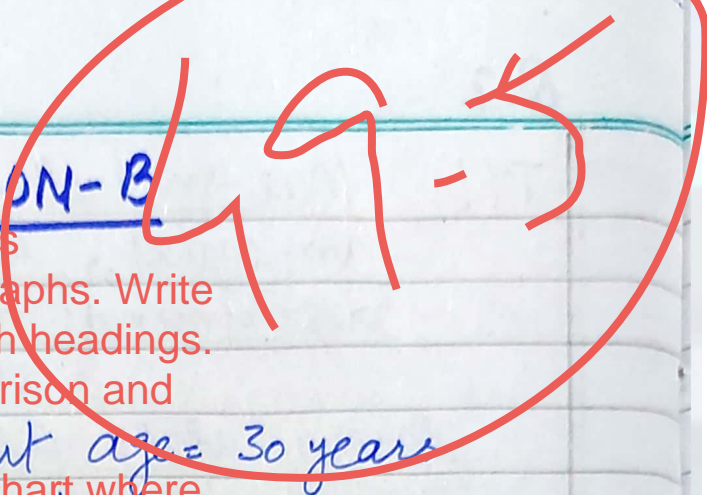


Date
19-July-23

USA Mock Exam

General Instructions

SECTION-B



1. Give numbering to headings
2. Do not write lengthy paragraphs. Write medium sized paragraphs with headings.
3. Do not use table for comparison and contrast questions.
4. Draw figures/diagram/flowchart where needed.
5. Start new question from fresh page.
6. Write unit of the answer in ability section.
7. Explain mathematical steps and the reasoning for better score.

8. Change colour scheme for references to give them more visibility.
9. Manage time well.
10. Wide page borders are discouraged. Should be reasonable.
11. Avoid writing wrong references.
12. Give more weightage to expressly asked part/s of the question.

Son's present age = 30 years
 Father's present age = x
 Son's age 5 years ago = $30 - 5 = 25$
 Father's age 5 years ago = $x - 5$

Solution:-

Since it is given in the question that 5 years ago, father's age was thrice of the son's age, so the equation becomes

$$x - 5 = 75$$

$$x = 75 + 5$$

$$x = 80$$

So, the present age of Father is 80 years, whereas, that of his son is 30 years. And there ages before 05 years were
 father = 75 years, son = 25 years

Q6(b)

Data:-

Income tax = 10% of his income

Income Tax amount = Rs. 1500

Income = ?

Solution:-

Suppose - the income is x .

$$x \times \frac{10}{100} = 1500$$

$$x \times \frac{10}{100} = 1500$$

$$10x = 1500 \times 100$$

$$10x = 150000$$

$$x = \frac{150000}{10}$$

$$x = 15000$$

Row

$$\begin{array}{r} 1500 \\ \times 100 \\ \hline 0000 \\ 0000 \times \\ 1500 \times \times \\ \hline 150000 \end{array}$$

Hence the total income of man is
Rs. 15000

Ans!

Q6(c)

Data:-

Arithmetic Mean₁ = 20

No: of observation = 6

Arithmetic Mean₂ = 15

No: of observation = 5

Number to be removed = ?

Solution:-

Formula for finding Arithmetic Mean =

$$\text{Mean} = \frac{\text{Sum of Numbers}}{\text{Total Number of observations}}$$

$$\text{Mean} = \frac{x}{6}$$

$$x = 20 \times 6$$

$$\boxed{x = 120}$$

mean after removing 2 number

$$\text{Mean} = \frac{\text{Sum of } \del{x} \text{ numbers}}{\text{Total number of observations}}$$

$$15 = \frac{x}{5}$$

$$x = 15 \times 5$$

$$\boxed{x = 75}$$

- Number to be removed = $120 - 75$

Number removed = 45

Q6(d)

Find - the missing one

i) 8, 4, 32, 7, 5, 35

Explanation:- The first two numbers ~~8 and 4~~ 8 and 4 when multiply with each other gives 32, $8 \times 4 = 32$, $4 \times 8 = 32$, which is the third number in the series.

