

Part - II

Section - I

Q. NO. 02

Answer (a)

Dengue:

Dengue is a mosquito borne viral disease, which widely spread throughout the tropics. Its spread increases with the temperature, humidity and rainfall.

Causative Agent:

Dengue virus is transmitted by female mosquito mainly of the specie *Aedes aegypti*.

Symptoms:

- (i) High fever (40°C / 104°F) usually accompanied by 2 of the following symptoms: severe headache, pain behind the eyes, muscle and joint pains, nausea, vomiting, swollen glands or rash.
- (ii) In case of severe Dengue:
Plasma leaking
Fluid accumulation

- Respirator Distress
- Severe Bleeding
- Organ impairment

(ii) Warning Signs:

- Decrease in temperature (below 38°C / 100°F)
- Severe abdominal pain
- Persistent vomiting
- Rapid Breathing
- Bleeding gums.
- Fatigue
- Restlessness
- Blood in vomit.

After the warning symptoms appear in the patient next 24 hours are lethal for him and proper medical attention is required to save his life -

Answer (ii)

Dark Energy:

- In 1929, Edward Hubble determined that the universe is expanding
- Due to the expansion in universe

empty spaces are created. Dark energy is some kind of energy intrinsic to these empty spaces.

Features of Dark Energy:

- (i) It makes up approximately 68% of the Universe and appears to be associated with the vacuum in space.
- (ii) It is evenly distributed throughout the universe.
- (iii) Evenly distribution means that it doesn't have local gravitational effect rather it has a global effect on the universe which leads to repulsive forces which tends to accelerate the expansion.

Ideas to explain Dark Energy:

- (i) Empty spaces has its own energy.
- (ii) Idea of Einstein in 1917, idea of cosmological constant, a force that counteract force of gravity.
- (iii) It is unknown kind of energy fluid or field.

Dark matter:

- Galaxies are rotating with such speed that the gravity generated by this observable matter couldn't possibly hold them together; they should have torn themselves long ago. This led scientists to believe that something we can't see at work.
- This led to thought that there is some extra mass which is providing additional gravity to hold these galaxies. This strange matter is named as Dark matter, yet not visible.

Features of Dark matter:

- Unlike normal matter, it doesn't interact with electromagnetic force.
- It doesn't absorb, emit or reflect sunlight.
- Scientists are able to infer its existence only by gravitational effect.
- Places with concentration of dark matter bend light passing nearby (interact with

gravity).

- It seems to outweigh visible matter by roughly 6 to one making up about 27% of the universe.

Answer (iii)

Structure of Mitochondria:

- The mitochondria may be vesicle rod or filament shaped.
- Bounded by two membranes.

Outer membrane

↓
smooth

Inner membrane

↓
Forms many infoldings called cristae.

↓
The inner structure of cristae contains small knob like structure called F_1 particles.

↓

These F_1 particles are suspended inside the matrix.

