

(a) ^{er} Data is the new oil. ^o What we have is a slight difference. Like oil, data is raw and needs refining, processing to become valuable. But unlike oil, data is renewable, reusable and increasingly central to how people live and work. Furthermore, it fuels the digital economy the way fuelled the industrial economy. It powers elections; drives innovation, and shapes behaviour often visibly. Here are everyday examples how data is the

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new oil.

① Online Shopping Recommendations:-
when you browse a few things. Social media platforms use data to give you personalised advertisements to your liking. That is data at work people's clicks, searches, purchases are refined into personalised suggestions.

② Google Maps use real-time location data from thousands of users to give rates to people stuck ⁱⁿ traffic jams.

③ Data has also become increasingly common in technological warfare. Some countries use data or the breach the privacy of their data to attack.

Q.2

(b) Universe is expanding, and it is ~~expanding~~ resembles with balloon blowing in working as follows:-

(1) Surface Expansion: As an individual blows air into a balloon, its surface stretches outward. And as time progresses space itself expands, stretching the distances between galaxies.

(2) Every point on the balloon's surface moves away from every other point, there is no single 'center' on the surface. surface, and just like that in universe, galaxies move away from each other, and there's no central point of expansion.

(3) Dots drawn on the balloon get further apart as it inflates. Galaxies (like those dots) move apart as space expands, even though they are not necessarily moving through space, - space itself is stretching.

(c) Balanced diet refers to nutritional intake that includes all essential nutrients such as carbohydrates, proteins, fats, vitamins, minerals, fibre and water in the right with the right proportions to support body's growth, maintenance and overall health. Deficiency of vitamin A can lead to night blindness and dry skin. - Deficiency of vitamin D can lead to rickets in children and increased risk of weak bones. Whereas deficiency in vitamin E

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can lead to nerve damage and coordination issue due to oxidative stress.

(d) GPS is Global positioning system, it is a satellite-based navigation system that allows any GPS receiver (like your phone) to determine its exact location on Earth. Each satellite sends a signal with its location and the exact time. The receiver calculates how long the signal took to arrive, and using the speed of light, the receiver computes its distance from each satellite. It needs signals from 3 satellites to determine latitude and longitude, whereas for 3D locations, it requires 4 satellites to calculate the altitude (height).

Fiber optics is a technology that transmits data as light pulses through thin strands of glass or plastic. Its structure is made up of Core, Cladding and buffer coating. It works when data is converted into light pulses using lasers. The light travels through the core, bouncing off the cladding. At the destination, light is

Converted back into electrical signals. (4)

Q3

a.) Cells form organelles to compartmentalize functions, like departments under administration. Each organelle performs a specific task. It allows cells to multitask and regulate processes. ~~Harmful react~~ It protects cell from harmful reactions.

Mitochondria is the powerhouse of the cell. Their key roles include:

- ① ATP Production:- They convert glucose into ATP via oxidative phosphorylation.
- ② Calcium Storage:- Regulate calcium levels for signaling and muscle contraction.
- ③ Apoptosis = Triggers programmed cell death to remove damaged cells.
- ④ Heat Generation = In brown fat cells, they produce heat (thermogenesis).
- ⑤ Metabolism = Involved in the Krebs cycle and fatty acid oxidation.

(b) Doping is the process of adding impurities to a pure semiconductor (like Silicon) to improve its electrical conductivity.

Types of Semi Conductors:

<u>Type</u>	<u>Dopant elements</u>	<u>Charge Carriers</u>	<u>Effect</u>
<u>N-type</u>	Phosphorus, Arsenic	Extra Electrons	Enhances Conductivity by adding free electrons.
<u>P-type</u>	Boron, Gallium	Holes (missing electrons)	Improves Conductivity by creating positive charge carriers.

These doped materials form PN junctions, essential for diodes, transistors and solar cells.

C. Merits and demerits of volcanic Eruption

Merits:-

- (a) Fertile Soil = volcanic ash enriches soil with minerals.
- (b) Geothermal energy = Heat from volcanoes powers sustainable energy systems.
- (c) Mineral Resources = Eruptions bring valuable minerals like sulfur and pumice to the surface.
- (d) Tourism = volcanoes attract visitors, boosting local economies.