So is the case with 4th and 5th number i.e. 7 and 5, when multiplied with each other gives 35 i.e. $7 \times 5 = 35$, $5 \times 7 = 35$

Hence, the next^(6th) number in series is 35.

ii) 17, 19, 23, 29, 31, 37

Explanation:- The series is ^{showing} following prime numbers between 17 and 39. Prime numbers are numbers that are divisible by only 1

and the number itself. All the numbers in the series i.e. 17, 19, 23, 29, 31, 37 are ~~not~~ only divisible by 2 and themselves.

Q# 8 (a)

Data:-

Paint = 3 liters

Area covered = 24 sqm

~~Age~~ percentage increase in paint = x

Area = 50.4 m²

Solution:-

Paint	Area covered
\uparrow 3 \uparrow x	24 \uparrow 50.4 \uparrow

$$\boxed{x : 3 :: 50.4 : 24}$$

$$x \times 24 = 3 \times 50.4$$

$$24x = 151.2$$

$$x = \frac{151.2}{24}$$

$$\boxed{x = 6.3}$$

R.w
50.4
<u>9.3</u>
151.2
6.3
24 $\overline{)151.2}$
<u>-144</u>
72
<u>-72</u>
0
x 9

6.3 litres paint is required

to cover area of 50.4 m^2

Now, to find percentage increase
in the paint

$$\% \text{ increase} = \frac{\text{new} - \text{old}}{\text{old}}$$

$$\% \text{ increase} = \frac{\text{new value} - \text{old value}}{\text{old value}} \times 100$$

$$\% \text{ increase} = \frac{6.3 - 3}{3} \times 100$$

$$\% \text{ increase} = \frac{3.3}{3} \times 100$$

$$\% \text{ increase} = 1.1 \times 100$$

$$\% \text{ increase} = 110\%$$

$$\begin{array}{r} 1.1 \\ 3 \overline{) 3.3} \\ \underline{3} \\ 0 \\ \times 3 \\ \underline{3} \\ 0 \end{array}$$

Hence the increase in paint
required is 110% to paint
an area of 50.4 m^2

$$\begin{array}{r} 100 \\ 1.1 \\ \hline 100 \\ 100 \times \\ \hline 110.0 \end{array}$$

Q8(b)

Data:-

Automobile travels:

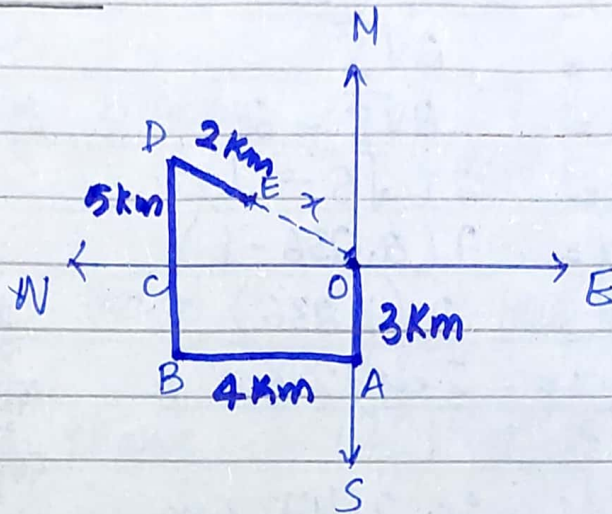
3 Km = south

4 Km = west

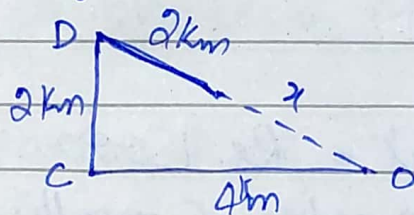
5 Km = north

2 Km = south-east

Solution:-



To know the distance, how far he is from his starting point take triangle OCD



$$OC = AB = 4 \text{ km}$$

$$BD - BC = CD$$

$$5 - 3 = 2 \text{ km}$$

By using Pythagoras theorem

$$(\text{Hyp})^2 = (\text{Per})^2 + (\text{Base})^2$$

$$(2+x)^2 = 4^2 + 2^2$$

$$(2+x)^2 = 16 + 4$$

$$(2+x)^2 = 20$$

Taking root on both sides

$$\sqrt{(2+x)^2} = \sqrt{20}$$

$$2+x = 2\sqrt{5}$$

$$x = 2\sqrt{5} - 2$$

$$x = 2(\sqrt{5} - 1)$$

$$x = 2(2.236 - 1)$$

$$x = 2(1.236)$$

$$x = 2.472 \text{ km}$$

$$\begin{array}{r} 2 \overline{) 20} \\ \underline{2} \\ 0 \end{array}$$

$$\begin{array}{r} 5 \\ \underline{5} \\ 0 \end{array}$$

$$\begin{array}{r} 1 \\ \underline{1} \\ 0 \end{array}$$

$$\begin{array}{r} 2.23 \\ \underline{2.23} \\ 0 \end{array}$$

$$\begin{array}{r} 2 \\ \underline{2} \\ 0 \end{array}$$

$$\begin{array}{r} 2 \\ \underline{2} \\ 0 \end{array}$$

$$\begin{array}{r} 42 \\ \underline{2} \\ 84 \end{array}$$

$$\begin{array}{r} 443 \\ \underline{3} \\ 1329 \end{array}$$

$$\begin{array}{r} 446 \\ \underline{271} \end{array}$$

Automobile is 2.472 km away from its starting point.

Q8 (C)

Dalia:

Tahir's investment = Rs. 15000

Uma's investment after 5 months = Rs. 30,000

Usman's investment in last 4 months = Rs. 45,000

profit at the end of year = 406,000

Find share of each = ?

Solution:-

Tahir	:	Uma	:	Usman
15000×1	:	30000×7	:	45000×4
		$\begin{array}{r} 15000 \\ 75000 \\ \hline 90000 \end{array}$		$\begin{array}{r} 15000 \\ 18000 \\ \hline 33000 \end{array}$
		$\begin{array}{r} 90000 \\ 2500 \\ \hline 92500 \end{array}$		$\begin{array}{r} 33000 \\ 123 \\ \hline 33123 \end{array}$

~~15000~~ :

$$1500 : 17500 : 1500$$

6:7:6

$$1 : 1.167 : 1$$

$$\begin{array}{r} 2500 \\ 17 \\ \hline 17500 \end{array}$$

$$\begin{aligned} \text{Sum of ratios} &= 1 + 1.167 + 1 \\ &= 3.167 \end{aligned}$$

$$\text{Tahir's share} = \frac{1}{3.167} \times 406000$$

$$\boxed{\text{Tahir's share} = 128197 \text{ Rs}}$$

$$\text{umar's share} = \frac{1.167}{3.167} \times 406000$$

$$\boxed{\text{umar's share} = 149605 \text{ Rs}}$$

$$\text{Usman's share} = \frac{1}{3.167} \times 406000$$

$$\boxed{\text{Usman's share} = 128197 \text{ Rs}}$$

Hence, the share of Tahir, umar, and usman are Rs 128197, Rs 149605 and Rs 128197 respectively.

Q8(d)

Data:-

property left = 640,000 Rs

Debt = Rs. 40,000

spent on burial = Rs. 5000

distribute the remaining amount
to between his widow, one
daughter and two sons according
to Islamic Law.

Solution:-

Find we need to find the amount
left after paying debt and
burial expenses.

Amount left = Total amount - (debt +
burial expenses)

Amount left = 640000 - (40,000 + 5000)
640000 - 45000

Amount left = 595000 Rs

Now, the remaining amount is
to be distributed among
his widow, sons and daughter
as per Islamic Law.

