

SECTION - IIQ7

a) Volume of sphere

SolGiven $\rightarrow$ Diameter = 14 cm

$$\text{radius} = r = \frac{d}{2} = \frac{14}{2} = 7 \text{ cm}$$

$$\text{Volume of sphere} = \frac{4}{3} \pi r^3$$

$$= \frac{4}{3} \left(\frac{22}{7} \right) (7)^3$$

$$= \frac{4}{3} (22) (7)^2 \text{ cm}^3$$

$$= \left(\frac{88}{3} \right) (49) \text{ cm}^3$$

$$V = 1404 \text{ cm}^3 \text{ Ans}$$

b)

Five friends savings = 25000 Rs.

Ratio of shares = 1:2:3:4:5

Smallest share = ?

Sol:-

$$\begin{aligned} \text{Sum of ratio} &= 1+2+3+4+5 \\ &= 15 \end{aligned}$$

$$\text{Share of 1 friend} = \frac{\text{Ratio of share}}{\text{Sum of Ratios}} \times 25000$$

So the smallest ratio will have smallest share.

$$\begin{aligned} \text{Smallest share} &= \frac{1}{\frac{15}{3}} \times \frac{5000}{25000} \\ &= \frac{1666.67}{3} \end{aligned}$$

So the smallest share = 1666.67

next friend's share = 2×1666.67 and so on.
which could be more than 1st one.

So the smallest share = 1666.67.

c) Spot the error / complete series

i) 2, 6, 18, 54, 162, 486 (which number doesn't fit)

$$2 \times 3 = 6$$

$$6 \times 3 = 18$$

$$18 \times 3 = 54$$

$$54 \times 3 = 162$$

$$162 \times 3 = 486$$

All the numbers are obtained by multiplying previous number with '3' except the 1st number which is '2'

ii) 3, 5, 7, 11, 13, _____

The given series represents the prime numbers
so the next number in series will be

'17'

3, 5, 7, 11, 13, 17

(d)

Sides of triangle are given

Let $a = 5\text{cm}$

$b = 12\text{cm}$

$c = 13\text{cm}$

Find angles = ?

Sol

To check whether the given sides are sides of right angled triangle, let us use Pythagorean Theorem.

$$(\text{hyp})^2 = (\text{base})^2 + (\text{perp})^2$$

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

$$(13)^2 = (5)^2 + (12)^2$$

$$169 = 25 + 144$$

$$169 = 169$$

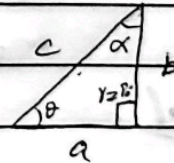
So the given sides are the sides of a rt. angled triangle.

So one angle = 90°

$$\text{As } \sin \theta = \frac{\text{perp}}{\text{hyp}} = \frac{b}{c}$$

$$\Rightarrow \sin \theta = \frac{12}{13}$$

$$\Rightarrow \theta = \sin^{-1}\left(\frac{12}{13}\right) \text{ 2}^{\text{nd}} \text{ angle}$$



As sum of angles of triangle = 180°

$$\Rightarrow \alpha + \theta + \gamma = 180^\circ$$

DATE: ___/___/___

$$\alpha + \sin^{-1}\left(\frac{12}{13}\right) + 90^\circ = 180^\circ$$

$$\alpha = 180^\circ - 90^\circ - \sin^{-1}\left(\frac{12}{13}\right)$$

$$\boxed{\alpha = 90^\circ - \sin^{-1}\left(\frac{12}{13}\right)} \quad 3^{\text{rd}} \text{ Angle.}$$

Question #6

(d)

Unscramble

(i) STSTAICITS

STATISTICS

(ii) LGEBMAR

GAMBLER

(c)

$s = \text{Distance covered} = 36 \text{ km}$

$v = \text{Speed} = 18 \text{ km/hr}$

$t = \text{time} = ? \quad (\text{starting } 1 \text{ pm})$

Sol

As Distance = speed $\times$ time.

$$s = vt$$

$$\Rightarrow \frac{s}{v} = t$$

$$\Rightarrow t = \frac{36 \text{ km}}{18 \text{ km/hr.}}$$

$$t = 2 \text{ hr}$$

DATE: ___/___/___

Starting at 1pm he will reach at 3pm

(b) Price of Camera = 200\$
Off = 25%, tax = 6%
Amount Paid = ?

