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GENERAL SCIENCE

&

ABILITY MOCK TEST

Q:2 (a) "Data is the new oil"

Outline :

1. Introduction - A New Era Beyond Oil
2. Why Data Surpasses Oil
3. Harari's Argument on Dataism and Control
4. Three Real World Examples
5. Ethical Challenges
6. Conclusion - Data as the Ultimate Power.

Answer :

In today's world, data is not just the new oil - it is far more valuable. Oil once powered industries and still does but data powers intelligence, governance and life itself. While oil is finite, data multiplies endlessly; while oil fuels machines, data fuels minds, systems and decisions. In the 21st century, those who control data possess a form of power that even oil tycoons

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could never imagine

Cleve Humby's phrase "data is the new oil" was once revolutionary, but it now underestimates reality. Oil loses value once used; data grows in worth every time it is ^{shared or analyzed} processed. The more you use the more it flourishes it grows faster than a bacteria. Yuval Noah Harari, in Homo Deus, calls this as the rise of "Dataism" - a new ideology where the free flow of information is the supreme value. Harari argues that humans have moved from worshipping Gods and Nations to worshipping Data, because it decides what we see buy, and even believe. In his words, "those who control the flow of data control the future of life itself".

Three Real World Examples:

Firstly, social media reveals this dominance. Platforms like Tik Tok and Instagram don't only sell products, they sell attention shaped by user data. Every like, comment and scroll trains algorithms that predict and influence behaviour. The Cambridge Analytica scandal exposed how political opinions were manipulated through data analytics. Oil could never change elections,

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but data did. It has become a tool not of industry, but of influence.

Secondly, in healthcare, data has transformed prediction into prevention. Smart devices like Apple Watch collect millions of biometric readings daily, warning users about irregular heartbeats or stress levels. Horvitz notes that when data companies know your bodies better than you do, the balance of power shifts from individuals to algorithms. Oil fueled progress, but data now fuels foresight - it can save lives before symptoms appear.

Thirdly, in commerce and navigation, data drives precision. Google Maps uses continuous user data to predict traffic; Amazon anticipates what customers will buy before they even search; Netflix crafts entertainment tailored to each viewer's taste. Unlike oil, which powers engines blindly, data learns, adapts, and evolves - making it an intelligent fuel.

Yet immense power drives danger. Shoshana Zuboff, in *The Age of Surveillance Capitalism*, warns that humans are now the "raw materials" mined for digital profit. While oil polluted air and oceans, data can pollute truth and privacy.

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Still, even these ethical challenges only confirm data's supremacy & it is shaping not only economics but human consciousness itself.

In conclusion, data is far greater than oil because it is renewable, limitless, and central to every aspect of modern existence. Oil built the industrial age; data is building the cognitive age. The nations that once thrived on oil wealth are being replaced by those that master information. The 20th century ran on fuel; The 21st century runs on insight.

Q2:6 The Expanding of Universe and the balloon Analogy

1. Introduction:

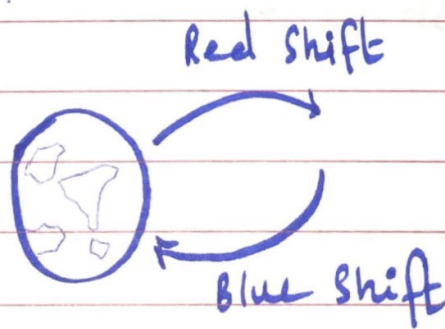
One of the most fascinating discoveries in modern science is that the universe is expanding. This means that galaxies are continuously moving away from one another as space itself stretches. The most effective way to visualize this process is through the balloon analogy, which demonstrates how expansion

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works without implying that galaxies are moving through space. Instead, space itself is expanding.

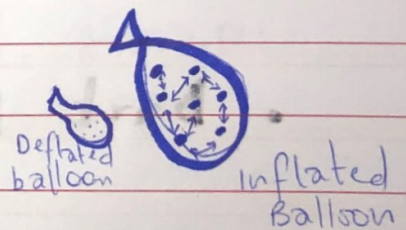
2. Hubble's Discovery and the Big Bang.

