Q a) What causes a cyclone? In which part of cyclone winds are the strongest and destructive? [4]
b) What is black hole and how is it formed? [4]
c) Discuss the rotation and revolution of the earth, and its structural parts [4]
d) Distinguish ionic and covalent bonds with examples [4]

a) Cyclones are formed through complex process of atmospheric conditions and factors such as warm ocean waters, moisture, pressure gradient, coriolis effect. Cyclones are formed over disturbances that might occur over warm ~~water~~ ocean water. The disturbance could be a ~~tower~~ low pressure area or tropical wave. The warm, moist air rises from the surface of earth and then condenses to form clouds. These clouds grow larger as more moist air is drawn into the disturbance. The coriolis effect, caused by the rotation of earth, causes the wind in the atmosphere to rotate around the center of the disturbance. This creates a spinning motion that gets stronger as more moist air is drawn in, causing a pressure drop in the center. The spinning motion ~~continues~~ continues to get bigger and stronger, eventually leading to the formation of cyclone. The structure of cyclones comprises of the following 3 parts

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1) Eye: Center most part of the cyclone. This part has the lowest pressure.
2) Eye-wall: This part surrounds the eye and has a radius ranging from 15 - 30 Km.
3) Ring shape region: This is the outer most part of the cyclone.

Keep the paragraphs short. First one is lengthy.

Text

Attempt a 5 marks GSA question on 2 sides of a page on average.

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The winds as the most destructive and strongest in the center of the cyclone. This part is called the 'Eye' of the cyclone.

b). What is a black hole.

Black holes are regions in space that have such an extremely strong gravitational force that even the light cannot escape. They are formed when massive stars die and their core collapses under its own gravitational force. The collapse creates a singularity with infinite density and zero volume.

Formation of black holes:

The formation of black hole occurs when a massive star collapses at the end of its life. When a star runs out of fuel, it can no longer produce heat or light that are essential to counteract the gravity force that is pulling inwards. As a result, the star collapses under under its own weight creating a shock wave that blows the outer layer in a super nova explosion. In the ..... , the gravity force overcomes all other forces causing it to collapse into a single singularity.

Add more detail and subdivide your arguments.

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C) 1) Earth:
Earth is the third planet from the Sun in the galaxy called milky way. Earth has a mass of 6×10^{24} Kg and the strength of its gravitational force is $9.81 \, m/s^2$

2) Movement of earth: The movement of earth consists of two motions, orbital and Spin motion.

2.1) Orbital motion: This type of movement is also called revolution. In this type of movement, the earth moves around the Sun. This type of movement is associated with seasonal changes. It takes 365.25 days for the earth to complete this orbit.

2.2) Spin motion: This type of movement is also called rotation, and refers to the rotation of earth around its own axis. This type of movement causes change of day and night. It takes 23 hours, 56 minutes and 4.1 seconds for earth to complete one full rotation.

3) Structure of Earth: the shape of the earth is like a boiled egg, and it comprises of 3 parts, core, mantle and crust.

3.1) Core: This is the inner most part of the earth and is composed of metals [molten]. It extends till the depth of 2900 Km.

Draw the figures if rotation and revolution of earth.

Short and incomplete answer.

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3.2) Mantle: this is the layer that lies beneath the crust. This is the largest layer and makes 84% of earth's volume. It reaches till the depth of 2900 Km and mostly consists of silicates at high pressure.

3.3) Crust: This is the outer most layer of the earth. It consists of silicates and reaches the depth of 70 Km.

1) 1) Bonds:

Atoms need to make bonds with other atoms in order to stabilise. For atoms to achieve stability they must have 8 electrons in their outer most shell unless its their shell in which case they only require 2 electrons. To attain the desired number of electrons to become stable, atoms form bonds where they share, lose or gain electrons.

2) Ionic Bond: This is a type of chemical bond where an atom completely transfers an electron to another atom, so that both can become stable.

Example: NaCl -> Table salt

Na has 1 electron in its outer most shell, where as Cl has 7. For Na to reach stability it must dispose of the one electron it has in its outer most shell, and Cl needs one more electron to become stable. Therfore, Na tranfers one electron to Cl and as a result an Ionic bond is formed.

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3) Covalent Bond: This is a type of chemical Bond in which both the atoms mutually share electrons inorder to become stable.

Example: Water Molecule → H_2O

The formation of water molecule consists of one Oxygen atom and two Hydrogen atoms. The two hydrogen atoms have one electron in their ~~first~~ outer most shell. Since their outer most shell is the first shell, they both require one electron each to stabilise. The oxygen atom contains 6 electrons in its outer most shell and requires 2 electrons to become stable. Hence, these atoms mutually share electrons, where the two hydrogen atoms share their only electron with the oxygen atom and in return the oxygen atoms shares one electron with each hydrogen atom.

Draw the structure of examples showing the bonds.

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