LUMS SBASSE Scientific Aptitude Test

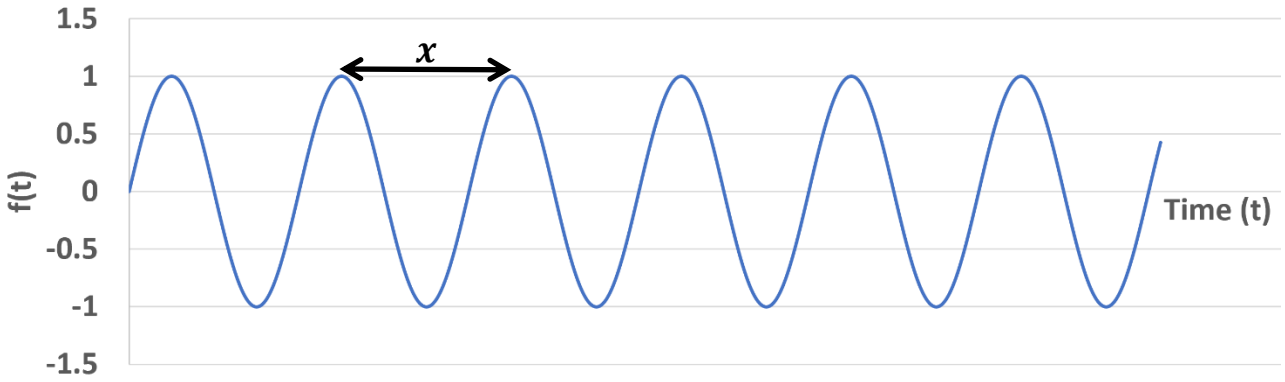
Sample Questions

1. The sum of the ages of Ahmad, Waqas and Jameel is 80 years. What was the sum of their ages three years ago?

A. 71 years
B. 72 years
C. 74 years
D. 77 years

Answer: A

2. In the graph below, x represents:



A. Time period
B. Twice the time period
C. Wavelength
D. Frequency

Answer: A

3. Satellite-based Global Positioning Systems (GPS) help to locate an object on the ground with an accuracy of a few centimeters. Which of the following applications is not suitable for GPS based localization?

A. Measuring the yearly drift of glaciers
B. Studying the movement of animals in a forest
C. Tracking a table tennis ball to support the referee for making decisions
D. Guiding robots on an agricultural field

Answer: C

4. Some people still believe that the Earth is a flat plane, and not a curved spherical body floating in space. Which of the following is not a good scientific argument to convince a non-believer that the Earth is indeed curved.

A. There are countless photographs of the Earth by astronauts and orbiting satellites that clearly show that the Earth is curved.
B. When the Earth passes between the Sun and the Moon to cast a shadow on the Moon, during a Lunar eclipse, the shadow is always circular.
C. If we travel South, some stars of the Northern night sky vanish while some new ones become visible that are not visible in the North.
D. The shadows become longer during Sunset and Sunrise, and the shortest when the Sun is directly above our location.

Answer: D

5. In the 19th century, Georg Cantor came up with a way to compare infinities. The set of all natural numbers, that is, 1, 2, 3, … , is, of course, infinitely big. Cantor decided to compare other infinite sets with this set of natural numbers. He wrote: “Two sets are equivalent … if it is possible to put them, by some law, in such a relation to one another that to every element of each one of them corresponds one and only one element of the other.” If this is the case, then we say that the two sets have the same cardinality. Given this, which of the following statements is true?

A. The cardinality of the set of all natural numbers and the set of all rational numbers is not the same.

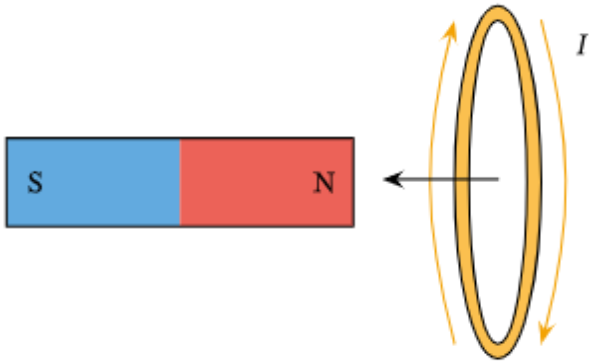
B. The cardinality of the set of all real numbers and the set of natural numbers is the same.

C. The cardinality of the set of all natural numbers and the set of all even numbers is the same.

D. None of the above

Answer: C

6. In the 19th century, Michael Faraday performed a series of landmark experiments that led to the widespread use of electricity in our everyday lives. In one experiment, he moved a loop of wire with constant velocity towards a magnet (see below), and he observed that a current flowed in the wire. This can be easily explained: as we move the loop of wire, we are also moving the charges in the loop (notably the electrons), and the magnetic field produced by the magnet then exerts a force on these charges, thereby setting up an electromotive force responsible for the flow of current.



However, if we analyze the same situation in the frame of the loop (imagine sitting on the loop), the loop is stationary, while the magnet moves towards the loop. Given this, which of the following statements is most likely to be true?

A. Analysing the situation in the frame of the loop is not valid. The two viewpoints are not equivalent; in one, the loop is moving, while in the other, the loop is stationary. Being at rest or in motion are obviously different things.
B. If we keep the loop stationary and move the magnet towards the loop, no current flows in the loop.
C. In the frame of the loop, the moving magnet can exert a magnetic force on the charges in the loop, which then redistribute themselves to produce an electromotive force.
D. In the frame of the loop, we see a changing magnetic field, which then sets up an electric field. This electric field is responsible for the electromotive force.

Answer: D

7. The antibiotic Cefaclor is used to treat a variety of infections. It is available in powder form, and one must add water to the powder (forming a suspension) before giving the antibiotic to the patient. The usual dosage in children is 20 mg/day/kg body weight in divided dose every 8 hours. You are supposed to administer Cefaclor to a child weighing 20 kg. If you add the correct amount of water, you end up with 60 ml of suspension, with every 5 ml containing 250 mg of the antibiotic. However, you accidentally add 80 ml instead. What is the dose you should give to the child with this prepared antibiotic after every eight hours (in ml)?

A. 2.5

B. 3.0

C. 3.5

D. 4.0

Answer: C