In 1929, Edwin Hubble observed that the light from distant galaxies is red shifted, meaning its wavelength is stretched towards the red end of the spectrum. The farther a galaxy is, the faster it appears to be moving away. A relation now known as the Big Bang, which occurred around 13.8 billion years ago when all matter and energy were compressed into a single dense point.



3. The Balloon Analogy Explained:

Imagine a balloon with small dots drawn on its surface. As the balloon inflates, the distance between the dots increases.



even though the dots remain in the same position. Similarly, in our universe, galaxies are not flying through space, rather the space between them is expanding. No point on the balloon's surface is the "center" of expansion; from every point, all others appear to move away. This perfectly mirrors the isotropic nature of the Universe; it looks the same in all directions.

4. Scientific Evidence:

Several scientific findings reinforce this analogy.

- **Red Shift of Galaxies:** confirms the continuous stretching of space
- **Cosmic Microwave Background:** discovered by Arno Penzias and Robert Wilson in 1965, is the afterglow of the Big Bang - evidence that the universe once existed in a hot, dense state.
- **Dark Energy:** discovered in the late 1990's, explains why this expansion is accelerating

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pushing galaxies apart faster than before.

Conclusion:

The expanding universe resembles an inflating balloon in both sides direction and scale. However unlike the balloon ^{expanding into air} the universe is expanding into nothingness, creating new space itself. This elegant analogy helps us visualize one of the most profound truths of modern physics, that creation is still unfolding.

(C) Balanced Diet and Vitamin Deficiencies:

Balanced Diet.

A balanced diet is one that provides all the essential nutrients - carbohydrates, proteins, fats ~~and~~, vitamins, minerals, fiber, and water in the right proportions for the body growth, repair, and energy needs. It keeps all organ systems functioning properly and prevents both deficiency and life-style related diseases.

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2. Importance of Nutrient Balance:

Every nutrient plays a unique role.

- Carbohydrates provide energy
- Proteins help in tissue repair and enzyme production
- Fat store energy and assist in vitamin absorption
- Vitamins and Minerals regulate metabolism and strengthen ~~imm~~ immunity. When any of these nutrients are deficient, the body's balance is disturbed, leading to health disorders.

3. Deficiency of Vitamin A, D, and E.

- Vitamin A Deficiency: leads to night blindness, dry eyes (xerophthalmia), and weak immunity. Vitamin A maintains healthy vision and epithelial tissues. It is found in carrots, liver, and eggs.
- Vitamin D Deficiency Causes rickets in children and osteomalacia in adults, leading to soft or weak bones. Vitamin D helps the body to absorb calcium and phosphorus and is produced when the skin is exposed to sunlight.

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Vitamin E Deficiency: Results in muscle-weakness, nerve damage, and poor immune response. Vitamin E is an antioxidant that protects cells from oxidative stress. It is abundant in nuts, seeds, and vegetable oils.

4. Health Imbalances and Consequences:

Deficiency of the vitamins can cause metabolic imbalances, weakening the body's ability to repair cells maintain bone density, and fight infections. Chronic deficiencies also increase vulnerability to degenerative diseases.

5. Conclusion:

A balanced diet is essential to maintain energy, immunity, and organ function. Including a variety of fruits, vegetables, grains, and proteins ensures that all vitamins especially A, D, and E are supplied in proper amounts. Since Science clearly shows that good nutrition is the first defence against diseases and the foundation of human life.

Q2 (d)

1. Global Positioning System.

GPS is a satellite-based navigation system that uses at least 24 satellites orbiting 20,200 km above Earth. Each satellite continuously transmits signals containing its position and the exact time. A GPS receiver on Earth calculates its distance from multiple satellites using the time delay of these signals.

2D and 3D locations:

For 2D location (longitude and latitude), signals from three satellites are required.

For 3D location (latitude, longitude, and altitude), the receiver needs data from four or more satellites, which allows it to determine elevation along with precise position and time.