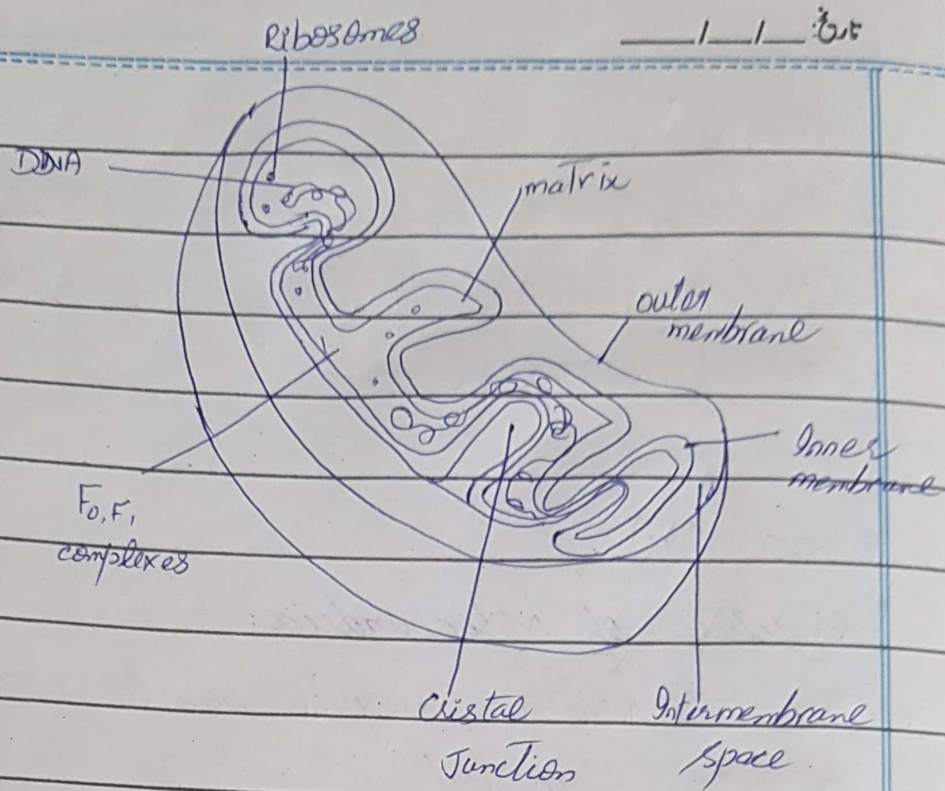


Fig: Structure of mitochondria

Functions of mitochondria:

- 1- Krebs cycle
 - 2- Aerobic respiration
 - 3- fatty acid metabolism.
- } metabolic processes

Mitochondria → Powerhouse of cell:

Mitochondria is one of the most important organelle of Eukaryotic cells. Energy is released from organic food during the metabolic processes taking place inside mitochondria. This energy is provided to energy rich compound

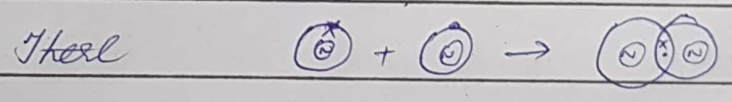
ATP. ATP provides energy to cell on demands and ATP is broken to ADP.

This ADP absorbs energy from mitochondria and again becomes ATP. This is how mitochondria works as the powerhouse of cell.

Answer (d).

Covalent Bonds :

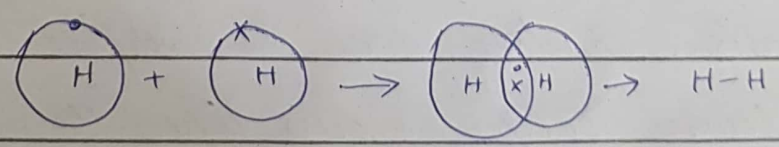
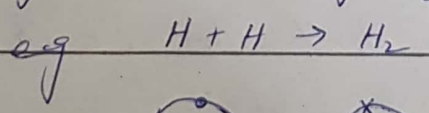
The bonds which are formed through ~~transfer~~^{sharing} of electrons is known as covalent bond.



Types of covalent bonds:

① Single covalent bond:

When a covalent bond is formed by the sharing of single pair of electrons

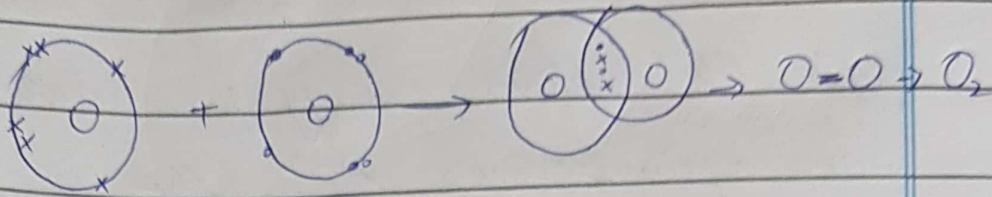


② Double Covalent Bond:

When a covalent bond is formed

by sharing of two pair of electrons

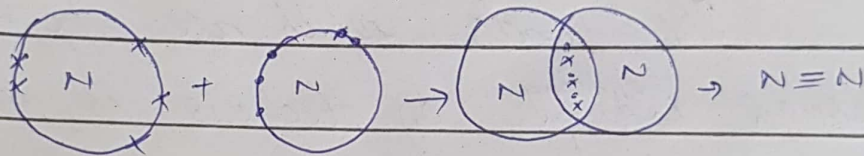
eg



③ Triple covalent bond: $(x \equiv x)$

Molecules can be formed by sharing of three pair of electrons.

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Question : NO. 03

Answer : a

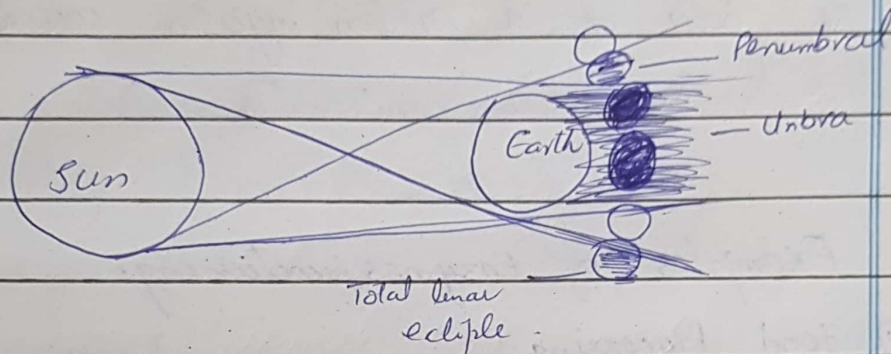
Lunar Eclipse:

Lunar Eclipse takes place when earth comes between moon and sun. Earth casts shadow over the surface of moon.

