

Section I

(Q2) (Part A)

- oil is what drives & has been driving the machinery of the civilized world as the primary source of energy. Data can be considered the digital equivalent of oil, in the sense that it makes the digital mechanism run, without data, there can be no input to process & interpret by computers.
- The Recent AI revolution can be considered as on a metaphorical equivalent to the industrial revolution in the early 1800's. The industrial revolution increased the demand & consumption of data many fold. Similarly, the AI revolution has increased the demand & consumption of data by a tremendous amount.
- examples: 1) The Map & terrain data in online cab services like uber is as essential as the oil which runs the cab itself.
2). Artificial Intelligence models consume data to operate much like machines consume oil to do so.
3m). Data is Used to mine cryptocurrency much like oil is used to produce electricity.

(Q2 part b)

- The Universe has been expanding since the big bang. The big bang itself happened due to the rapid expansion or explosion.
- This expanding phenomena ~~can~~ has been studied by analyzing the red shift in the spectra of electromagnetic wavelength of distant galaxies & heavenly bodies.
- If dots are drawn on a balloon, & the balloon is inflated dots on the surface of the balloon move apart much like the galaxies in the universe, which are drifting apart due to the expansion of the universe.

(Q2 C)

- A balanced diet constitutes of all the necessary vitamins & minerals required for the proper working of our body, which itself is a chemically composed ~~carbon based~~ carbon based machine.
- Deficiency of vitamin A causes bad eyesight & night blindness.
- Deficiency of vitamin D causes our bones to weaken & may result in disease like rickets.
- Deficiency of Vitamin E causes muscle weakness & decreases our immunity.

Q2d)

- GPS consists of satellites, receivers & ground stations
- receiver calculates the position by measuring signals from satellites.
- calculating the difference in signal arrival time, it maps out latitude, longitude & even altitude.
- optical fibers carry data as light through glass fibres at light speed through total internal reflection.
- 2D location: Need 3 satellites for latitude & longitude
- 3D location, 4 satellites (latitude, longitude & even altitude).

Q3-A

- Cells form organelles to divide various functions & work efficiently amongst the various components.
- Mitochondria is the power house of the cell.
- It produces energy (ATP) through respiration

Q3-B

- ~~Add~~ Doping is the addition of different elements or impurities to semiconductors to change the conductivity of the material.
- types: N-type: Added impurity gives extra electron
P-type: added impurity creates electron h

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Q3C

- volcanic eruption. Destroys life & property, pollutes air, causes the climate to cool down drastically and contributes a tremendous amount to global warming.
- Its merits may include increase in soil fertility, can be used for geothermal energy.

(Q3D)

- dengue fever spreads via aedes mosquito.
- Causes High fever, body ache, rash and may also decrease platelets.
- Rest & Medication may alleviate the symptoms.

Section-II

(Q6) A

• Apple : Berry : cherry : Date
3 : 6 : 2 : 5

• Let the amount of each candy be determined by multiplying its ratio with x .

• so, Apple = $3x$, Berry = $6x$, cherry = $2x$, Date = x

• $5x - 3x = 35$, since Date candies exceed apple candies by 35.

• $x = 17.5$

• Berry = $17.5(6) = 105$ candies.

(Q6-B)

• Price = 200\$

• Discount = 25% = 50\$

• Discounted price = 150\$

• sales tax = 6% = 9\$

• total paid amount = 159\$

(Q6-C)

• speed = 18 km/h, distance = 36 km, starting time = 1 pm

• Bicycle arrives at 3 pm.

(Q6-D)

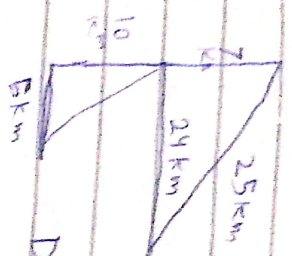
- (i) Statistics
- (ii) Grammar.

~~(Q7A)~~

(Q8A)

$$H^2 = 10^2 + 15^2 = \sqrt{576 + 49} = \sqrt{625} = 25$$

$$H = 25$$



Total distance travelled
 $= (24 + 25 + 7 + 1015) \text{ km}$
 $= 71 \text{ km}$

Distance from the start
 $= H^2 = \sqrt{150 + 25}$
 $= \sqrt{125}$
 $= 11.18$

Rough work:

$$11 \times 11 = 121, 11.5 \times 11.5 = 132.25$$

$$12 \times 12 = 144, 11.8 \times 11.8 = 127.69$$

$$11.2 \times 11.2 = 125.4, (11.18)^2 = 124.9 \approx 125$$

(Q8B)

Total = 9000\$, let $A = x, B = \frac{1}{2}x$

$B = 3C, \frac{1}{2}x = 3C, C = \frac{x}{6}$

$C = 4D, \frac{x}{6} = 4D, D = \frac{x}{24}$

$D = 2F, \frac{x}{24} = 2F, F = \frac{x}{48}$

total = $x + \frac{1}{2}x + \frac{x}{6} + \frac{x}{24} + \frac{x}{48} + \frac{x}{96} = 9000$

$= 48x + 24x + 8x + 2x + 2x = 9000$

$84x = 9000$

$x = 107.14$

Power Depreciation

$A = \frac{1}{2}B, B = 2x, C = 3C, C = \frac{2}{3}x$

$C = 4D, \frac{2}{3}x = 4D, D = \frac{x}{6}$

$D = 2F, \frac{x}{6} = 2F, F = \frac{x}{12}$

$x + 2x + \frac{2}{3}x + \frac{2}{12}x + \frac{2}{24}x + \frac{2}{48}x = 9000$

- $$24x + 48x + 16x + 4x + 8x = 9000 \times 24$$

$$100x = 9000 \times 24$$

$$x = 2250$$

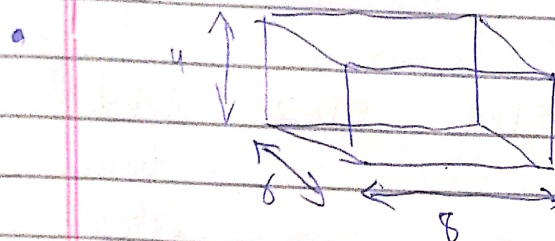
$$B = 2x = 4500, \quad C = \frac{2}{3}(2250) = 1500$$

$$D = \frac{2}{3}(2250) = 1500, \quad C = 4D, \quad D = 375$$

$$D = 2E, \quad E = 187.5 = F = 187.5$$

(Q8C)

- $$\text{Volume} = 192 \text{ m}^3$$



- $$\text{Surface Area} = (24 \times 2) + (48 \times 2) + (32 \times 2)$$

$$= (48 + 96 + 64) \text{ m}^2$$

$$= 208 \text{ m}^2$$

(Q8D)

- Family of 8 = 4 men, 4 women

- $$\text{Avg Consumption of Family} = \frac{122}{2} = 61 \text{ kg}$$

- After Anna joins Avg consumption = 67 kg

- $$\text{Consumption of family} = 288 + 200 = 488$$

- $$\text{Total consumption with Anna} = 67 \times 9 = 603$$

- $$\text{Consumption of Anna in kg} = 115 \text{ kg}$$