(SOLUTION) TEST - 7 (IPM 2022)

30. Correct Answer : B

Answer Justification :

Earth's magnetic field (and the surface magnetic field) is approximately a magnetic dipole, with the magnetic field S pole near the Earth's geographic north pole and the other magnetic field N pole near the Earth's geographic south pole. This makes the compass usable for navigation. **The cause of the field can be explained by dynamo theory.**

- A magnetic field extends infinitely, though it weakens with distance from its source.
- The Earth's magnetic field, also called the geomagnetic field, which effectively extends several tens of thousands of kilometres into space, forms the Earth's magnetosphere.
- **Earth is largely protected from the solar wind, a stream of energetic charged particles emanating from the Sun, by its magnetic field, which deflects most of the charged particles.**
- Some of the charged particles from the solar wind are trapped in the Van Allen radiation belt.
- A smaller number of particles from the solar wind manage to travel, as though on an electromagnetic energy transmission line, to the Earth's upper atmosphere and ionosphere in the auroral zones.
- The only time the solar wind is observable on the Earth is when it is strong enough to produce phenomena such as the aurora and geomagnetic storms.
- Bright auroras strongly heat the ionosphere, causing its plasma to expand into the magnetosphere, increasing the size of the plasma geosphere, and causing escape of atmospheric matter into the solar wind.
- Geomagnetic storms result when the pressure of plasmas contained inside the magnetosphere is sufficiently large to inflate and thereby distort the geomagnetic field.
- The solar wind is responsible for the overall shape of Earth's magnetosphere, and fluctuations in its speed, density, direction, and entrained magnetic field strongly affect Earth's local space environment.

https://web.ua.es/docivis/magnet/earths_magnetic_field2.html

31. Correct Answer : A

Answer Justification :

Isostasy (Greek isos “equal,” stasis “stand still”) is a term in geology, geophysics, and geodesy to describe the state of mass balance (equilibrium) between the Earth’s crust and upper mantle. It describes a condition to which the mantle tends to balance the mass of the crust in the absence of external forces.

- **The term *isostasy* was proposed in 1889 by the American geologist C. Dutton, but the first idea of mass balancing of the Earth’s upper layer goes back to Leonardo da Vinci (1452–1519).**
- The term means that the Earth’s topographic mass is balanced (mass conservation) in one way or another, so that at a certain depth the pressure is hydrostatic.
- *Isostasy* is an alternative view of Archimedes’ principle of hydrostatic equilibrium.
- Isostasy is a fundamental concept in the Geology.
- **It is the idea that the lighter crust must be floating on the denser underlying mantle.**
- It is invoked to explain how different topographic heights can exists on the Earth’s surface.
- Isostatic equilibrium is an ideal state where the crust and mantle would settle into in absence of disturbing forces.
- The waxing and waning of ice sheets, erosion, sedimentation, and extrusive volcanism are examples of processes that perturb isostasy.
- The physical properties of the lithosphere (the rocky shell that forms Earth’s exterior) are affected by the way the mantle and crust respond to these perturbations.
- Therefore, understanding the dynamics of isostasy helps us figure out more complex phenomena such as mountain building, sedimentary basin formation, the break-up of continents and the formation of new ocean basins.