

General Science and Ability

Q No. 2 (a)

Ans: Yes, I agree with the statement. In today's digital age, data has become an incredibly valuable asset, much like oil was in the industrial age. It drives economic growth, innovation, and decision making across the various sectors.

Streaming Services

Fitness Trackers
+ Smartwatches

↑ Data is the new oil
Ride sharing applications ←

Everyday Examples:-

1) Ride-sharing Application:- Companies like Uber and Lyft use real time data on driver locations, passenger requests, traffic knowledge, and surge pricing to efficiently connect drivers with riders like using Lyft services. These applications use data optimization which allows them to operate effectively and adapt to demand.

2) Fitness Trackers and Smartwatches:- Devices like Apple, Xosmi, and Fitbit watches collect data on your every step, monitor your heart rate, sleep patterns and blood pressure. This data helps people to monitor their health,

set goals. This pattern of data can be used for self-improvement and preventative healthcare.

3) Streaming Services:- Streaming services like Netflix and e-commerce sites like Amazon collect data on your viewing and purchasing habits. Afterwards use this data to recommend webseries, shows and products. In this way they keep you engaged and spending.

(B) Universe is expanding, how it resembles with balloon blowing in working?

Ans: The balloon analogy illustrates the expansion of the universe by representing the fabric of space itself as the surface of the inflating balloon and galaxies as dots on the surface. As the balloon is inflated, the dots on the surface move farther away from each other, but the dots itself do not expand.

Working → Hubble's Law + The expanding space.

→ Hubble's Law:- This law states that the recession speed of a galaxy is directly proportional to its distance from Earth.

Mathematically,

$$v = H_0 d$$

$\therefore v =$ Galaxy's recession velocity
 $H_0 =$ Hubble's constant
 $d =$ distance

Expansion of the universe:- This law provides evidence that the universe is expanding, as all distant galaxies are moving away from us, and the farther they are, the faster they move.

value of $H_0 = 70.6 \pm 3.1 \text{ Km/sec}$

(C) What do you mean by balanced diet? Deficiency of vitamins A, D, and E can result into what type of imbalances in human body?

Ans:- Balanced diet → A balanced diet is the type of diet that provides all the essential nutrients; Carbohydrates, proteins, fats, vitamins, minerals and water in the correct portions for the maintenance of good health, growth (proper), and provide energy without excess or deficiency.

Carbs ← Balanced Diet → Fats
Proteins ✓ Minerals
water → Vitamins

Deficiencies:-

1) Deficiency of Vitamin A → Night blindness

Deficiency of Vitamin A may lead to night blindness, and in severe cases, permanent blindness, and can lead to impair immune functions too.

2) Deficiency of Vitamin "D" →

Rickets

↳ Children

Osteomalacia

↳ Adults

→ Deficiency of Vitamin D leads to rickets in children and in adults it may result into Osteomalacia but it may also compact muscle strength.

3) Vitamin "E" deficiency — Neuropathy

→ Deficiency of Vitamin E leads to nerve damage and increased oxidative stress.

(D) GLOBAL POSITIONING SYSTEM:-

Global Positioning System is a satellite based navigation system that provides geolocation and time information to a GPS receiver anywhere on or near Earth.

Working → It is comprised of three segments. Satellite, Receiver and Trilateration. Satellite uses a conste-

lation of at least 24 operational satellites each satellite continuously transmits a radio signals. Receiver may include phone or the car which listen for those radio signals and calculate the distance by multiplying their distance by the speed of light. In the last, receiver uses trilateration to find its position.

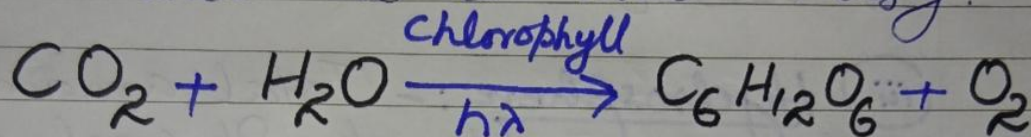
Fibre Optics:- Fibre optics is a technology that transmits information as the light passes through fibre. This method allows data to be transmitted at extremely high speeds and over much greater distances than tradition.

