



- 18) In order to stay over the same location on the Earth, a geostationary satellite must be directly above the
- Tropic of Cancer
 - Either North or South Pole
 - Equator
 - Tropic of Capricorn

Solution: c)

Most of the communication satellites today are placed in a geostationary orbit.

Geostationary satellites in orbits circle the Earth at the same rate as the Earth spins.

- The satellites are located near the equator since at this latitude there is a constant force of gravity from all directions. At other latitudes, the bulge at the centre of the Earth would pull the satellite down.

- 19) Consider the following statements regarding Gravitational waves (G-waves).

- G- Waves can pass through any intervening matter without being scattered significantly.
- They can be observed in the merger of two black holes.
- All movement of matter in space create G-waves that can be easily noticed by satellites.

Which of the above statements is/are correct?

- 1, 2
- 2, 3
- 3 only
- 2 only

Solution: a)

While light from distant stars may be blocked out by interstellar dust, gravitational waves will pass through essentially unimpeded. This feature allows G-Waves to carry information about astronomical phenomena never before observed by humans. With this detection we will be able to turn the Universe into our own laboratory.

Not all movements lead to massive or noticeable Gravitational waves.

- Two objects orbiting each other in a planar orbit such as a planet orbiting the Sun or a binary star system or the merging of two black holes will radiate Gravitational waves! But, if the objects are really small and their gravitational pull and the way they bend space-time curve is not significant, they won't create noticeable gravitational waves. It is extremely hard to track the G-waves of even big events like black hole formation.