Lunar Eclipse occurs when the moon is full.

Types of Lunar Eclipse:

- ① Total Lunar Eclipse
- ② Partial Lunar Eclipse
- ③ Penumbral Lunar Eclipse



Answer (b)

Function Enzymes:

"Enzyme is specialized organic structure substance, composed of polymers of amino acids that act as catalysts to regulate the speed of the many chemical reactions involved in the metabolism of living organisms".

Junctions of Enzymes:

- 1) Play vital role in signal transduction and cell regulation.
- 2) Breakdown nutrients into useable molecules.

- 3) Store and release energy (ATP)
- 4) Coordinate biological reactions between different systems in an organism.
- 5) They take part in bodily movement with the help of a protein myosin which aids in muscle contraction.

Examples of Enzymes functioning:

① Food Processing:

Amylases enzymes are used in production of sugars from starch in making corn syrup. Catalyze Enzyme is used in breakdown of starch into sugar and in baking fermentation process of yeast raises the dough.

Proteases Enzyme: helps in manufacturing of biscuits and in lowering the protein level.

Trypsin Enzyme: used in the body baby foods used ~~on~~ for pre-digestion of baby foods.

Answer (iii)

Electromagnetic Radiations:

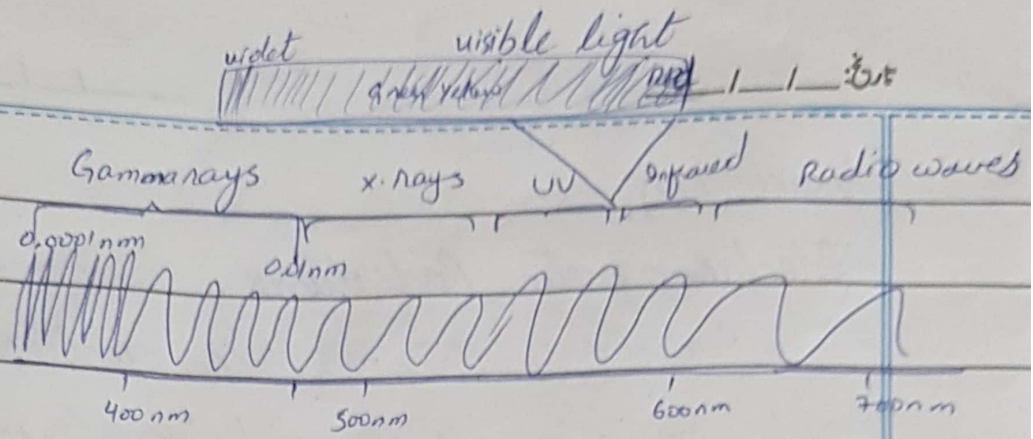
Radiations that has both electric and magnetic fields and travels in waves.

Electromagnetic Radiations can vary in strength from low energy to high energy. It includes radio waves, microwaves, infrared light, visible light, ultraviolet light, x-rays and gamma rays.

EMR Spectrum:

The EMR spectrum is a range of frequencies, wavelengths and photon energies covering frequencies from below 1 hertz to above 10^{25} Hz, corresponding to the wavelengths which are a few kilometers to a fraction of a size of an atomic nucleus in the spectrum of electromagnetic waves.

The electromagnetic spectrum consists of a span of all electromagnetic radiations



Answer (iv)

Earth quakes and volcanic eruptions are interconnected.

Earthquakes occur due to the movement of tectonic plates. It happens when the energy is released in the form of seismic waves that results in vibrations over the surface of earth.

Inside the earth molten rocks are present in the form of lava. Large amount of energy is trapped in it. And when this energy is released along the fault lines over the earth's surface sometimes lava protrudes out from these fault lines.

Ans(c)

Given Two coins are tossed 500 times

Two head = 105 Times

One head = 275 Times

NO head = 120 Times

To find:

Probability of each event to occur = ?