2D — To calculate a 2D position;
Latitude and Longitude

Q No. 4 (A)

CHLOROPLAST

Ans:- Chlorophyll is the primary pigment found in plant cells, algae, and in cyanobacteria and providing the site for photosynthesis in which light energy is converted into chemical energy.



Function:-

- to absorb the light energy
- It is located in the plant cells, embedded in the thylakoid membrane inside the chloroplast.

(B) Role of Ribosomes in Protein Synthesis:-

Ribosomes are the essential cellular organelles responsible for protein synthesis in the process called Translation. Ribosomes act as the machine that reads the codes carried by mRNA through transcription. Further, ribosomes unleash the amino acid sequence and produces the proteins by generating codes.

(D)

1) Biofuel - Fuel that is produced from biomass. It is considered a renewable energy source.

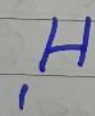
Examples:- Ethanol + Biodiesel. PAPERWORK

(ii) Adulteration:- Act of debasing the quality of food or drugs products by adding inferior or unwanted substances often to increase bulk, reduce cost, or mask poor quality. It can be harmful to health.

(iii) Hydrosphere:- Total amount of water on a planet. It includes all the water on, under, and over the surface of earth such as Oceans, seas, lakes, rivers, glaciers, ground water, and water vapours in the atmosphere.

(iv) Troposphere:- It is the lowest layer of Earth's atmosphere, estimatedly 8-15 km in altitude.

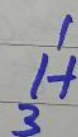
(v) Isotops:- Atoms of same element that have the same number of protons, but different number of neutrons.



Protium



Deuterium



Tritium

Part ii

Q No: 06

Ans:

(a) Let x be the common multiplier for the ratio. The number of candies

→

$$5x - 3x = 35$$

$$2x = 35$$

$$x = \frac{35}{2} = 17.5$$

→ Calculate the no. of berry candies

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

→ There are 105 berry candies. Ans

(B)

→ Calculate the discount = 25%

25% of 200

$$0.25 \times 200 = 50 \$$$

→ Calculate the price after discount →

$$50 - 200 = 150 \$$$

→ Calculate the Tax: 6% of 150

$$0.06 \times 150 = 9 \$$$

$$150 + 9 = 159 \$ \text{ Ans}$$

(C)

→ Calculate the time taken

$$T = \frac{S}{V}$$

$$T = 36 / 18$$

$T = 2 \text{ hrs}$, Now add this time,

$$1 \text{ pm} + 2 \text{ hrs} = 3 \text{ pm} \text{ Ans}$$

(D)

STSTAICITS → Statistics

LGEBMAR → Algebra

Q No: 7 (a)
Ans:.

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

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

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

$$V = \frac{88 \times 49}{3} = \frac{4312}{3} = 1437.33 \text{ cm}^3$$

Ans

(b)

$$\text{Total saving} = 20,000$$

$$\text{Ratio} = 1:2:2:3:4:5$$

$$\text{Sum} = 15$$

$$\frac{\text{Total Savings}}{\text{Sum of ratio}} = \frac{20000}{15} = 1333.33$$

Rs
Ann

(c)

(i) 2, 6, 18, 54, 162. 486.

(ii) 3, 5, 7, 11, 13, 17, 19

this is the series of prime numbers.
so the next prime numbers are 17
and 19.

(iii)

(D)

Date

Sides; $a = 5 \text{ cm}$

$$b = 12 \text{ cm}$$

$$c = 13 \text{ cm}$$

By using pythagorean theorem

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

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

$$25 + 144 = c^2$$

$$169 = c^2$$

By taken square root

$$13 \text{ cm}$$

$$\sin \alpha = \frac{a}{c} \sin^{-1}$$

$$\alpha = 22.62^\circ$$

$$\sin \beta = \frac{b}{c} = \frac{12}{13}$$

$$\beta = \sin^{-1} \frac{12}{13} = 67.38^\circ$$

$$90^\circ + 22.62^\circ + 67.38^\circ = 180^\circ \quad \text{Ans}$$