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Q2a What causes a cyclone in which parts of cyclone winds are strongest and destructive
Cyclone

It is a system of rotating winds around a low pressure core due to pressure gradient and Coriolis effect of spin motion of the Earth.

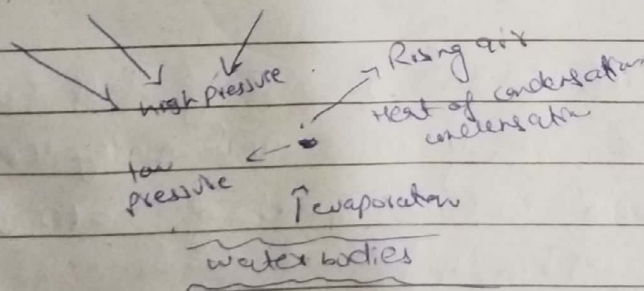
Causes of formation of cyclone

Two major factors play role in formation of cyclone

- i) Pressure Gradient
- ii) Coriolis effect

Pressure Gradient

Water is evaporating from water body all the time. This gas at certain height liquify which is called as condensation. Heat released during condensation is called as heat of condensation. Air surrounding this heat rise. The place from where air rises has less pressure. Air surrounding this having high pressure moves towards that low pressure.

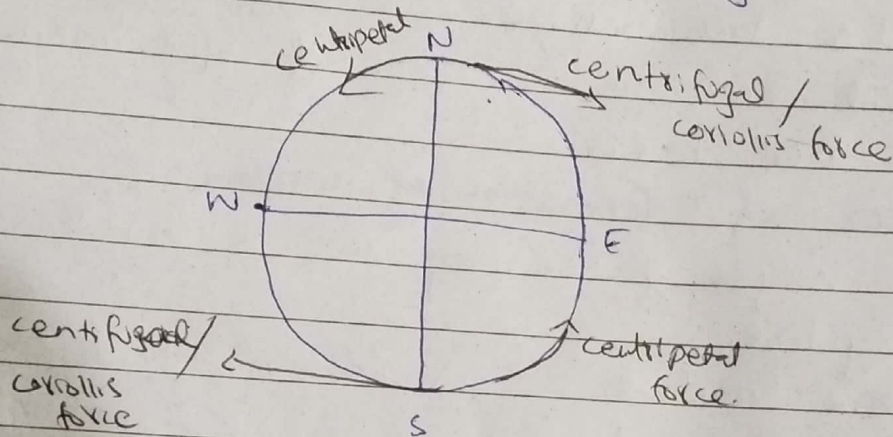


Coriolis force: A force which tends to move the objects to the right in northern hemisphere and to the left in southern hemisphere, due to spin motion of the Earth.

Origin of coriolis force

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The force due to moving frame on moving object is called as Coriolis force. Coriolis force is analogous to that of centrifugal force. Centrifugal force is reaction of centripetal force.



When this Coriolis effect of spin motion of Earth is coupled with ~~pressure~~ pressure gradient then the resulting phenomenon is termed as **Cyclone**.

Regions of cyclone:

- i) Eye
- ii) eye wall
- iii) Ring shaped region

The eyewall consists of ring of tall thunderstorms that produce heavy rains and usually the strongest winds with a speed of around 74 mph (119 km/h)

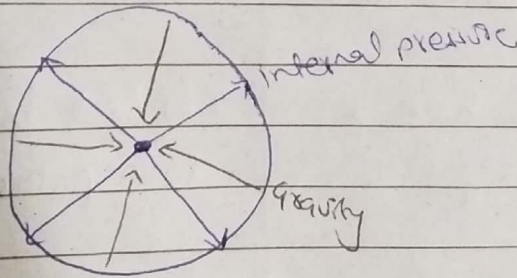
Changes in the structure of the eye and eyewall can cause changes in the wind speed which is ~~the~~ an indicator of the storm's intensity.

Q2 b What is a black hole and how it is formed
Black hole:

An object of extreme density and very strong gravitational pull. even light cannot escape from it.

Formation of Black hole:

Scientists think that the smallest black holes formed when the universe began - Stellar black holes are made when the centre of a very big star falls in upon itself & collapses. When this happens, it causes a supernova. A supernova is an exploding star that blasts part of the star into space. Scientists think supermassive black holes were made at the same time as the galaxy they are in.



Star is maintained until there is a balance between internal pressure and gravity i.e. equal and opposite.

Star collapse when there is imbalance when hydrogen combine with hydrogen to form helium but helium is not most stable. - 4 will go more toward stable state. Iron is considered most stable.

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Star - Fusion reaction slows down and internal pressure is decreased. But gravity is not decreased so star will collapse toward centre because gravity is more than internal pressure. Star collapsed to small volume - Density increase and it result in Black hole.

d. Distinguish ionic and covalent bonds with examples

Ionic Bonds

Definition

A chemical bond which is formed by the complete transfer of electron from one atom to another atom is called as ionic bond.

Ionic bonds have a high polarity.

Ionic bond is non-directional.

Ionic bonds occur through the interaction of cations and anions.

