Q.5) With reference to "Gravitational Wave", consider the following statements:

1. Albert Einstein predicted the existence of gravitational waves in 1916 in his general theory of relativity.
2. Pulsar Radio emission's study has confirmed the Einstein's Prediction.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 and 2

Q.5) Solution (c)

Basic Information:

Gravitational Wave

Gravitational waves are 'ripples' in space-time caused by some of the most violent and energetic processes in the Universe.

Albert Einstein predicted the existence of gravitational waves in 1916 in his general theory of relativity. Einstein's mathematics showed that massive accelerating objects (such as neutron stars or black holes orbiting each other) would disrupt space-time in such a way that 'waves' of undulating space-time would propagate in all directions away from the source. These cosmic ripples would travel at the speed of light, carrying with them information about their origins, as well as clues to the nature of gravity itself.

The strongest gravitational waves are produced by cataclysmic events such as colliding black holes, supernovae (massive stars exploding at the end of their lifetimes), and colliding neutron stars. Other waves are predicted to be caused by the rotation of neutron stars.

In year 1974, two astronomers using the Arecibo Radio Observatory in Puerto Rico discovered a binary pulsar, exactly the type of system that general relativity predicted should radiate gravitational waves (proved for first time.)

Since then, many astronomers have studied pulsar radio-emissions (pulsars are neutron stars that emit beams of radio waves) and found similar effects, further confirming the existence of gravitational waves.