640000
45000
595000

Share of widow in Islam is

1/8

and share of son is twice as that of daughter's share

$$\text{Widow's share} = \frac{1}{8} \times 595000$$

$$\boxed{\text{Widow's share} = 74375 \text{ Rs}}$$

$$\text{Remaining} = 595000 - 74375$$

$$\boxed{\text{Remaining} = 520625 \text{ Rs}}$$

$$\begin{array}{r} 595000 \\ - 74375 \\ \hline 520625 \end{array}$$

Now the remaining 520625 Rs is to be distributed b/w 1 daughter and 2 sons

Acc to Islamic share

daughter's share is half of the brother, means brother gets double

If daughter's share is x then brother's share would be $2x$

$$x + 2x + 2x + 520625$$

$$5x = 520625$$

$$x = \frac{520625}{5} = 104125$$

$$\boxed{x = 104125 \text{ Rs}}$$

$$\boxed{\text{Daughter's share} = 104125 \text{ Rs}}$$

share of son = $2x$

share of son = 2×104125

Share of son = 208250

$\begin{array}{r} 104125 \\ \times 2 \\ \hline 208250 \end{array}$

share of individual son = 208250.

Hence, Share of widow, daughter,
1st son and 2nd son is Rs 74375,
Rs. 104125, Rs 208250, Rs 208250
respectively.

SECTION-A

Question # 3

a. Role of kidney in the urine formation.

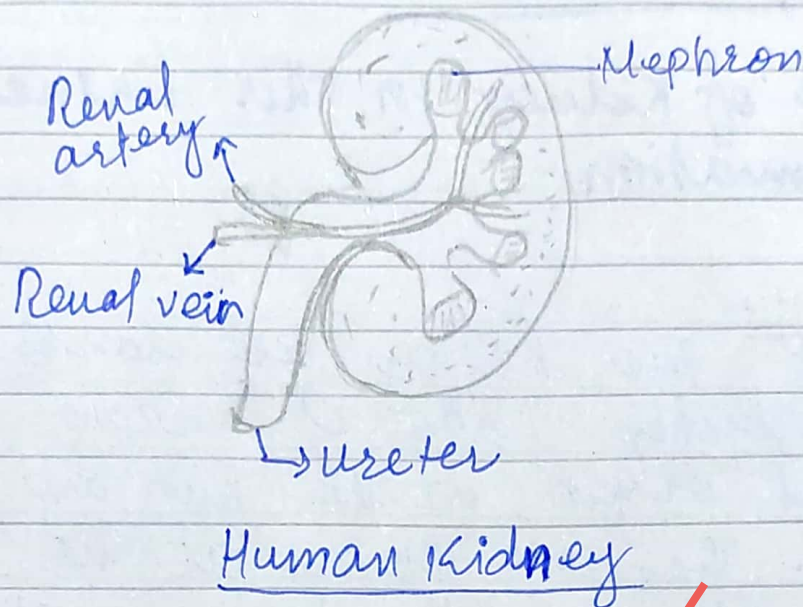
Kidney:-

The kidney are dark red, slightly flattened, bean shaped organ in the human body. They are placed at the back wall of abdominal cavity just below the diaphragm. Kidneys are protected by the last two ribs.

Role of kidney in the urine formation:-

Urine is produced by kidneys and it contains the by-product of metabolism (salt, water and toxins) that end up in the blood. The kidneys and urinary tract filter and eliminate these waste substances from our blood. Without kidneys, waste products

and toxins would soon build up in the blood to a dangerous level. Detail needed



Q3(b)