Metallic elements tend to form ionic bonds.

Covalent Bonds

A chemical bond which is formed by the mutual sharing of electrons between the atoms is called as covalent bond.

Covalent bonds have a low polarity.

Covalent bond is directional.

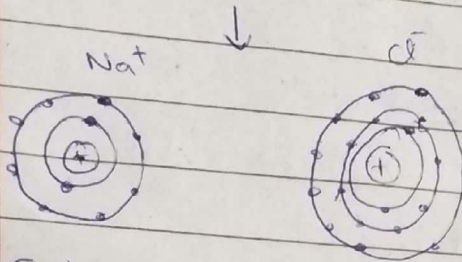
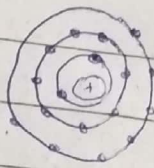
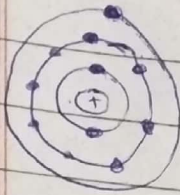
Covalent bonds occur through the interaction of neutral atoms.

Non metallic elements tend to form covalent bonds.

Example Ionic bond

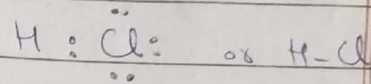
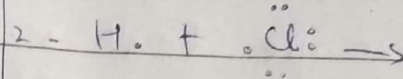
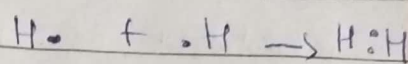
Na
Z=11

Cl
Z=17



Sodium with atomic number 11 will contribute 1 electron to Cl with atomic number 17. Sodium^{ion} will gain positive charge and chloride ion will get negative charge. Because opposite charges attract, the atoms bond together to form a molecule.

Covalent bond



In these types of bonds there is sharing of a pair of valence electrons.

Q2 c Discuss the rotation and revolution of Earth and its structural parts.

Rotation of Earth

Rotation of Earth is defined as spinning motion of Earth about its own axis.

Example: Earth rotates on its own axis, producing the 24-hour day.

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Revolution of Earth

Revolution of Earth is defined as orbital motion of Earth around the Sun.

Example: Earth revolves about the Sun, producing the 365-day year.

Structural parts of Earth

Earth is almost a sphere. It has three main layers.

- i) Earth Crust
- ii) Mantle
- iii) Core

Earth Crust: It is the top most layer on which we live. It contains silicates. Its depth is ~~approx~~ around 70-80 km. Below Earth crust there is mantle.

Mantle: It also contains silicates but at high pressure. Its depth is approx. 2900 km. Lava and tectonic plates are present in mantle.

Core: It is the innermost layer. It contains metals. Its depth is approx. 6400 km. It is the hottest part of the Earth.

Q3 b

What is meant by Essential fats?
Write down different types of fat.

Essential Fats:

Essential fats are those Polyunsaturated fats that must be provided by foods because these cannot be synthesized in the body but they are necessary for health.

Types of fats

1) Saturated fat:

Saturated fat is solid at room temperature, which is why it is also known as 'solid fat'. It is mostly in animal foods, such as milk, cheese, and meat. Poultry and fish have less saturated fat than red meat. Saturated fat is also in tropical oils, such as coconut oil, palm oil, and cocoa butter. Foods made with butter, margarine or shortening (cakes, cookies, and other desserts) have a lot of saturated fat. Saturated fat can raise cholesterol. A healthy diet has less than 10% of daily calories from saturated fat.

2) Trans fat

This is a fat that has been changed by a process called hydrogenation. This process increases the shelf life of fat and makes the fat harder at room temperature. Harder fat makes crispier crackers and flakier pie crusts. Trans fat can raise cholesterol, so eat as little trans fat as possible.

It is present in

- Processed foods
- Snack foods, such as chips and crackers
- Some margarine and salad dressings
- Foods made with shortening and partially hydrogenated oils

Unsaturated fat.

Unsaturated fat is liquid at room temperature. It is mostly in oils from plants. If you eat unsaturated fat instead of saturated fat, it may help improve your cholesterol levels.

Monounsaturated fat and polyunsaturated fat are types of unsaturated fat.

Monounsaturated fat: This fat is in avocados, nuts, and vegetable oils, such as canola, olive, and peanut oils. Eating foods that are high in monounsaturated fats may help lower your 'bad' LDL cholesterol. Monounsaturated fats may also keep 'good' HDL cholesterol levels high. But eating more unsaturated fat without cutting back on saturated fat may not lower your cholesterol.

Polyunsaturated fat: This type of fat is mainly in vegetable oils such as sunflower, sesame, soybean, and corn oils. Polyunsaturated fat is also the main fat found in seafood. Eating polyunsaturated fat in place of saturated fat may lower LDL cholesterol. The two types of polyunsaturated fats are omega-3 and omega-6 fatty acids.

Omega-3 and omega-6 fatty acids: These are essential fatty acids. These are necessary for the body to function correctly. They make the compounds called eicosanoids which are important hormones that control the immune system, nervous system and other hormones.