Demerits:-

- (a) Loss of Life and Property = Lava flows and ash clouds destroy homes and nearby infrastructure.
- (b) Health Hazards = Ash causes respiratory issues and contaminates water.
- (c) Environmental damage = Forest and habitats are destroyed, affecting biodiversity.
- (d) Climate Effects = ^{Ash} Ash clouds from volcanic eruption affect weather patterns and contribute to global warming.

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d. Dengue, Symptomology, Causive agents, and Remedies =

Dengue is a viral infection transmitted by the bite of infected mosquitoes. It's common in tropical and subtropical regions. Its symptoms include high fever (upto 104°F), headache, pain behind eyes, muscle and joint pain, rash, nausea and vomiting.

It is caused by four types of dengue virus (DENV-1 to DENV-4). Infection with one type gives immunity to that type but increases risk of severe illness if infected by another type later. There is no specific antiviral treatment but its remedies include hydration, paracetamol, hospitalization for severe cases, and use repellents, nets and eliminate breeding sites for prevention.

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Section-II

Q. No 6

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

Apple candies exceed date candies
by 35. Berry candies?

$$\text{Ratio} = 3x$$

$$\text{Date} = 5x$$

Apple candies exceed date candies by
35 So:

$$3x - 5x = -2x \rightarrow$$

$$3x - 5x = -2x = +35$$

$\hookrightarrow$

$$x = \frac{35}{2}$$

$$x = 17.5$$

Now

Berry =

$$\text{Berry} = 6x = 6$$

$$= 6(17.5) = 6$$

$$= 105 \text{ ans}$$

$$\begin{array}{r} 17.5 \\ 2 \overline{) 35} \\ \underline{-26} \\ 15 \\ \underline{-14} \\ 10 \\ \underline{-10} \\ 0 \end{array}$$

(b)

original price = \$200

Apply 25% discount

$$\frac{25}{100} = 0.25$$

$$200 \times 0.25 = 50$$

$$\text{price after} = 200 - 50$$

$$\text{discount} = 150$$

Apply 6% tax. $\rightarrow \frac{6}{100} = 0.06$

Tax applied to discounted price:-

$$\begin{aligned}\text{Tax amount} &= 150 \times 0.06 \\ &= 9\end{aligned}$$

$$\begin{aligned}\text{Total amount paid} &= 150 + 9 \\ &= \underline{159} \\ &\text{amount.}\end{aligned}$$

(c)

Distance = 36 km

Speed = 18 km/hr

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

$$= \frac{36}{18} = 2 \text{ hours}$$

Add to the start time =

Start time = 1:00 pm

Add 2 hours = 1 + 2

$$= 3:00 \text{ pm. ans.}$$

Date:

(a)

- i) ~~Statistics~~
- ii) ~~Algebra~~

(d)

- i) ~~PA~~
- ii) ~~STATISTICS~~
~~ALGEBRA~~

Qno. 7

(a)

Volume of a sphere
with a diameter 14 cm.

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

Volume formula =

$$V = \frac{4}{3} \pi r^2$$

$$V = \frac{4}{3} \times \frac{22}{7} \times 7^3$$

$$V = \frac{343}{7} = 49.$$

$$V = \frac{4}{3} \times 22 \times 49$$

$$V = 22 \times 49 = 1078$$

$$V = \frac{4 \times 1078}{3}$$

$$V = \frac{4312}{3}$$

$$V = \frac{1437.3 \text{ cm}^3}{3}$$

$$\frac{4312 \text{ cm}^3}{3}$$

⑫ Five friends's savings = RS. 25000
ratio 1: 2: 3: 4: 5

$$1 + 2 + 3 + 4 + 5 = 15$$

$$\text{Smallest share} = \frac{1^{\text{st}}}{15^{\text{th}}} \times 25000$$

$$= \frac{25000}{15}$$

$$= \frac{5000}{3}$$

$$= 1666.6 \text{ RS.}$$

⑬
i)

Pattern:-

$$2 \times 3 = 6$$

$$6 \times 3 = 18$$

$$18 \times 3 = 54$$

$$54 \times 3 = 162$$

$$162 \times 3 = 486 \text{ Consistent.}$$

All numbers All numbers fit.

ii)

3, 5, 7, 11, 13

$$\underbrace{+2} \quad \underbrace{+2} \quad \underbrace{+4} \quad \underbrace{+2} \quad \underbrace{+4}$$

$$= 17.$$