What is Remote Sensing:-

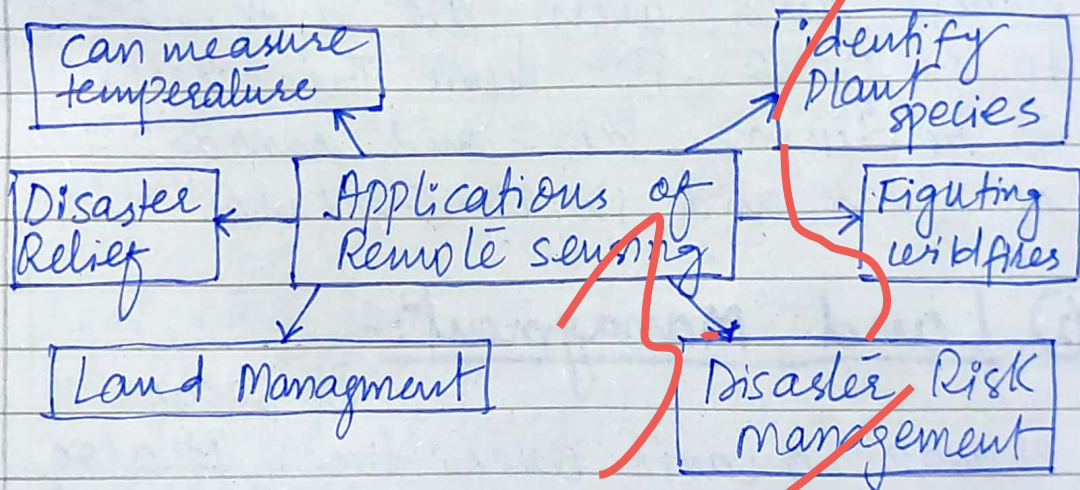
Remote Sensing is the science of obtaining information about objects or areas from a distance, typically from aircraft or satellite. The process involves detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance.

Types of Remote sensing:-

There are two types of remote sensing.

1. Active sensing
2. Passive sensing

Applications of Remote sensing in environmental science:-



Following are explained ^{in brief} some of the ~~brief~~ applications of remote sensing in environmental science.

① Disaster Relief:-

Access to area after natural disaster is challenging. Remote sensing is used to quickly

evaluate the damage and help to prioritize the relief efforts need in particular form of disaster

② Disaster Risk Management:-

Remote Sensing helps in navigating the environmental conditions, helps to predict extreme weather events and warn the authorities to prepare for them. This helps in reducing risk and damage of lives and infrastructure.

③ Land Management:-

It shows change in land over time. It also tells about soil, erosion, vegetation, density. Land managers use this data to identify areas of higher risk and develop plans to address them.

④ Fighting wild fires:-

Through remote sensing, hot spots on the

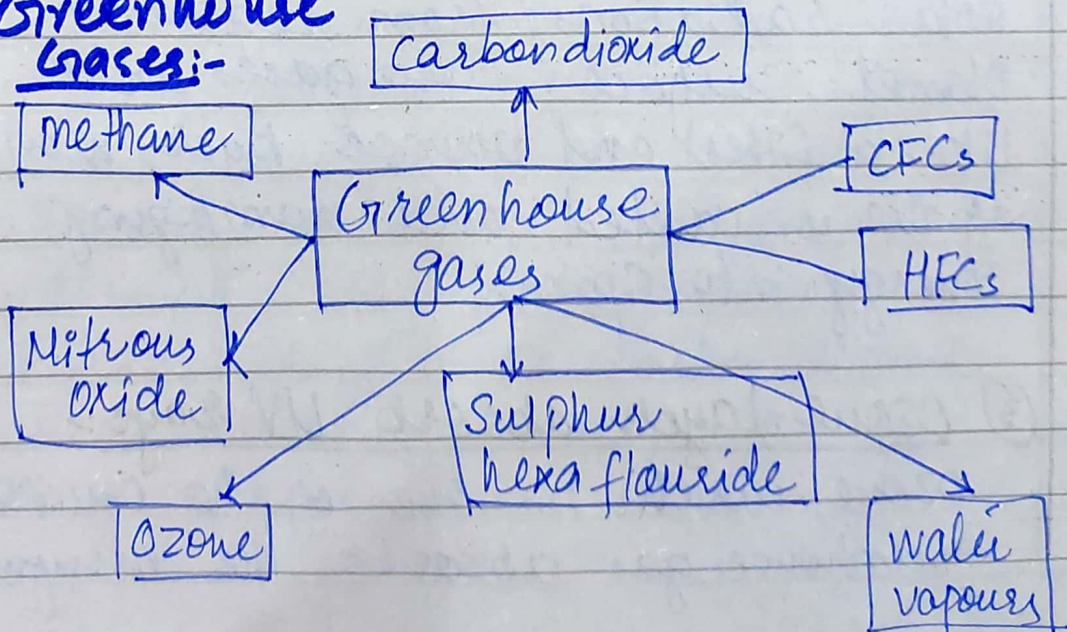
land which may turn into wild fire are spotted, they aren't visible from ground, so remote sensing can address them before they become the real threat.

