60 on both sides

$$60 \times \frac{x}{60} = 10 \times 6$$

$$\boxed{x = 60}$$

the number is 60.

(c)

odd one out?

8, 16, 24, 34, 40, 48

Solution

34 is odd one because all other numbers are multiple of 8.

$8 \times 1 = 8$

$8 \times 2 = 16$

$8 \times 3 = 24$

$8 \times 4 = 36$ not 34

$8 \times 5 = 40$

$8 \times 6 = 48$

So, the odd one out of above series is 34.

(d)

Given:

height of tower = $h = 15\,m$

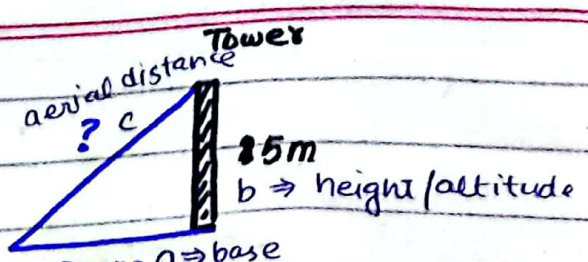
base = $9\,cm$

To find:

aerial distance = ?

Solution

Using Pythagorean theorem



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

$$(20m)^2 + (15m)^2 = c^2$$

$$400 + 225 = c^2$$

$$625 = c^2$$

$$c^2 = 625$$

Taking under root on both sides

$$\sqrt{c^2} = \sqrt{625}$$

$$\boxed{c = 25m}$$

So, the aerial distance from top of tower is 25m

(d)

Given:

Tariff for odd dates = Rs. 1000

Tariff for even dates = Rs. 2000

Tariff paid by man = Rs. 30000

To find:

No. of days man stayed = ?

Solution:

Suppose man stayed for x days

The number of odd days = $x/2$

The number of even days = $x/2$

Total amount paid = (no. of odd days × tariff for odd days) + (no. of even days × tariff for even days)

$$30000 = \left(\frac{x}{2} \times 1000\right) + \left(\frac{x}{2} \times 2000\right)$$

$$30000 = 500x + 1000x$$

$$30000 = 1500x$$

$$\frac{30000}{1500} = x$$

$$\boxed{x = 20 \text{ days}}$$

So, the man stayed for 20 days in hotel.