42 Lecture - PHY101

Important Mcqs

Which of the following is not a postulate of special relativity?

- a) The laws of physics are the same in all inertial frames of reference
- b) The speed of light in vacuum is the same in all inertial frames of reference
- c) The laws of physics are the same in all non-inertial frames of reference
- d) The principle of relativity

Answer: c) The laws of physics are the same in all non-inertial frames of reference

According to special relativity, which of the following is not an absolute quantity?

- a) Energy
- b) Momentum
- c) Velocity
- d) Mass

Answer: c) Velocity

In special relativity, the factor that relates time and space intervals between two events is known as:

- a) The speed of light
- b) The Lorentz factor
- c) The Doppler effect
- d) The Michelson-Morley factor

Answer: b) The Lorentz factor

What is the proper length of an object?

- a) The length of the object measured in its rest frame
- b) The length of the object measured in a moving frame of reference

c) The length of the object measured by an observer at rest relative to the object

d) The length of the object measured by an observer moving with the object

Answer: a) The length of the object measured in its rest frame

Which of the following statements is true regarding time dilation in special relativity?

a) Time dilation occurs only for objects moving at speeds close to the speed of light

b) Time dilation occurs for all objects in motion

c) Time dilation occurs only for objects at rest

d) Time dilation occurs only for objects in free fall

Answer: b) Time dilation occurs for all objects in motion

According to special relativity, the faster an object moves:

a) The slower its internal clocks run

b) The faster its internal clocks run

c) Its internal clocks do not change

d) None of the above

Answer: a) The slower its internal clocks run

In special relativity, the principle of causality is maintained by:

a) The relativity of simultaneity

b) The equivalence principle

c) The principle of least action

d) The principle of locality

Answer: a) The relativity of simultaneity

The twin paradox in special relativity involves:

a) Two twins who travel at different speeds and reunite to find that one has aged more than the other

b) Two twins who travel in opposite directions and reunite to find that they have aged the same amount

c) Two twins who travel at the same speed and age at the same rate

d) None of the above

Answer: a) Two twins who travel at different speeds and reunite to find that one has aged more than the other

According to special relativity, the mass of an object:

- a) Increases as its velocity increases
- b) Decreases as its velocity increases
- c) Remains constant regardless of its velocity
- d) None of the above

Answer: b) Decreases as its velocity increases

The formula E=mc² in special relativity relates:

- a) Energy and momentum
- b) Energy and mass
- c) Mass and momentum
- d) None of the above

Answer: b) Energy and mass