Q3(c)

What is Green House Gas ?

Greenhouse gases are gases in the earth's atmosphere that trap the heat. Sunshine shines during the whole day, warming the earth's surface. At night earth's surface cools, releasing heat back into the air. But some of the heat is trapped by the greenhouse gas in the atmosphere.

Greenhouse Gases:-



Benefits of Greenhouse effect:-

Some of the most positive effects of greenhouse gases are given below.

1. It helps to maintain certain temperature level:-

Greenhouse gas helps to maintain a certain temperature level on earth's surface making it habitable for living beings. Without GHGs the heat would have escaped the atmosphere, making earth's surface way cooler.

2. Greenhouse gas block harmful solar radiation:-

GHGs help to block the harmful solar radiations from reaching planet's surface. These gases work like a filter and bounce back most of the unwanted and damaging energy into space.

3. Ozone layer absorb UV rays:-

Ozone, which is one of the crucial greenhouse gas absorbs the harmful

UV rays of the sun, which are much harmful for life on Earth.

(4) Greenhouse gas maintain water level:-

GHG effect has allowed the planet to maintain its water level on the surface.

How Greenhouse Gas Contribute Towards Global warming:-

Greenhouse gases are responsible for global warming because they trap heat that would otherwise escape from the atmosphere.

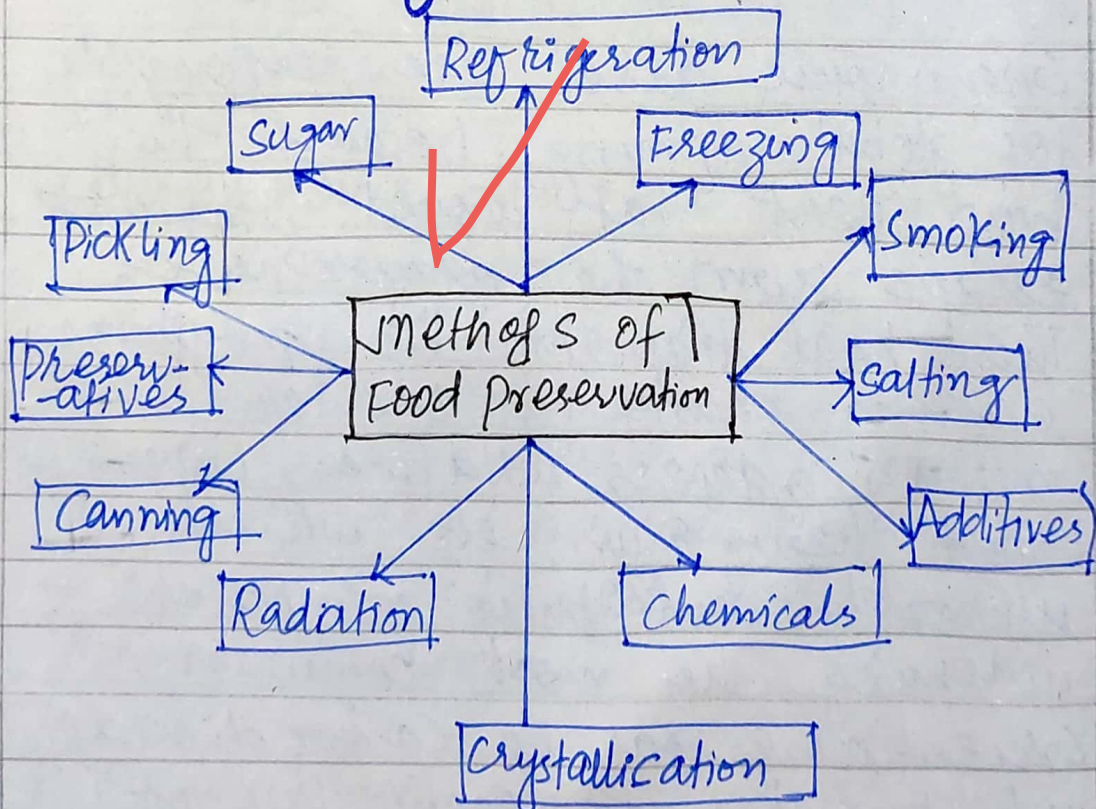
These heat trap into the atmosphere causing change in sea level, melting glaciers, wild fires, unpredictable flood, heavy rain, etc which ultimately contributes to global warming. The most common greenhouse gas is Carbon dioxide, which makes up nearly 80% of all greenhouse gas emission.