Sol
$$25\% \text{ off on Price} = \frac{25}{100} \times 200^2$$
$$= 50$$

So the price after off = $200\$ - 50\$$
 $= 150\$$

tax = 6%
Amount of tax to be paid = $\frac{6}{100} \times 150^3$
 $= 9\$$

So the price paid = $150\$ + 9\$$
 $= 159\$$ Ans

(a)

Apple : Berry : Cherry : Date
3 : 6 : 2 : 5

SECTION-I

Q2

(d) Discuss working of GPS.

What is fiber optic?

How 2D & 3D location measured by satellite.

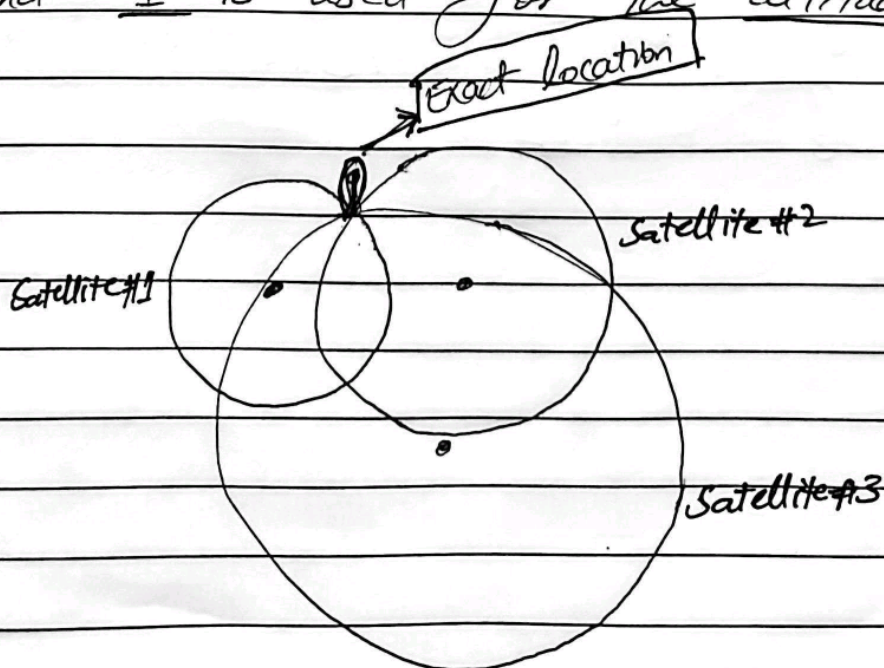
Ans

GPS

GPS is the abbreviation for Global Positioning System which is used to find the location of any object with the GPS.

Working of GPS

GPS works with the help of four satellites. 3 satellites are used for positioning and 1 is used for the altitude.



All the Three satellites search the desired thing within their range. So the point where their range intersects is the point of exact location.

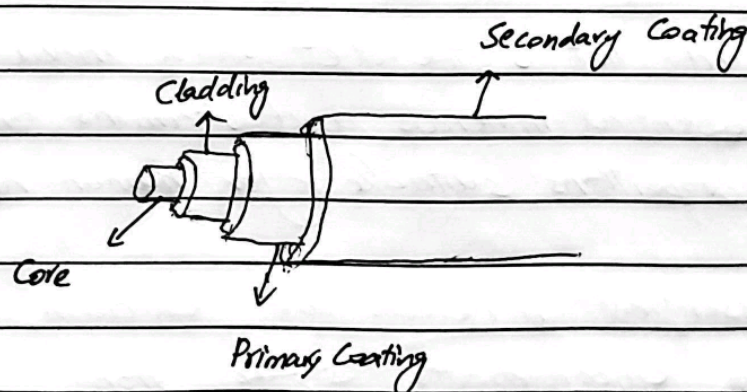
2D & 3D

2D location is just the location on map and it does not tell about the speed or anything else about the object.

3D location is the exact location on the road with speed and everything else is located by 3D. In this all the four satellites are involved.

Fiber Optic

Fiber optics are thin strands of glass or plastic in which information travels in the form of rays or light.



Parts of Fiber Optic

Core → Internal layer in which light travels.
It is made up of glass.

Cladding → It is made up of glass or plastic with high refractive index.

Primary Coating → It provides protection to the cladding to avoid information leakage.

Secondary Coating → It is the outermost coating in which the fiber optics are packed. It provides extra safety layer.