Soln:

$$\text{Prob}(E) = \frac{\text{No of ways of occurrence of an Event}}{\text{Total possible Outcomes}}$$

$$\text{Prob}(\text{Two heads}) = \frac{105}{500} = \frac{21}{100}$$

$$\text{Prob}(\text{one head}) = \frac{275}{500} = \frac{11}{20}$$

$$\text{Prob}(\text{one head}) = \frac{11}{20}$$

$$\text{Prob}(\text{NO head}) = \frac{120}{500} = \frac{6}{25}$$

$$\text{Prob}(\text{NO head}) = \frac{6}{25}$$

Ans (d)

let age of Jamie = x

• age of Jamie's Dad = $4x$

After 14 years

Jamie age = ~~$4x$~~ $14+x$

Age of Jamie Dad = $2(14+y)$

To find :

Sum of Jamie's age now and Jamie's Dad age now = ?

Soln:

$$14+x = 2(14+y)$$

$$14+x = 28 + 2y$$

$$x - 2y = 28 - 14$$

$$-x = 14$$

→ According to 1st condition Jamie's Dad is 4 times older than Jamie:

$$4x = y$$

In 14 years time, Jamie's Dad will be twice the age of Jamie.

$$x + 14 = 2(y + 14)$$

$$x + 14 = 2y + 28$$

$$x - 2y = 28 - 14$$

$$\boxed{x - 2y = 14}$$

Section - II

Q. NO. 07

Answer (a)

$$20\% \text{ of } x = y$$

$$\frac{20}{100} x = y$$

$$\frac{1}{5} x = y$$

$$x = 5y$$

$$y\% \text{ of } 20 = x$$

As $\frac{y}{100} \times 20 = x$

$$\frac{y \times 20}{100} = x$$

$$y = x\%$$

Answer (b)

$$\frac{5050}{2} = P + Q$$

monthly salary of P = ?

$$\frac{Q + R}{2} = 6250$$

$$\frac{P + R}{2} = 5200$$

$$P + Q = 215050$$

$$= 10100$$

$$Q + R = 26250$$

$$= 12500$$

$$P + R = 25200$$

$$= 10400$$

Monthly salary of P = ?

$$P = ~~10100 - Q~~$$

$$P + Q - (Q + R) = 10100 - 12500$$

$$P + \cancel{Q} - \cancel{Q} - R = 2400$$

$$\boxed{P - R = 2400}$$

$$P - R + P + R = 2400 + 10400$$

$$2P = 12800$$

$$\boxed{P = 6,400}$$

⇒ Monthly salary of P is 6,400

$$4x - y = 0 \quad \text{--- (i)}$$

$$4(x - 2y = 14)$$

$$4x - 8y = 56 \quad \text{--- (ii)}$$

subtracting eq (ii) from (i)

$$4x - y = 0$$

$$+ 4x - 8y = 56$$

$$7y = 56$$

$$\boxed{y = 8}$$

$$4x - y = 0$$

$$4x - 8 = 0$$

$$4x = 8$$

$$x = \frac{8}{4}$$

$$\boxed{x = 2}$$

⇒ sum of Age of Jamie & his Dad = $8 + 2$

$$= 10$$

Question No. 08

$$\text{charge} = £ 20 + 4x$$

$$n = 7$$

$$\text{charge} = £ 20 + 4(7)$$

$$= 20 + 28$$

$$\text{charge} = 48$$

→ Brian charged ₹ 48 from his customer

Ans (c)

$$\begin{array}{ccc} \text{L.H.S} & & \text{R.H.S} \\ (A \cup B)' & = & A' \cap B' \end{array}$$

$$A = \{10, 11, 12, 13, 15\}$$

$$B = \{10, 12, 14\}$$

$$U = \{10, 11, 12, 13, 14, 15, 16, 18\}$$

L.H.S

$$(A \cup B)'$$

$$(A \cup B) = \{10, 11, 12, 13, 15\} \cup \{10, 12, 14\}$$

$$= \{10, 11, 12, 13, 14, 15\}$$

$$(A \cup B)' = U - (A \cup B)$$

$$= \{10, 11, 12, 13, 14, 15, 16, 18\} - \left\{ \begin{array}{l} 10, 11, 12, 13, \\ 14, 15 \end{array} \right\}$$

$$= \{16, 18\}$$

R.H.S

$$A' = U - A$$

$$= \{10, 11, 12, 13, 14, 15, 16, 18\} - \{10, 11, 12, 13, 15\}$$

$$= \{14, 16, 18\}$$

$$B' = U - B$$

$$= \{10, 11, 12, 13, 14, 15, 16, 18\} - \{10, 12, 14\}$$

$$= \{11, 13, 15, 16, 18\}$$

(19)

$$A' \cap B' = \{14, 16, 18\} \cap \{11, 13, 15, 16, 18\} \\ = \{16, 18\}$$

Hence it is proved that L.H.S = R.H.S

$$(A \cup B)' = A' \cap B'$$

Ans: d

No. of triangles = ~~24~~ 20