Q6(d)

Food preservation:-

Food preservation is the procedure by which food is treated and handled to stop or slow down food spoilage. It usually involves preventing bacteria, fungi and other micro-organisms, from developing and causing food spoilage.

Methods of Food Preservation:-



A number of food preservation techniques can be used which can either prevent, decay or otherwise reduce food spoilage altogether. Some of the methods are described below.

1. Pickling:-

Food preserved by using thing methiad preserves meat, vegetables by using vinegar. The action of acetic acid prevents microbial growth hence preventing food spoilage.

2. Salting:- Salting process removes moisture from the food especially meat and stops food deterioration. Salting process is commonly used for preserving meat.

3. Refrigeration:-

Refrigeration preserves food by slowing down the growth of microorganism and enzymes that causes food to rot.

4. Drying:-

Drying is one of the most ancient technique of food preservation which eliminates water from the food and food become dry enough to prevent bacterial growth in it.

5. Chemicals:-

Many chemicals are used as a food preservation technique to kill or inhibit the growth of microorganisms in the food.

6. Additives:-

Additives are most of the times used in preservation of canned foods. They inhibit mould or fungal growth in the canned food.

7. Crystallisation:-

Fruits are preserved by placing them in sugar syrup from where the preserved material is cooked in sugar to point of crystallisation and the resulting product is then stored in a dry place.

Q4ca)

AI has revolutionalized the world. Comment

What is AI?

AI is the term used to describe the machine's, learning logic, reasoning and creativity which were once considered unique to humans. It is the computer programming which immitate thoughts and actions by analyzing data and problems.

How AI has revolutionalized the world

AI is changing the way we live, work, travel and do business in the 21st century. It has made its foot steps in automobile industry, manufacturing industry, education and health industry. AI is widely used in businesses. It is a perfect tool for providing valuable insights to businesses. AI has power to revolutionalize

the world but humans are still building and controlling robots. AI is still dependent on humans, and it does not have emotional intelligence, so it's not as smart as we are. ^{However,} Humans have an innate conscious sense that machine do not have.

Q4(b)

Water scarcity:-

Water scarcity refers to unavailability of water where people do not have access to sufficient water for drinking, cleaning, washing and cooking purpose. It is a global situation, at present about 47% of the population don't have access to clean drinking water and water for other purposes. Water

Source? availability in Pakistan has decreased by more than 80% in the last 70 years. If the situation persist Pakistan may become water scarce country by 2025.

Measures to deal with the issues of water scarcity.

water scarcity can be significantly reduced by practical implementation of few of the remedial measures given below.