This principle of trilateration enables applications in navigation, mapping, defense and disaster management.

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Fibre-Optic Communication:

Fiber optics transmits data as light pulses through thin glass fibres, based on total internal reflection, allowing signals to travel long distances with ~~min~~ minimal loss. Each fibre can carry terabits of data per second, forming backbone of high speed internet, telecommunication, and medical imaging system.

Conclusion:

GPS provides global precision, while fibre optics ensures fast, reliable data flow. Together, they represent the twin pillars of modern communication and connectivity.

Q6 (a)

Apple : Berry : Cherry : Date

3 : 6 : 2 : 5

Let the common multiplying factor be k

So

Apple = $3k$

Berry = $6k$

Cherry = $2k$

Date = $5k$

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Acc to the given condition
Apple exceeds date by 35

$$3k - 5k = -2k$$

$$-2k = -35$$

$$2k = 35$$

$$3\frac{5}{2} = 17.5$$

Berry ratio
 $6(k)$

$$6(17.5) = 105 \text{ candies}$$

105 Berry candies are in the packet

Q6(b)

Discount = 25% of 150

$$\frac{25}{100} \times 200 = 50$$

Actual Price = \$200

$$= \$200 - \$50$$

$$= \$150$$

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6% Sales Tax

$$\begin{array}{r} 6\% \text{ of } 150 \\ \underline{6} \times 150 \\ 150 \\ 21 \end{array}$$

$$3 \times 3 = 9$$

$$\text{Tax} = \$9$$

Total Price of Camera will be \$159

Q6: (C)

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

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

$$\text{Start time} = 1:00 \text{ pm}$$

$$\text{Time} = \frac{\text{Dis}}{\text{Time}} \quad \frac{s}{t}$$

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

Now

Add travel time to starting time

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$$\rightarrow 1:00 \text{ pm} + 2 \text{ hours} = 3:00 \text{ pm}$$

The bicycle will reach its destination
at 3:00 pm

Q6(d)

- (1) STATISTICS
- (2) ALGEBRA

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Q7 (b)

Possible outcomes when a dice is thrown

$$= \{1, 2, 3, 4, 5, 6\}$$

Total outcomes = 6

Even numbers = $\{2, 4, 6\}$

Greater than 4 = $\{5, 6\}$

$$\text{Probability} = \frac{\text{favourable outcome}}{\text{Total outcomes}}$$

$$P(\text{Even}) = \frac{3}{6} = \frac{1}{2} = 0.5$$

$$P(>4) = \frac{2}{6} = \frac{1}{3} = 0.33$$

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Q7 (a)

##

$$\text{Diameter} = 14 \text{ cm}$$

$$\text{Radius (r)} = \frac{14}{2} = 7 \text{ cm}$$

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

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

$$= \frac{4}{3} \times \frac{22}{7} \times 343$$

$$= \frac{4 \times 22 \times 49}{3} = \frac{4312}{3} \text{ cm}^3$$

$$V = 1437.33 \text{ cm}^3$$

(b)

$$1 + 2 + 3 + 4 + 5 = 15 \text{ parts}$$

$$\text{One part} = \frac{25000}{15} = 1666.67$$

$$\text{Smallest share} = 1 \times 1666.6$$

Answer

$$= 1666.6$$

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Q7(c)

(i) $2 \rightarrow 6 \rightarrow 18 \rightarrow 54 \rightarrow 162 \rightarrow 486$

All numbers are multiplied by 3 so correct.

The sequence is correct.

(ii) $3 \rightarrow 5 \rightarrow 7 \rightarrow 11 \rightarrow 13$

All are odd prime numbers

Q7(d)

$$(5)^2 + (12)^2 = 25 + 144 = 169 = 13^2$$

Right-Angled triangle.

~~Since~~ The right angle is opposite the 13cm side

$$\sin \theta = \frac{5}{13} = 22.6^\circ$$

$$\sin \theta = \frac{12}{13} = 67.38^\circ$$

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Answer :

22.6° , 67.4° & 90° .