Q3c Why mitochondria is called as Power house of the cell

Mitochondria is a double membrane-based semi-autonomous organelle present in the cytoplasm of the cell. Mitochondria have their own DNA. They are self-replicating bodies. They possess ribosomes. Mitochondria extract energy from food through cellular respiration. This energy is released in the form of Adenosine triphosphate (ATP) which is the energy currency of the cell. That is why mitochondria is known as power house of the cell.

Q3d food deterioration . .

Food adulteration refers to the process by which the quality or nature of a given food is reduced through addition of adulterants or removal of vital substance.

During food adulteration, small quantity of non-nutritious substances are added intentionally to improve the appearance, texture or storage properties of the food, which results in food deterioration.

Remedial measures:

a) There must be strict actions regarding the punishment for those who are

- involved in food adulteration -
- There should be consumer awareness programmes organized by holding exhibitions / seminars / training programs and publishing pamphlets.
 - There must be proper surveillance of the implementation of food law.
 - There should be periodical training programmes for senior officers / inspectors / Analysts for food safety.

SECTION - II

Q 6 (c)

BROTHER
Q D G S N Q A

SISTER
Q D S R H R

In 'BROTHER' letter preceding B is A and letter preceding R is Q - so they are written but starting from right to left - In the same way letter preceding S in 'SISTER' is R so it is written, here we will also write starting from right to left

Q 6 a 4, 18, 100, —, 294

4, 8, 100, 180, 294

$$2^3 - 2^2 = 4$$

$$3^3 - 3^2 = 18$$

$$5^3 - 5^2 = 100$$

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$$6^3 - 6^2 = 180$$

$$7^3 - 7^2 = 294$$

Q7 b If square of hypotenuse..

$$\text{Formula} = A^2 = B^2 + B^2$$

$$H^2 = B^2 + P^2$$

$$128 = 2B^2$$

$$\frac{128}{2} = B^2$$

$$64 = B^2$$

$$B = 8$$

$$B = 8$$

So, the length will be 8 cm.

Q7 c

Mode

It's a statistical term used to represent the most repeated value in the given data.

Example

2, 4, 6, 6, 8, 10, 12 Mode = 6

Median

It's a statistical term used to represent the mid value in the arranged data.

Example

2, 4, 6, 8, 10

Median is 6 in above example

Range

It is the difference of maximum and minimum value in the given data.

For example

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2, 4, 6, 8, 10, 12

$$\text{Range} = 12 - 2 = 10$$

IQ Intelligence Quotient

An IQ is a total score derived from a set of standardized tests or subtests designed to assess human intelligence

EQ Emotional Quotient

EQ is the ability to understand, use and manage your own emotions in positive ways to relieve stress, communicate effectively, overcome challenges, empathize with others and defuse conflict -

Q7 d

Solution

~~the~~ the height of building-1 = 34m

The height of 2nd building = 29m

Distance between the two buildings = 12m

As CDE is right angle triangle
so apply Pythagoras theorem

$$EC^2 = DC^2 + DE^2$$

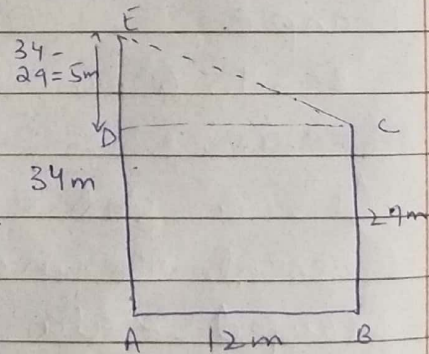
$$EC^2 = 12^2 + 5^2$$

$$= 144 + 25$$

$$\sqrt{EC^2} = \sqrt{169}$$

$$EC = 13m$$

So the difference between the top of two buildings is 13m -



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Q6 b

Tahir's capital = Rs 15,000
Umar's capital = Rs 30,000
Usman's capital = Rs 45,000
Total Profit = 406,000
15,000 : 30,000 : 45,000
1 : 2 : 3

Formula

Share = $\frac{\text{given ratio}}{\text{parts}}$ (what is to be distributed)

$$\text{Tahir's share} = \frac{1}{6} (406,000)$$
$$= 67,666 \text{ Rs}$$

$$\text{Umar's share} = \frac{2}{6} (406,000)$$
$$= \text{Rs } 135,333$$

$$\text{Usman's share} = \frac{3}{6} (406,000)$$
$$= 203,000 \text{ Rs}$$

Q6 d

Jogging track = 2000 meters

Aspirant covers = 25 %

How much track = ?

left to be covered

$$= \frac{25}{100} (2000)$$

$$= 500 \text{ m}$$

He has covered 500 meters

Track left to be covered = 2000 - 500

$$= 1500 \text{ meters}$$

Q7 (a)

Let father = y daughter = x

Age of a father after 5 years

$$y + 5 = 3(x + 5)$$

$$y + 5 = 3x + 15$$

$$y - 3x = 15 - 5$$

$$y - 3x = 10 \quad \text{--- (1)}$$

father's present age = $4y$

$$4y = x \quad \text{--- (2)}$$

$$y - 3x = 10$$

$$4y = x$$