1. Construction of Large dams:-

It is the most important measure to overcome the issue of water scarcity. Government needs to build new dams for storing water. These can collect sufficient amount of water during rainy day which can be used during dry spells.

2. Efficient management of water resources:-

Water resources in Pakistan are mismanaged, government need to improve infrastructure to stop water wastage. There should be proper lining of canals, so that seepage of water can be avoided.

3. Replacement of traditional irrigation system with modern irrigation system:-

Modern irrigation system is to be followed to avoid wastage of water as traditional irrigation consumes much quantity of water. Modern techniques such as drip irrigation can be used.

4. Curbing Population:-

Tariff

Population growth must be controlled to address the issue of water crisis. This can be done through family planning and legislation to ensure small family system in the country.

5. Nationwide awareness Campaign:-

Nation is unaware about the severity of the issue. Awareness campaign must be launched in the country. People of the country must be sensitized about developing water conservation habits. This can be done through social media and civil society.

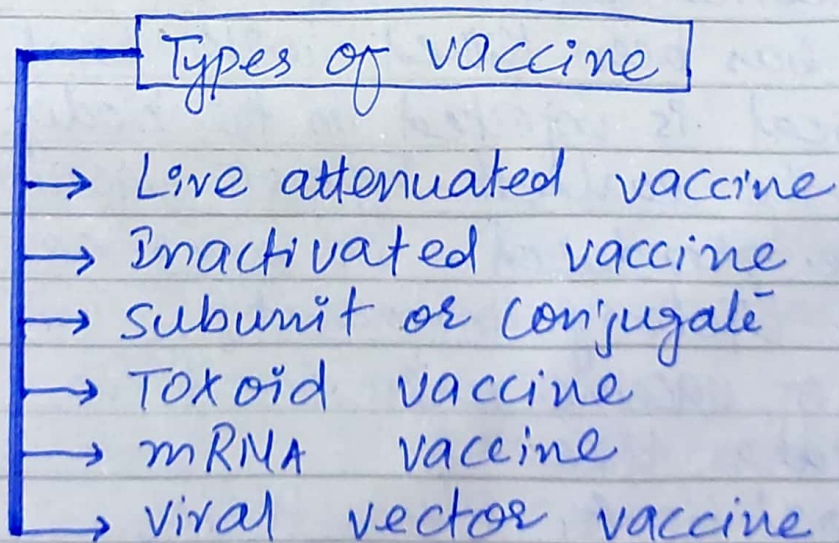
Q4CC)

What is vaccine:-

Vaccines are medications that are used to make people immune to certain disease. They contain virus, bacteria that causes illness or disease.

The virus or bacteria is included in the vaccine so that the immune system can be taught to recognize and produce antibodies against it, if a person is exposed to it naturally.

Types of vaccine:-



1. Live attenuated vaccines:-

In this type of vaccine a live version of the germ ~~or~~ that causes a disease is injected into the body. The virus after being injected make memory B-cells that helps in recognizing and fighting against disease. Live attenuated vaccines are used for:

Measels, Smallpox, chickenpox, yellow fever.

2. Inactivated vaccine:-

In this type of vaccine bacteria or virus that has been killed with heat or chemical is injected in the body. It is the earliest type of vaccine to be produced. It does not offer lifelong immunity. This type of vaccine are used in diseases like:

Hepatitis A, Flu, Polio, Rabies

3. Sub-unit or Conjugate

This type of vaccine trigger very strong immune response. In this vaccine particular part of germ or virus with protein is injected into the body. It is used for diseases: Hib, Hepatitis B, HPV.

4. Toxoid vaccines:-

Toxoid vaccines used toxins created by virus or bacteria. This also does not offer life long immunity and need to be topped up over time. It is used for tetanus and diphtheria.

5. mRNA vaccine:-

This is the recent development in types of vaccine and has consumed many years in development. It has low manufacturing time and cost and kept at low temperatures. First mRNA vaccine was produced against COVID-19.