Working of fiber optics on two principles.

- 1) Total internal reflection
- 2) Continuous Refraction

Q2(c)

Balanced Diet

"Let thy food be thy medicine"

Balanced diet is the diet which includes all the essential minerals and vitamins in desired proportions, suitable for human health.

Some essential minerals are Calcium, Potassium, Carbohydrates, sugar, Iron, Proteins etc.

Similarly some essential vitamins are:

Vit A, D, E, K, Vit C,

↳ Vitamin B complex - B1, B3, B5, B6, B7, B9, B12

Deficiency of Vitamins ADEK

Vitamins	Deficiency Causes	Sources of Vit.
Vit. A	Night Blindness, Dizziness, Growth disturbs	^{sked} Yellow coloured food, fish, carrots etc.
Vit D	Bone weakness, and deformation, muscle weakness	Sunlight, Milk, Eggs,
Vit E	Skin and hair problems, Ageing	Nuts, Green leafy vegetables, Dry fruits
Vit K	Blood clotting issues, Muscle weakness,	Fresh fruits, Green vegetables, liver, meat etc.

Q2(a)

Data is the new oil. Do you agree? Justify with 3 examples.

Ans

Yes, I agree with the statement "Data is the new oil" because data now possesses the same value as once oil did.

From small machineries to big economies, everything revolved around the 'oil'. Now this place is taken by data.

Justification & Examples

1- Use of data in AI

Modern age is the age of artificial intelligence (AI). AI needs data for its working as it uses data to update its knowledge and performance. So data is the core of AI.

2- Use of data by Tech companies

The tech giants use data to know the trends. By analyzing data tech companies give ads according to people choices and ideas. Data selling and buying is a big business now.

3. Use of data in ad industries

Advertisement industries use data to shape trends or to promote a specific trend.

Question # 4

(d)

i) Biofuel

Biofuel is the fuel which is made by using the organic compounds in the form of biogas and biodiesel through the animal and plant wastes.

Biofuel is cheaper than the traditional fuel and is environment friendly as compared to the traditional fuel.

ii) Adulteration

Adulteration is the intentional addition of something harmful in food to increase the quality or quantity of food.

In this process, quality of food is intentionally made low just to gain the economic motives.

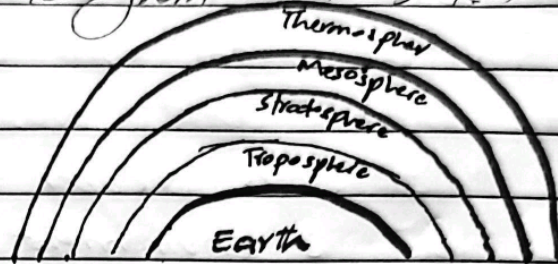
eg. addition of brick powder in Chilli powder, adding water in milk, use of lime water in milk etc.

iii) Hydrosphere

Hydrosphere is the layer of water on earth which includes all the water bodies from rivers to seas and oceans.

(iv) Troposphere

Among the four layers of atmosphere surrounding the earth, troposphere comes first. Its range is from 0 to 50 km.



This layer includes the gases like oxygen and nitrogen which are helpful in breathing. Aeroplanes also travel in this layer.

(v) Isotopes

Isotopes of an element are the atoms with same atomic number but different mass number, i.e. the number of protons remain the same but number of neutrons become different.

e.g. Isotopes of Hydrogen are:

deuterium, tritium etc.

Q4(c) Discuss different methods of solid waste management.

Solid Waste Management

Solid waste management is the process of in which solids and semi-solid waste is collected, transferred and managed in a way that it does not pose any threat to human health.

Methods of Solid Waste Management

1- Combustion / Incineration

In this method solid waste is burnt in some open place to decompose or exhaust the waste. This is the most common practice in Pakistan and India but it has many environmental hazards. So it is not recommended.

2- Open Dumping

In this method, solid waste is dumped outside the city, away from the population. It is the most disliked and unsafe method and is a big cause of environmental pollution.

iii) Composting

This method is used for the waste management of organic compounds in which solid wastes of animals and plants is buried and the product formed is known as compost which can be later used as fertilizer.

iv) Incineration

This is the most suitable method for solid waste management. In this method solid is burnt under controlled conditions and converted into ashes and the smoke from burning is also controlled and processed so that it does not pose any harm to the environment.