Gas atoms and molecules in the exosphere move along **"ballistic trajectories"**, reminiscent of the arcing flight of a **thrown ball (or shot cannonball)**, as it gradually curves back towards Earth under the pull of gravity. Most gas particles in the exosphere zoom along curved paths without ever hitting another atom or molecule, eventually arching **back down into the lower atmosphere due to the pull of gravity**.

Statement 2 is correct. : At this distance, radiation pressure from sunlight exerts more force on hydrogen atoms than does the pull of Earth's gravity. A **faint glow of ultraviolet radiation scattered by hydrogen atoms** in the uppermost atmosphere has been detected at **heights of 100,000 km** (62,000 miles) by satellites. This **region of UV glow** is called the **geocorona.**

Statement 3 is correct. Although the exosphere is technically part of Earth's atmosphere, in many ways it is part of outer space. Many satellites, including the **International Space Station (ISS)**, **orbit within the exosphere or below**. The **ISS loses about 2 km (1.2 miles)** in altitude each month to such **"orbital decay",** and must periodically be given an upward boost by rocket engines to keep it in orbit.

Q.31) Ans: b
Exp:
Option 1 is incorrect: Revolution of the earth around the Sun is not responsible for the variations in insolation at the surface of the Earth.

Variability of Insolation at the Surface of the Earth:

- The amount and the intensity of insolation vary during a day, in a season, and in a year.
- The factors that cause these variations in insolation are:
    - The **rotation of the earth** on its axis
    - The **angle of inclination** of the **sun's rays**
    - The **length of the day**
    - The **transparency** of the **atmosphere**
    - The **configuration of land** in terms of its aspect.

Hence the correct option is b.

Q.32) Ans: c
Exp:
Statement 1 is correct. Jet streams are currents of air high above the Earth. They **move eastward at altitudes of about 8 to 15 kilometers** (5 to 9 miles). They **form where large temperature differences exist** in the atmosphere. The tropopause is one such spot. Jet streams are so fast and powerful that airplanes have difficulty flying against them. Pilots either fly with the jet stream or above it; they do not attempt to fly against it.

Statement 2 is correct. An air current is a flowing movement of air within a larger body of air. Air currents flow in the atmosphere, the layers of air surrounding the Earth. They **form because the sun heats the Earth unevenly**. As the sun beams down on the Earth, it **warms some areas,** particularly the **tropics, more than others, such as the poles**. As the Earth is heated, it warms the air just above it. The warmed air expands and becomes lighter than the surrounding air. It rises, creating a warm air current. **Cooler, heavier air then pushes in to replace the warm air**, **forming a cool air current**. Jet streams are air currents in the highest part of the atmosphere.

Q.33) Ans: a
Exp:
Statement 1 is correct. Kelp forests are underwater areas with a high density of kelp. They are recognized as one of the **most productive and dynamic ecosystem**s on Earth. They occur worldwide throughout **temperate and polar coastal oceans**.

Statement 2 is incorrect. The **Photic Zone is a well-lit zone of oceans and highly productive**. This isn't necessarily a problem for oceans away from deserts, e.g. the Arabian Sea near Western ghats.

Statement 3 is incorrect. A recent discovery to play a significant role in **oceanic primary production** is the **micronutrient iron**. This is used as a cofactor in enzymes involved in processes such as nitrate reduction and nitrogen fixation. A **major source of iron to the oceans** is dust from the **Earth's deserts,** picked up and delivered by the wind as **aeolian dust.** In regions of the ocean that are distant from deserts or that are not reached by dust-carrying winds (for example, the Southern and North Pacific ocean),